



Tłegóhłı́ ʔełets'éhkwę Godı
ʔekw'ó heots'edıgha go ʔeʔá, ʔehdagókégħa,
nek'e areyone gok'erek ó

NORMAN WELLS 2024 PUBLIC LISTENING SESSION –
INFORMATION REQUESTS

Environment and Climate Change
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Information Requests (IR)

Tłegóhłı 2024 Public Listening Session

What are the impacts of climate change in the Sahtú Settlement Area on caribou and caribou habitat?

The Sahtú Settlement Area (SSA) has a diversity of habitats, ranging from the Mackenzie Mountains in the west to southern Arctic tundra in the north and east, which supports three ecotypes of caribou (*Rangifer tarandus*): northern mountain, boreal, and barren-ground. Northern mountain caribou inhabit the mountainous western regions of the SSA and boreal caribou live in the lower elevation boreal forests of the taiga plains that make up the central portion and majority of the SSA. Barren-ground caribou are migratory; in the winter they are found in the boreal forests and tundra of the SSA east of the Mackenzie River.

Even though there are differences in the three types of caribou and their habitats in the SSA, climate change is a threat to all three (Singer & Lee 2021). Like much of the Northwest Territories (NWT), the SSA is expected to become warmer and drier with climate change, with longer growing seasons and, conversely, shorter and warmer winters. Precipitation is also predicted to increase, especially in mountainous areas, however, overall, most areas will still likely be drier due to increased evaporation. The magnitude of climate change and its impacts on caribou and their habitats in the SSA and across the NWT will depend on the amount of greenhouse gases emitted into the atmosphere globally and measures taken to reduce emissions over the coming decades.

One major impact of climate change on caribou is through direct and indirect changes to their habitats (reviewed in Mallory & Boyce 2018). Increased plant productivity in all three ecotypes' ranges due to warmer temperatures and longer growing seasons is one potential direct impact of climate change. Increased productivity could lead to increased food availability and time to forage, representing a potential positive impact of climate change on caribou. However, there could be negative effects for caribou if high quality summer forage is replaced with woody plants that are harder to digest or have less nutritional value. Shrubs are already expanding in areas of the tundra across the NWT which are home to barren-ground caribou (Dearborn & Danby 2022, Nill et al. 2022) and this expansion is predicted to continue (Liu et al. 2022).

Climate change may also impact caribou habitats indirectly through changing wildfire dynamics and permafrost conditions. Wildfires and permafrost are natural features that play a central role in shaping northern landscapes. However, warmer and drier conditions could lead to earlier and longer wildfire seasons as well as shorter time intervals between fires, which in some places is changing spruce-dominated forests to more mixed / broadleaf forests (Baltzer et al. 2021). More frequent and intense burns along with longer wildfire seasons is of particular concern for caribou which rely on lichen found in old growth forests for winter forage. Loss or degradation of permafrost layers under northern forests and tundra could alter vegetation communities through slumping or changes in water levels (van der Kolk et al. 2016), impacting the type and quality of caribou food and the energy required to move through the landscape (SARC 2012).

Climate change can also impact caribou through changes to parasites and disease (reviewed in Mallory & Boyce 2018). Warmer, drier conditions and longer growing seasons are expected to increase insect harassment, which can reduce the amount of time caribou spend eating. Less time spent eating can negatively impact the body condition of caribou and, ultimately, negatively affect their ability to reproduce and survive. For northern mountain caribou, the period of insect harassment will likely increase and they will be less able to escape insect harassment because the ice patches they rely on to escape insects are melting. There could be changes to the type, frequency and distribution of new or existing diseases and pests as other species (e.g., white-tailed deer, *Odocoileus virginianus*) expand their range or increase in numbers.

A third way climate change is likely to impact caribou populations is through changing snow and ice conditions (reviewed in Mallory & Boyce 2018). During winter, caribou must dig through snow to access their food, primarily lichen. Warmer temperatures during fall and winter plus the increased possibility of rain instead of snow may increase rain-on-snow events and freeze-thaw events, which make it more difficult and energetically costly for caribou to access food. These changes and earlier thawing in the spring and later freeze up in the fall could also alter caribou movements and their routes and increase the energy and food they need.

