

Monitoring and Research Results 2016-2020

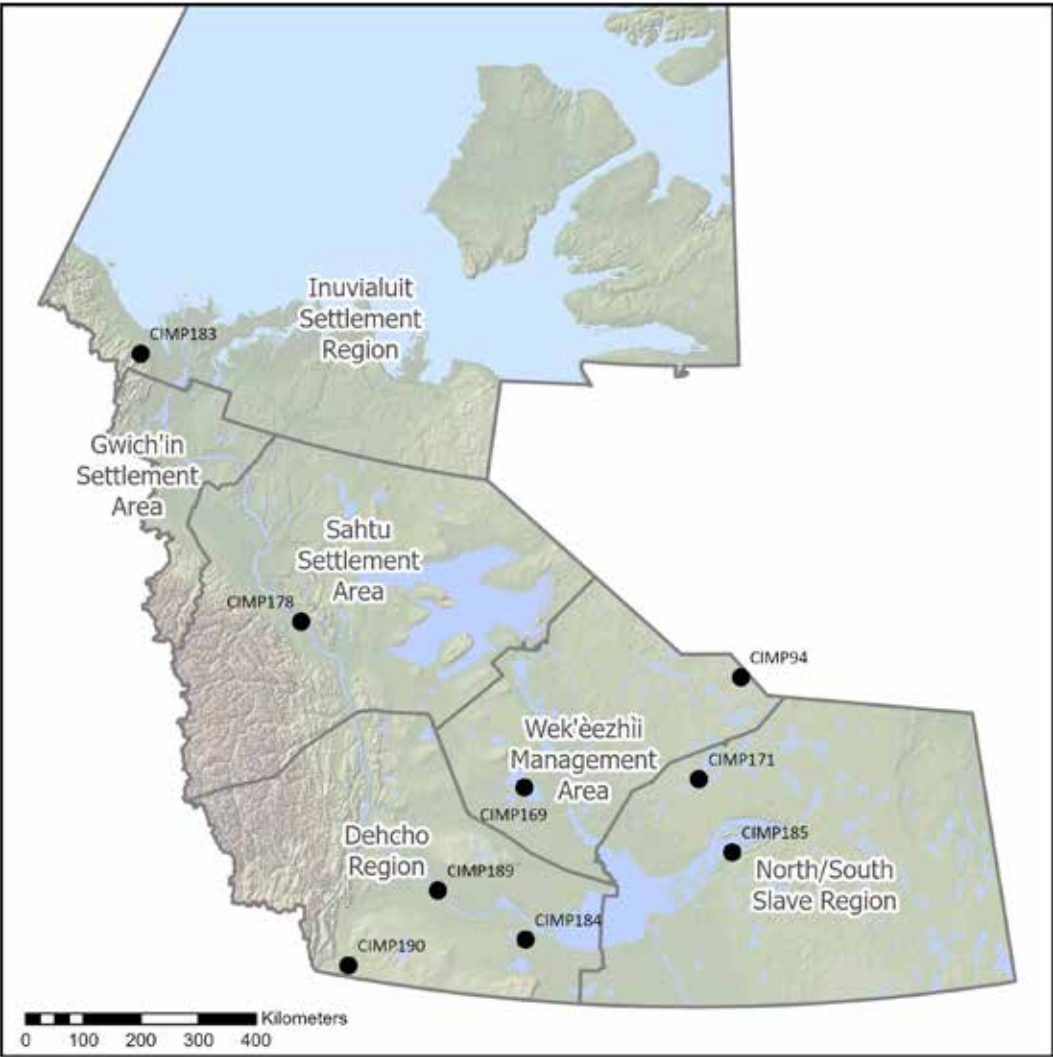
(Released December 2022)

NWT Cumulative Impact
Monitoring Program
(NWT CIMP)

TRADITIONAL KNOWLEDGE



NWT CIMP-funded traditional knowledge projects in the NWT



Cover photo: Tawna Brown Photography

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December 2022

About the Northwest Territories Cumulative Impact Monitoring Program (NWT CIMP)

The Northwest Territories Cumulative Impact Monitoring Program (NWT CIMP) is 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. Its main purpose is to better support resource management decision-making and the wise use of our resources by furthering our understanding of cumulative impacts and environmental trends. Based on the priorities of environmental regulators, co-management boards, and Indigenous governments and Indigenous organizations, the program has focused on caribou, water, and fish since 2011.

NWT CIMP strives to place research and monitoring results in the hands of those who need it to make decisions. As such, we are focused on reporting back to communities and to environmental regulators who can use the information to manage the land and water. This booklet of caribou monitoring, and research is one way in which the program shares results. Other means include community presentations by researchers, regional results workshops, peer-reviewed publications, and online through the NWT Discovery Portal.

NWT CIMP annually funds approximately 30 projects, providing \$1.7 million to research and monitoring of cumulative impacts in the Northwest Territories. This publication provides high level summaries of the results from the boreal and barren ground caribou research and monitoring projects that were funded in 2016-2020 (see map on facing page).