In summary, each of the three caribou ecotypes will experience unique impacts of climate change due to the differences in where and how they live, but they will all be impacted by climate change through changes to their habitat, pests and pathogens, and changing snow and ice conditions. Most climate change impacts are predicted to be negative but there is a lot of uncertainty about how caribou populations will do in the SSA overall, and responses of caribou and their habitats will probably differ across regions and local areas. For example, a study found that boreal caribou habitat may improve in some parts of the SSA over the next century (Stewart et al. 2023). A strong co-management system, less disturbance as well as local and regional differences in how caribou respond to climate change and potential areas of climatic refugia (areas where climate change may not be felt as strongly) give us reason to be optimistic about the future of caribou in the SSA.

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How are climate change plans or policies addressing caribou? Are other plans/policies anticipated?

The Government of the Northwest Territories (GNWT) have been planning and taking action to address climate change through [the 2030 NWT Climate Change Strategic Framework](#) and [2019-2023 Climate Change Action Plan](#). The action plan includes items that may impact caribou through various initiatives. ECC has also developed an Adapting Wildlife Conservation and Management to Climate Change Discussion Paper. This paper will go out for public engagement in 2024 and is an opportunity for co-management partners to share their thoughts and concerns around climate change and identify areas to improve on current strategies and management. Feedback on this paper will also be used in the development of the next Climate Change Action Plan.

Climate change can alter the distribution of vegetation, impact food availability, and affect predator-prey dynamics. Conservation efforts for wildlife often involve a combination of strategies to mitigate risks to populations. These strategies include:

Monitoring and Research: Ongoing monitoring and research initiatives are important so that we understand the specific challenges facing caribou. The GNWT Department of Environment and Climate Change (ECC) works with its co-management partners, external researchers and others to monitor caribou, their habitat and key factors and threats that may be affecting their status and health. This information helps everyone make wise management decisions for caribou.

Habitat Protection and Land-use Planning: Range planning efforts are currently underway for boreal and barren ground caribou to help decision-makers manage activities in a way that supports caribou conservation. The goal of these plans is to ensure healthy and sustainable caribou populations. These efforts will manage overall disturbance on caribou ranges and reduce

and manage impacts to caribou and caribou habitat.

Harvest Management: The impacts of harvest on caribou populations, no matter which type of caribou you are considering, depends on how large the harvest is in relation to population size and trend. Caribou harvest should:

- support the exercise of Aboriginal and treaty harvesting rights;
- support traditional values and practices;
- be sustainable, responsible and respectful;
- be accurately reported by all harvesters and communities;
- be managed collaboratively, fairly and consistently across areas;
- include appropriate enforcement mechanisms; and
- be adaptable and responsive to population rates and conservation concerns.

Indigenous Knowledge Integration: Indigenous communities play an integral role in co-management of wildlife in the NWT. Traditional knowledge about caribou and ecosystems is used along with available local and scientific knowledge to help inform collaborative decision-making. Climate change plans incorporate Indigenous knowledge to identify and understand climate change and inform management decisions as agreed upon with traditional knowledge holders and Indigenous governments and Indigenous organizations.

Carbon Emission Reduction: While not caribou-specific, efforts to reduce carbon emissions are fundamental in addressing climate change. The 2030 NWT Climate Change Strategic Framework first goal is transitioning to a lower carbon economy that uses less fossil fuel. Actions to achieve this goal are outlined in the 2030 Energy Strategy, which serves as the mechanism for reducing greenhouse gas emissions related to energy supply and consumption.

Education and Community Engagement: Education and knowledge sharing is pivotal in raising awareness about climate change and its impacts on caribou. Education is instrumental in promoting community engagement around the development and implementation of actions included in climate change plans and caribou conservation plans. ECC will continue to work with communities to provide input and guidance for the development of community-based monitoring programs and community conservation plans.

Partnerships and Collaboration: The GNWT collaborates with various organizations, including Indigenous governments, Indigenous organizations, renewable resources boards, academia, other provinces or territories, and federal agencies, to learn about and address climate change impacts on caribou. This collaborative approach ensures a coordinated effort in managing caribou populations and their habitats.

Climate-Resilience and Adaptation Strategies: ECC has undertaken engagement with Indigenous governments, Indigenous organizations, communities, Hunter and Trapper Committees and residents across the NWT in developing the ECC Sustainable Livelihoods Action Plan 2019-2023. During public engagement, ECC has heard about the challenges NWT communities are currently facing regarding changes to the country food system including changes to the landscape and

wildlife, including caribou, due to the impacts of climate change. ECC works with Indigenous governments and Indigenous organizations to promote alternative sources of country foods and provide services and support for traditional economies and land-based learning.

ECC would recommend the following documents as relevant for consideration by the Parties for the Public Listening.

- Overarching Strategies and Action Plans
 - [GNWT Sustainable Livelihoods Action Plan 2019-2023](#)
 - [2030 NWT Climate Change Strategic Framework](#)
 - [2030 NWT Climate Change Strategic Framework Action Plan 2019-2023](#)
 - [NWT Cumulative Impact Monitoring Program \(NWT CIMP\) Action Plan 2021-2025](#)
- Boreal Caribou
 - [Recovery Strategy for Boreal Caribou in the NWT](#)
 - [Boreal Caribou Status Report NWT 2022](#)
 - [Consensus Agreement Respecting Implementation of the Recovery Strategy for Boreal Caribou in the NWT](#)
 - [National Boreal Caribou Recovery Strategy](#)
 - [Framework for Boreal Caribou Range Planning](#)
 - [Boreal Caribou in the Wek'èezhii Region: Interim Range Plan \(2021\)](#)
- Barren-ground Caribou
 - [Recovery Strategy for Barren-ground Caribou in the NWT](#)
 - [Barren-ground Caribou Status Report NWT 2017](#)
 - [Consensus Agreement Respecting Implementation of the Recovery Strategy for Barren-ground Caribou in the NWT](#)
 - [Taking Care of Caribou – the Cape Bathurst, Bluenose-West, and Bluenose-East Barren-ground Caribou Herds Management Plan](#) and associated action plans
 - [GNWT and Tłjchǫ Government Joint Proposal on Management Actions for the Bluenose-East ʔekwǫ \(Barren-ground caribou\) 2022-2024](#)
- Northern Mountain Caribou
 - [Management plan for Northern Mountain Caribou in the NWT \(2023\)](#)
 - [Northern Mountain Caribou Status Report NWT 2020](#)
 - [Management Plan for the Northern Mountain Population of Woodland Caribou \(*Rangifer tarandus caribou*\) in Canada](#)

What programs or supports are available to communities for adaptation or mitigation measures related to climate change or wildfire impacts on caribou?

There are several funding opportunities and sources of information for communities who would like to propose actions to adapt or mitigate climate change or wildfire impacts to caribou. These include:

- The Northwest Territories Species Conservation and Recovery Fund supports projects to conserve, recover or protect species at risk of disappearing from the NWT. The deadline

to apply for funding this year is March 1, 2024. To learn more about the fund visit: www.nwt-species-at-risk.ca

- The Aboriginal Fund for Species at Risk (AFSAR) program facilitates active participation by Indigenous communities in the implementation of the Species at Risk Act (SARA). It invests in organizational capacity, encourages activities that conserve and/or recover community-led documentation and management of Indigenous Knowledge (IK). For more information visit: <https://www.canada.ca/en/environment-climate-change/services/environmental-funding/programs/aboriginal-fund-species-risk.html>
- [Agri-Food Funding](#) (provided by GNWT-ITI) to support community food productions and resilient agriculture.
- [Climate Change Preparedness for the North-Community Stream](#) (provided by CIRNAC)
- There are information tools to inform land-use planning and decision making:
 - Flood maps are currently being reviewed and re-evaluated for flood-prone communities (beginning with Fort Simpson, Hay River, and Aklavik)
 - Permafrost thaw sensitivity maps (ongoing)
- Climate Change Library to provide access to technical resources on climate change relevant to the North, including resources related to climate adaptation and caribou.
- The GNWT works with communities in the NWT to develop and implement Community Wildland Fire Protection Plans.
- An [announcement](#) in September 2022 showcased federal support for ten NWT projects to improve infrastructure and wildfire protection.
- The Indigenous community-Based Climate Monitoring Program provides \$6 million per year in contribution funding to support Indigenous Peoples in the design, implementation or expansion of community-based climate monitoring projects. Specifically, the program supports Indigenous-led projects that monitor climate and the environmental effects of climate change within community boundaries and on traditional territories using Indigenous Knowledge Systems and western science. For more information visit: <https://www.rcaanc-cirnac.gc.ca/eng/1509728370447/1594738205979>

What are the predicted impacts of climate change for this region?