For more information on the program, visit www.nwtcimp.ca. For NWT CIMP project results, visit nwtdiscoveryportal.enr.gov.nt.ca or email the principal investigator directly.

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Years funded: 2

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Recommended

Reading:

Recommended
Reading: For additional
information on this
project please visit
nwtDiscoveryportal.
enr.gov.nt.ca and
search "CIMP184"
or read the 24th
issue of the NWT
Environmental
Research Bulletin
(NERB), available
online at www.nwtcimp.ca.

The Ka'a'gee Tu Atlas: Community-based monitoring of landscape change in Kakisa, NWT

Purpose

This project's purpose was to develop an innovative web map built from community concerns about the impacts of both climate change and development on the health of the land. The Ka'a'gee Tu Atlas was constructed for use by the community. The Atlas' purpose was to collect and display data layers from various sources that contain information on traditional land uses, culturally significant places, as well as environmental information and development locations.

Key Findings

- There is a wealth of information and observation in the community about past conditions and recent changes that are important to document.
- There are many areas on the land that have changed over time. For example, community members have noticed changes in water resources, including water levels, availability, and quality. As well, permafrost thaw and slumping has created concerns for health of the land and animals as well as safety of harvesters and land users.
- There is concern that the impacts of climate change combined with the effects of developments in the region (oil and gas, forest management and other land uses), may pose a threat to the long-term health of the land, water and animals.

How does this project help in understanding cumulative impacts?

NWT communities are looking to enhance the monitoring of their lands to ensure the health of the water, land, and animals for future generations. The Ka'a'gee Tu Atlas (kaageetuatlus.wordpress.com) is an example of a community-led collaboration that focused on developing a monitoring and mapping resource for use by the community to record past conditions, Indigenous knowledge and local observations of change.

The Atlas provides a baseline for future monitoring initiatives to record how the land has changed over time.



Example of environmental change in a photograph. This photo taken 20 years ago; the tent structure is now under water. (Credit: L. Chicot)



A local youth enters observation data into a mapping program during an on-the-land activity. (Credit: K. Kok)

Years funded: 1

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Recommended Reading:

For additional information on this project please visit nwt.discoveryportal.enr.gov.nt.ca and search “CIMP189” or read the 16th issue of the NWT Environmental Research Bulletin (NERB), available online at www.nwt.cimp.ca.

Using traditional knowledge of Jean Marie River First Nation elders to better understand changes in the boreal caribou habitat

Purpose

The community of Jean Marie River is concerned with environmental changes occurring in our traditional territory. What affects the land affects our way of life and our culture. The decline in the quality of caribou habitat is a concern because hunting caribou is an important traditional food and source of spiritual renewal.

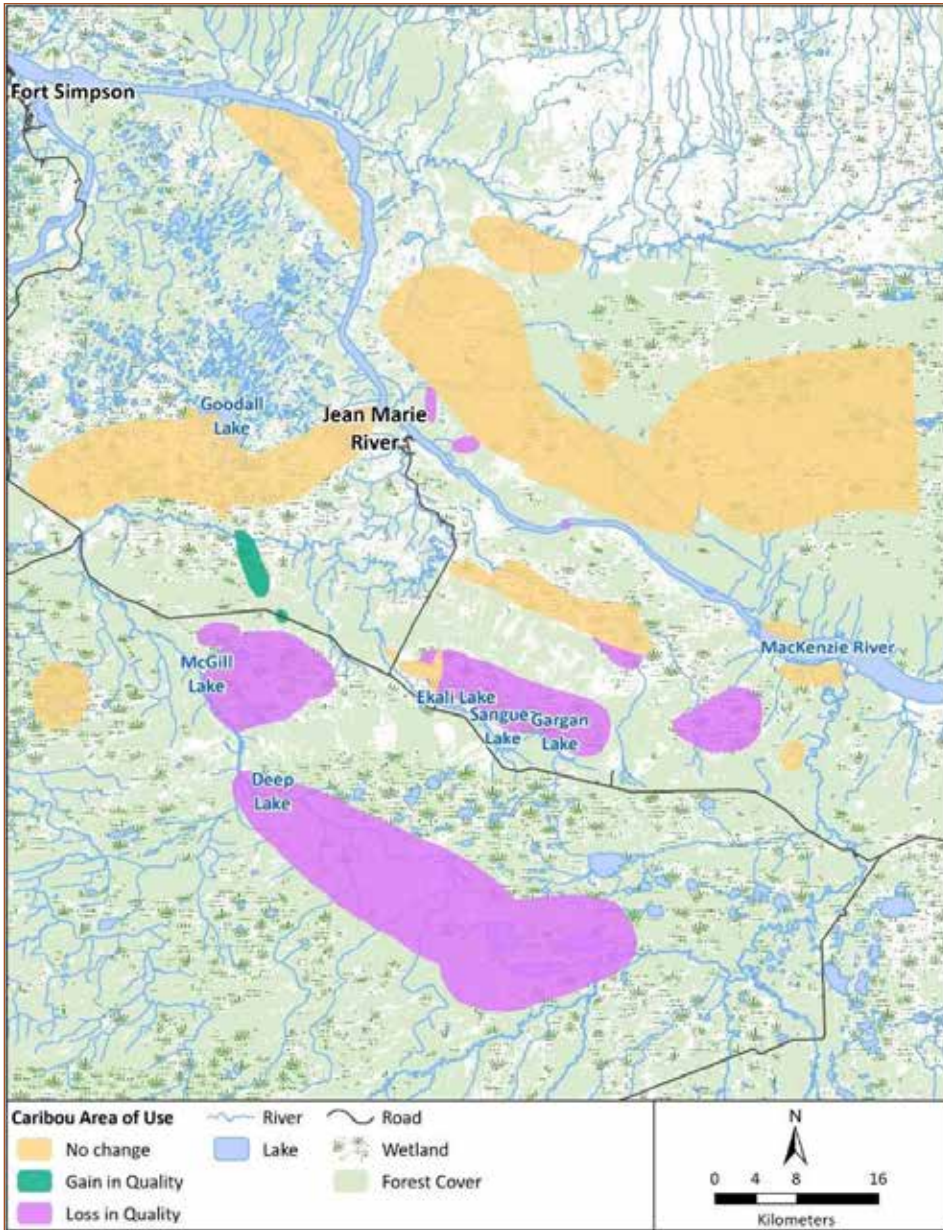
This project documented the cumulative impact of permafrost thaw and wildland fire on boreal caribou habitat. Areas of boreal caribou habitat were identified using traditional knowledge, information from one-on-one interviews and scientific information gathered from existing datasets.

Key Findings

- Project results showed that the quality of boreal caribou habitat has decreased in 35% of the areas, remained stable in 64% of the areas, and increased in 1% of the areas.
- Evaluation of the impact of forest fire and permafrost thaw showed that the latter has a particularly high impact on boreal caribou habitat, with 88% of boreal caribou areas affected and forest fire has a significant impact, with 29% of boreal caribou areas affected.
- Interview participants qualified that the current state of the boreal caribou habitat in the Jean Marie River area as being of ‘medium’ quality and is continuing to decline in quality.



Cyrielle Laurent (left, Yukon Research Centre) and Margaret Ireland (right, JMRFN) conduct a traditional knowledge interview with Billy Norwegian (center, JMRFN). (Credit: Yukon Research Centre)



Boreal caribou habitat change in quality from analysis of interview data.

How does this project help in understanding cumulative impacts?

Results show boreal caribou habitat conditions are being affected by forest fires and permafrost thaw. This may affect traditional harvest. It is likely that many other communities face similar challenges. Strategies to ensure food security are needed at the community level to address these challenges.

Future work will continue to integrate traditional knowledge with additional scientific knowledge to evaluate and monitor the loss and rate of changes to boreal caribou habitat as well as locate sustainable boreal caribou habitat around our community.

Years funded: 1

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**Recommended
Reading:**

For additional information on this project please visit nwt.discoveryportal.enr.gov.nt.ca and search “CIMP190” or read the 18th issue of the NWT Environmental Research Bulletin (NERB), available online at www.nwt.cimp.ca.

Acho Dene First Nation boreal caribou traditional knowledge and cumulative impacts qualitative assessment

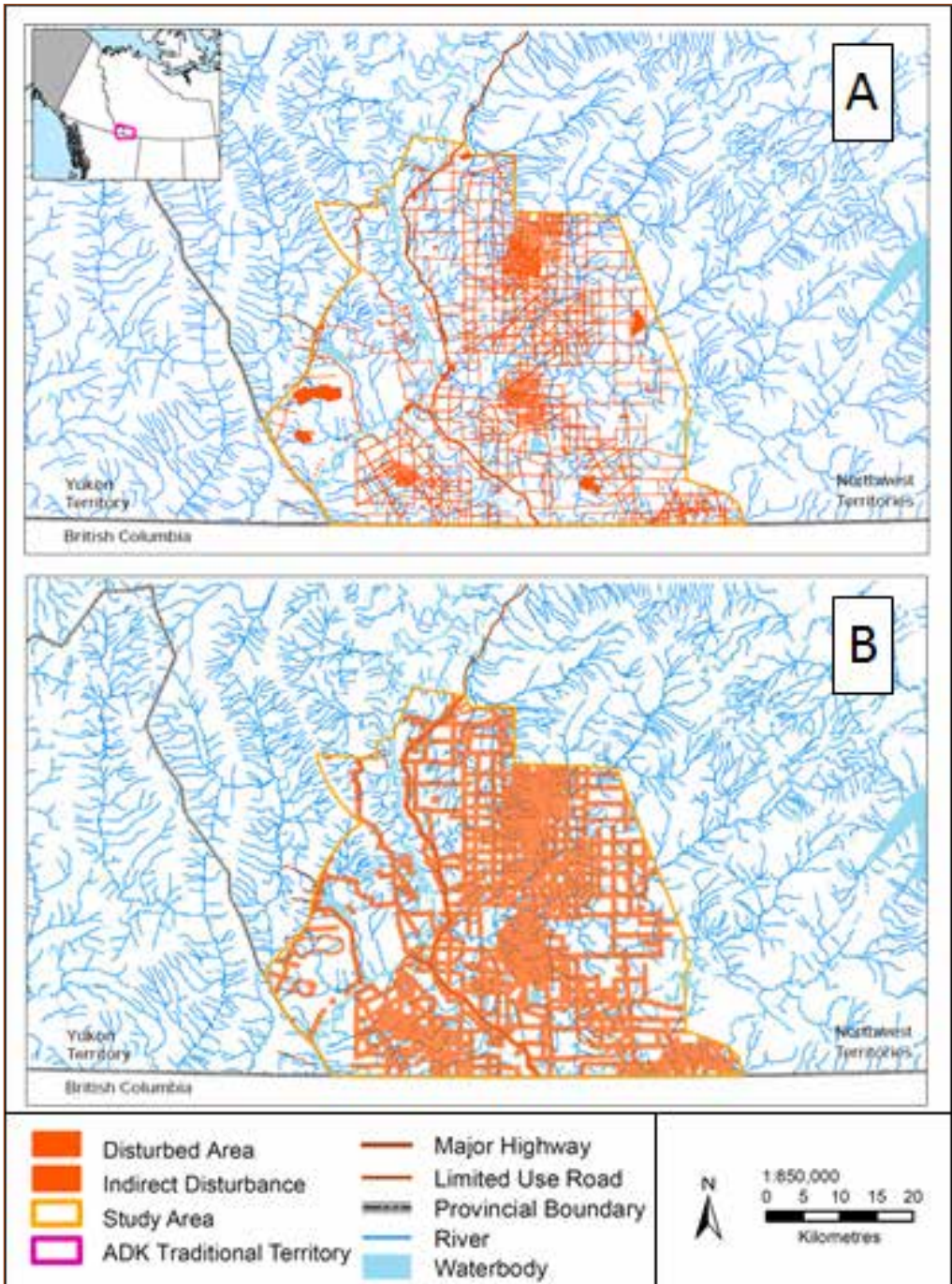
Purpose

The purpose of this project was to examine natural and human-induced impacts to boreal caribou within Acho Dene Koe First Nation (ADKFN) traditional territory. Impacts were observed for several ecological components, including habitat, migration routes, calving areas, food sources and water sources, and aspects of ADKFN culture, including hunting, transportation routes, habitation and gathering areas, and historic and named places.

Key Findings

- Interviewees confirmed boreal caribou in their traditional territory; 27 caribou habitat areas, two migration routes and 13 caribou food source areas were identified. Traditional use of caribou was also demonstrated through 33 identified hunting areas, 16 transportation routes, eight habitation/gathering sites and six historic and named places.
- The majority of traditional use sites identified are located in the southeast portion of ADKFN territory, which is an area of historic oil and gas exploration.
- Linear features (like seismic lines and roads) are present in the area. ADKFN members have observed wolves using these lines for hunting caribou.
- Despite these disturbances, interviewees indicated healthy caribou populations exist within their traditional territory.





Direct (A) and indirect (B) disturbance within the study area. (Adapted from Acho Dene Koe First Nation Boreal Caribou Traditional Knowledge and Cumulative Impacts Qualitative Assessment, Non-Confidential Final Report, 2018.)

How does this project help in understanding cumulative impacts?

Northern decision-makers can use this information for future development decisions in the southern NWT. The TK from this project will be used to inform planning in this region during the upcoming boreal range planning process.

Years funded: 2

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**Recommended
Reading:**

For additional
information on this
project please visit
nwtdiscoveryportal.
enr.gov.nt.ca and
search “CIMP183”.

Inuvialuit monitoring and management of the Big Fish River

Purpose

This project focused on addressing priorities of the Aklavik Hunters and Trappers Committee about the management and monitoring of Big Fish River Dolly Varden char. Elders and youth participated in a harvest monitoring program to build capacity and develop Inuvialuit and local knowledge indicators for co-management decision-making.

Key Findings

- Inuvialuit observations on Dolly Varden char and habitat were used to develop traditional and local knowledge indicators for co-management decision-making and allow a more balanced approach to annual harvest level recommendations.
- Inuvialuit observations on environmental change were documented and will be used to inform future long-term monitoring.
- Water quality results provided information on may potential impacts affecting Big Fish River Dolly Varden char habitat.

How does this project help in understanding cumulative impacts?

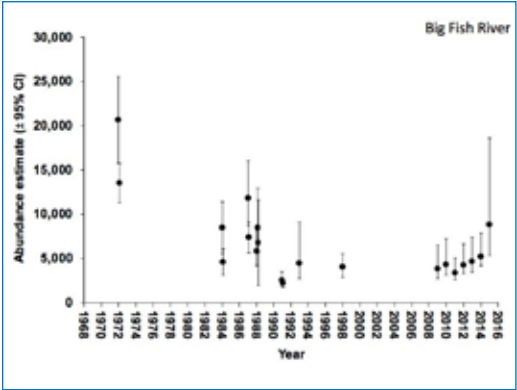
The indicators focused on char health such as general condition, presence of scarring and presence of parasites. Decision thresholds were developed for each indicator that categorized current status. The development of these indicators resulted in a more balanced approach to decision-making, equally incorporating both scientific data and Inuvialuit knowledge. The documentation of water quality at various sites along the Big Fish River and its tributaries (important Dolly Varden char habitat) will assist with future monitoring and cumulative effects assessments.



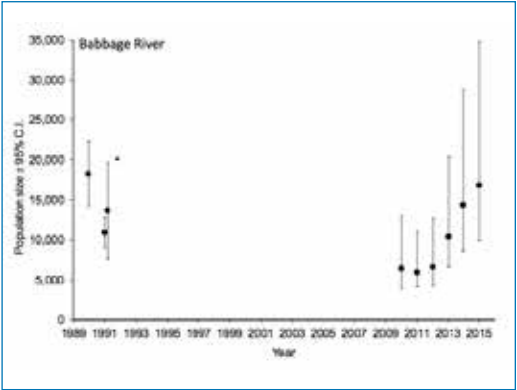
Tawna Brown Photography,
www.nwtarts.com



Map of area with water quality monitoring sites from 2014 marked in blue, sites from 2016 marked in red and places of importance marked in white.



Big Fish River char population abundance estimates, 1972-2015 (DFO data presented by Colin Gallagher to the West Side Working Group).



Babbage River char population abundance estimates, 1972-2015 (DFO data presented by Colin Gallagher to the West Side Working Group).

Years funded: 11

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Recommended Reading:
For additional information on this project please visit nwt.discoveryportal.enr.gov.nt.ca and search "CIMP94".

Tłıchq Ekwò Naowo: “Boots on the Ground” Bathurst Caribou monitoring program

Purpose

This project began in the summer of 2009 and is ongoing. The purpose of the project is to monitor the condition of the Bathurst caribou herd on its summer range using local and traditional knowledge, focusing on four key indicators: (i) habitat, (ii) caribou, (iii) predators, and (iv) industrial development.

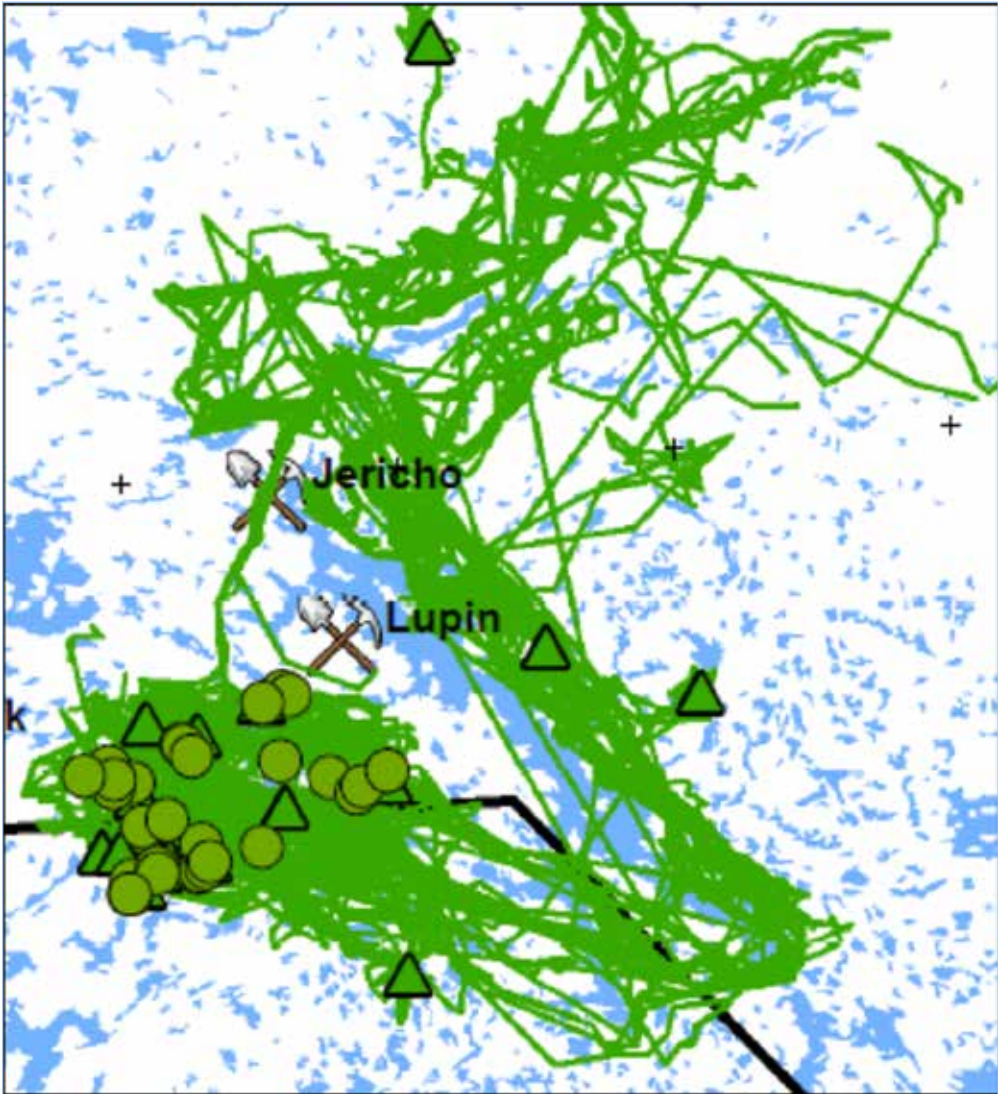
For six weeks each summer, Tłıchq and Inuit elders and harvesters documented observations about Bathurst caribou at Kokètì (Contwoyto Lake) and the surrounding land.

Key Findings

- A strong correlation between climate change and the conditions of caribou habitat were observed. Higher temperatures earlier in spring meant melted snow cover on the land by late June. As a result, herds were observed to engage in new types of behaviors, such as moving in circles and standing in water to minimize the heat and insect harassment.
- Injuries were the main health issue observed in animals, although a low number of caribou were observed to be injured.
- In 2018, the monitoring teams observed several groups of caribou with few calves. In contrast, several herds with high numbers of yearlings were observed, which correlates with the high number of calves observed in 2017.



(Credit: P. Jacobsen)



Congregation of cow and bull caribou northwest of the nazokè (watercrossing), between Kokètì (Contwoyto) and Itchen lake in mid-August. Green lines on the map show movement of Bathurst caribou based on collar locations from June to August 2017. Green dots represent cow caribou; Green triangles: bull caribou. Source: GNWT-ENR

How does this project help in understanding cumulative impacts?

Results from this project have been incorporated into management processes of several caribou management agencies, including the Wek'èèzhì Renewable Resources Board and the Government of the Northwest Territories' Department of Environment and Natural Resources.

Years funded: 3

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Recommended

Reading:

For additional information on this project please visit nwtdiscoverypportal.enr.gov.nt.ca and search "CIMP169" or read the 4th issue of the NWT Environmental Research Bulletin (NERB), available online at www.nwtcimp.ca.

When do caribou return? Impacts of wildfires on Tòdzì

Purpose

This project documented Tłı̨ch̓ knowledge about tòdzì (boreal caribou) – in particular, the relationship between range use (preferred landscape and habitat) and wildland fire.

According to Elders, when forest fire destroys certain habitat that tòdzì need for winter foraging or for cover from predators, tòdzì move to a different area of their range. Usually, it takes 20 to 30 years for forage lichen to recover after a fire. However, tòdzì may still use impacted areas as routes to other habitats if the forage has recovered sufficiently.

Key Findings

- The Tłı̨ch̓ perspective considers the state of tòdzì and their habitat within the context of dè. Dè is about interconnectedness and belonging to place and includes everything that is associated with land, ground, dirt, earth, and with whom Tłı̨ch̓ have a relationship with that is responsive to their attention, action, and behavior.
- Elders found that tòdzì have less range than they did in the early 1990s due to the frequent occurrence of large, intense wildland fires.
- In some burned areas, vegetation communities were returning more slowly because soil conditions were extremely dry; however, in wetland areas, vegetation communities were returning relatively quickly.
- Evidence of tòdzì, including tracks, pellets and browsing, were found at sites where wildfires had never occurred or where burns had occurred at least 15 years earlier. Evidence of tòdzì in areas recently burned by wildfires was not found by the research team or by elders.
- To maintain a healthy population, tòdzì need 100% of their current range, which includes the various habitats and vegetation they need at different times of the year for birthing, resting from predators and insects, foraging, etc.
- Tòdzì must be able to move freely throughout their range, to seek and find the various suitable habitats they need, in various locations, as forest fires and other factors can make certain locations unavailable for periods of time – sometimes very long periods of time.



Documented vegetation communities at monitoring site. (Credit: A. Legat)



Documented animal and human activity at monitoring site (Credit: A. Legat)

How does this project help in understanding cumulative impacts?

Tłchq traditional knowledge provides unique and relevant information and perspectives not available through science and other sources. Tłchq Elders want their people to use their knowledge system; and for decision-makers to listen, honour and use their ways of caring for the land and wildlife.

Years funded: 3

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Recommended

Reading:

For additional information on this project please visit nwtdiscoveryportal.enr.gov.nt.ca and search “CIMP171”.

Barren-ground caribou traditional knowledge mapping and analysis

Purpose

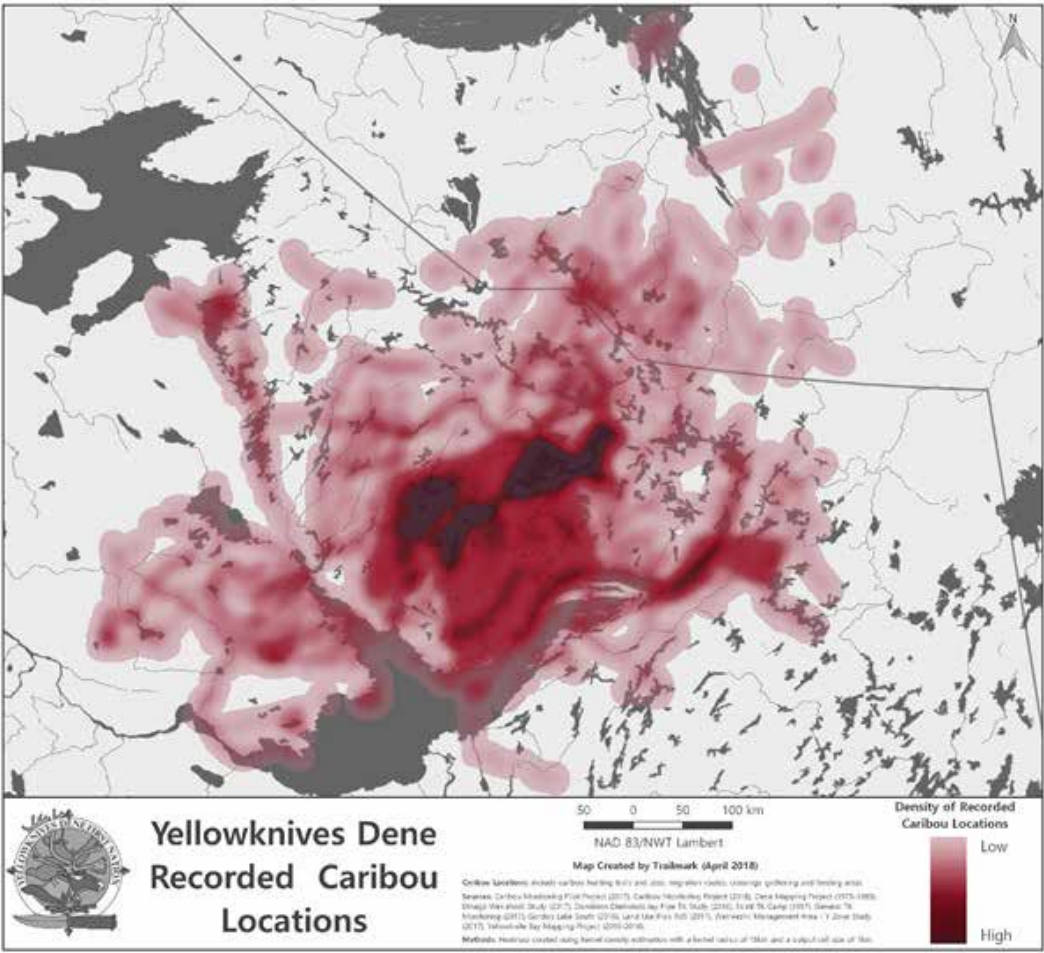
The purpose of this project was to use Yellowknives Dene First Nation (YKDFN) traditional knowledge to develop monitoring indicators to track and assess cumulative impacts on barren-ground caribou.

Key Findings

- A digital archive containing Traditional Knowledge (TK) and information shared by YKDFN on caribou is now accessible to and managed by the YKDFN, independently from external parties. In addition, a public portal containing TK and information shared by the YKDFN on caribou is now available online to researchers, decision-makers, and other external parties.
- The digitized TK for use at the community’s discretion.
- On-the-land data monitoring protocols developed and guided by the YKDFN provide key opportunities for YKDFN to gather contemporary data on caribou while practicing traditional skills on the land and engaging in knowledge transfer (e.g., between active hunters and youth). This knowledge transfer was integral to understanding ways YKDFN can monitor cumulative impacts.
- YKDFN’s set of criteria for TK indicators in cumulative impact monitoring of caribou are not exclusive, and include: patterns in migration, herd composition, and health, as well as abiotic, biotic, and human interactions.

How does this project help in understanding cumulative impacts?

This project highlighted key TK-based monitoring indicators for understanding cumulative impacts on caribou as identified and provided by the YKDFN. In addition to caribou, this project collected information about other themes for cumulative effects understanding and management.



A heat map indicating areas associated with past and current information on caribou recorded by the YKDFN. We note that this map is only limited to areas that were recorded and have been digitized in the IMS through this project; it is likely there are other areas that YKDFN use associated with caribou (and otherwise) that are not presented here. The sources of this information come from diverse methodologies according to the research focus at the time.

Years funded: 4

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**Recommended
Reading:**

For additional information on this project please visit nwt.discoveryportal.enr.gov.nt.ca and search “CIMP185” or read the 26th issue of the NWT Environmental Research Bulletin (NERB), available online at www.nwtcimp.ca.

Community-based traditional knowledge monitoring: Monitoring for better decision-making phase

Purpose

The inclusion of traditional knowledge (TK) in natural resource decisions can result in decisions that are better for humans and the environment and are more reflective of local concerns. This project explored the needs and challenges in documenting and applying TK into cumulative impact monitoring and decision-making. Five core challenges to integrating TK were identified. Recommendations to help address these challenges were provided.

The project examined when TK was cited or included in decision-making processes in the NWT, and how decision-makers considered and incorporated TK. This was done by:

- Reviewing scholarly literature on TK integration and community-based monitoring (CBM);
- Interviewing research practitioners and regulators; and
- Reviewing recent NWT environmental assessments.

Key Findings

The challenges to including TK in resource decisions were grouped into five themes:

- The expectation of what TK is and of its inclusion.
- The depth of inclusion of TK in resource monitoring and decision-making processes.
- Interdisciplinarity, knowledge co-production, and the use of different methods.
- The principles of ownership, control, and access for Indigenous people over their knowledge.
- Unclear linkages between observation-based TK and how to apply it in regulatory settings.

It was determined that CBM provides unique opportunities for gathering and integrating TK. CBM allows for the development of new methods for considering TK alongside other knowledge systems.



Local monitors on the land.

How does this project help in understanding cumulative impacts?

Based on project results, recommendations for Indigenous governments and environmental regulators, such as the Mackenzie Valley Review Board, Land and Water Boards of the Mackenzie Valley, Renewable Resources Boards, and GNWT, to improve the inclusion of TK in environmental decision-making were developed. The recommendations are available in the *Guide for Watching the Land: Yatıé Theza'Nuwé nën Haiq ı Xa* and is available online through the NWT Discovery Portal (nwtdiscoveryportal.enr.gov.nt.ca).

Years funded: 3

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Recommended Reading:
For additional information on this project please visit nwtcoveryportal.enr.gov.nt.ca and search “CIMP178” or read the 30th issue of the NWT Environmental Research Bulletin (NERB), available online at www.nwtcimp.ca.

Sahtú regional environmental monitoring and decision support tool set

Purpose

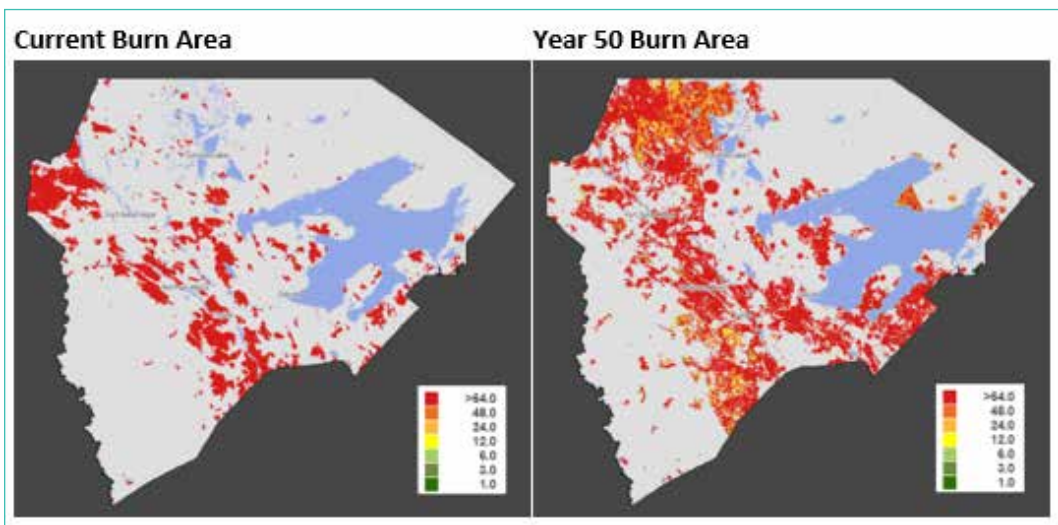
Landscapes and other valued environmental components change over time in response to land use, natural disturbance and climate. Identification of land-use strategies that balance social, economic and environmental objectives requires an understanding of how landscapes are likely to change in the future. This project integrated large datasets of monitoring information from the Sahtú region and traditional knowledge into a tool to support increased understanding and decision-making.

Key Findings

- A Landscape Cumulative Effects Simulator (ALCES) modeling tool was used to simulate the following long-term (50 years) scenarios in the Sahtú region:
 - oil and gas development;
 - other land uses;
 - fire and;
 - climate change.
- The modeling tool identified climate change as the most important factor in determining the region’s future environment, particularly with respect to caribou habitat and permafrost.

How does this project help in understanding cumulative impacts?

The ALCES tool allows decision-makers, including the Sahtú co-management boards, to explore the consequences of current and potential future land use on the landscape. Project results have been made available to community members through the Sahtú Renewable Resources Board.



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 km² of landscape disturbance.



Participants networking at the 2019 Sahtú Research Results Workshop, GNWT.



For more information:

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For monitoring results:

nwtdiscoveryportal.enr.gov.nt.ca