The SSA is expected to experience significant impacts with climate change, including thawing permafrost and more frequent and larger forest fires. Increased forest fires were modelled in a recent [Cumulative Impacts Monitoring Program Research Project](#). This project suggested that boreal and northern mountain caribou are sensitive to predicted increased fire disturbance.

For Norman Wells, we expect conditions in the 2051 to 2080 time period (under the highest-emissions scenario – RCP8.5) to be warmer than current conditions (about 4°C warmer in summer and about 7°C warmer in winter) and wetter (about 7 cm more precipitation throughout the year). Warmer conditions will result in a shorter winter road season in the Sahtu. Future climate conditions can be compared to current conditions using Environment and Climate Change Canada's [Climate Change Summary for Norman Wells](#).

In the fall and spring, more precipitation will fall as rain than snow, leading to a reduced snowpack in the spring, which could lead to more frequent drought conditions. With increased precipitation and thawing, permafrost thaw slumps or landslides on hills containing permafrost will likely be more common, which could impact caribou habitat and lead to decreased water quality (more sediment in water) and fish.

Warmer conditions could lead to more mid-winter rainfall events, creating ice on snow that may make it harder for caribou to access food through the snow. However, a shorter winter period may also mean less food scarcity for caribou during the winter. Additionally, warmer conditions will lead to a later freeze-up and earlier thaw of the Mackenzie River. Mackenzie River water levels will likely be more variable due to higher variability in precipitation. With a longer ice-free summer, there will be more evaporation from Great Bear Lake, potentially leading to lower water levels.

As it gets warmer the tree line is predicted to move upward in elevation in the Mackenzie Mountains. By the end of the century, vegetation may change so that vegetation currently seen near the NWT-Alberta border becomes more common in the Sahtú. In the tundra east of Great Bear Lake we predict increasing shrubs. The increasing “shrubiness” of the tundra has been observed at the GNWT Daring Lake Research Station and by satellite observations of ground cover. As vegetation changes, we expect animals to move north resulting in species in the Sahtú that are more common in the southern NWT and northern Alberta.

What adaptations or mitigations need to be planned in response to the predicted impacts?

The GNWT is implementing the [2019-2023 Climate Change Action Plan](#). The GNWT is about to complete the first NWT Climate Risks and Opportunities Assessment (ROA) to identify the most concerning climate risks (and potential opportunities) to build a shared understanding of key climate adaptation priorities. Many jurisdictions in Canada have followed the same process to identify where efforts need to be focused. This document was developed through a two-year engagement process. The public summary report is scheduled to be available in Fall 2024. Wildfire has been identified as a key risk. The ROA will inform engagement on the 2019-2023 Climate Change Action Plan.

In addition, many GNWT departments are developing more detailed assessments to better identify impacts and prioritize actions.

- The GNWT collaborated closely with the NWT Climate Change Council and the Government of Yukon and Government of Nunavut, through the Pan-Territorial Adaptation Framework, to ensure that the National Adaptation Strategy (NAS) acknowledges the unique northern climate context. The Strategy was released by the federal government in June 2023.
- The GNWT is now working with other provinces on a Northern Approach to the implementation of the NAS to make sure funding and capacity to advance NWT climate adaptation priorities are available. The NWT Climate Change Council will inform opportunities for alignment in how the NAS is implemented in the NWT.

Does your government distinguish between the terms “wildfire” and “forest fire”? If so, does your government have internal policies or guides about when it is appropriate to use one term over the other?

The new *Forest Act* (2023) guides fire management in the NWT, and defines the term ‘wildfire’ as *any non-structural fire that occurs in a forest*.

ECC does not distinguish between Wildfire and Forest Fire. Both refer to any natural-caused or unplanned human-caused fire that is burning in and consuming natural fuels such as forest, brush, tundra, grass, etc.

ECC will continue to use the term wildfire to discuss fire prevention and suppression activities in the NWT. ECC will ensure the messaging is clearer and more consistent with the term wildfire.

Do you have modelling programs for future fires? If so, please describe how these models work.

ECC uses the Canadian Wildfire Behavior prediction system to model current fires. The system models fire forecasts based multiple sets of data including forest fuels, topography and weather into growth predictions for what the fire may do over a short period of time (1-3 days).

However, due to the modeling requirements it is difficult to predict future fires over longer periods of time. As you model further into the future, the predictions become more unreliable and uncertain.

Currently, external collaborators are investigating models that uses historical weather to predict longer term growth of a wildfire over several months. ECC will share this information if it becomes operationally available.

ECC does not have a computer modelling program for future fires however ECC does use models that predict the growth of fires that would start within a year. The primary fire behaviour prediction models that ECC uses in fire operations are Prometheus, Burn P3, PSaaS and Firecast.

Researchers are investigating what future fire regimes may look like based on climate change but these models have not been incorporated into current decision making tools..

What is the GNWT Climate Change Framework and what does it say about the role of ?ehdzo Got'ı ne Gots'ę' Nákedı (Sahtú Renewable Resources Board) / ?ehdzo Got'ı ne (Renewable Resource Councils) in the Framework?

Many partners, including Indigenous government, Indigenous organizations, academia, the GNWT, and industry partners, worked together to develop the [2030 NWT Climate Change Strategic Framework](#) (the “Framework”). The Framework outlines how the NWT plans to respond

to challenges and opportunities associated with a changing climate, moving towards an economy that is less dependent on fossil fuels, and helping to contribute to national and international efforts to address climate change. The Framework was developed at the same time as the [2030 Energy Strategy](#), which focuses on reducing greenhouse gas emissions. The Framework focuses on tracking and reporting progress on mitigating the impacts of climate change, and building resilience and adapting to a changing climate.

The Framework rests on several guiding principles that focus on:

- **Taking Action:** The substantial extent of climate change impacts has created an urgent need for action, and climate change needs to be considered in all relevant planning, decision-making and operations;
- **Meeting Climate Change Commitments:** The NWT has a responsibility to contribute to national and international efforts to address climate change, particularly in reducing fossil fuel use and GHG emissions;
- **Sharing responsibility:** All segments of NWT are responsible for taking action on climate change, including governments, businesses and residents;
- **Strong Collaboration:** Strengthening the collaboration between governments – including community and Indigenous governments, stakeholders and residents – on mitigation and adaptation actions, based on recognition of rights, respect, cooperation and partnership;
- **Respecting Aboriginal and Treaty Rights:** Climate change mitigation and adaptation decisions respect Aboriginal and Treaty rights, including land, resource and self-government agreements;
- **Traditional, Local and Scientific Knowledge:** Accessing all knowledge types to understand and make decisions related to climate impacts and adaptation measures; and
- **Transparency and Accountability:** Decisions made to implement the Framework are transparent and accountable.

To achieve its vision, the Framework focuses on three goals and two cross cutting themes:

- **Goal #1: Transition to a lower carbon economy:**
 - In order to transition to a lower carbon economy that uses less fossil fuel, NWT must reduce its greenhouse gas (GHG) emissions by 30% (compared to 2005) by 2030. Electricity generation, space heating, transportation, and industry are the main sectors for fossil fuel use and GHG emissions tracked in the NWT.
- **Goal #2: Improve knowledge of climate change impacts:**
 - Improving knowledge of climate change impacts occurring in the NWT is the second goal of the Framework. To address climate change, there is a need for greater understanding of the impacts to the natural environment, residents' health, safety, culture and heritage, and the territory's infrastructure. The integrated use and management of traditional, local and scientific knowledge to determine knowledge gaps, set and implement research and monitoring requirements, and obtain current and timely information, is essential.
- **Goal #3: Build resilience and adapt to a changing climate:**
 - Building resilience and adapting to a changing climate is the Framework's third goal. Building resilience focuses on finding ways to withstand the changes that

are occurring. For changes that are unavoidable, adaptation efforts are required to find new ways of doing things, such as adjusting plans and operational activities.

The two cross-cutting themes are focused on leadership, communication and capacity-building as well as understanding the economic impacts and opportunities resulting from climate change. They include actions applying to all three goals in the Framework.

The Ɂehdzo Got'ıne Gots'ę Nákedı (Sahtú Renewable Resources Board) was involved in the development of the Framework through broad public engagement and continues to be involved in climate change activities through the NWT Climate Change Council. Input on the vision and principles of the Framework was gathered at last summer's climate and energy gathering in Yellowknife. During an independent evaluation on the Framework and the [2019-2023 Action Plan](#) Indigenous governments and Indigenous organizations will be asked for their input through their Climate Change Council representatives. Public engagement on the upcoming NWT Climate Change Action Plan will take place in Summer/Fall 2024.

