

RECOVERY STRATEGY FOR BARREN-GROUND CARIBOU [DRAFT]

In the Northwest Territories



SPECIES AT RISK (NWT) ACT

Management Plan and Recovery Strategy Series 2019

For copies of the recovery strategy or for additional information on Northwest Territories (NWT) species at risk, please visit the NWT Species at Risk website (www.nwt-speciesatrisk.ca).

Recommended citation: Conference of Management Authorities. 2019. Recovery Strategy for Barren-ground Caribou (*Rangifer tarandus groenlandicus*) in the Northwest Territories [**Proposed Draft**]. Conference of Management Authorities, Yellowknife, NT.

This document is a draft and should not be cited without permission from the CMA or relevant Management Authorities.

© Government of the Northwest Territories on behalf of the Conference of Management Authorities.

All rights reserved.

ISBN to come

Content (excluding the illustrations) may be used without permission, with appropriate credit to the source.

Cover illustration: Barren-ground caribou, Rob Gau, Environment and Natural Resources (ENR).

What is the Species at Risk (NWT) Act?

The *Species at Risk (NWT) Act* (the Act) provides a process to identify, protect, and recover species at risk in the NWT. The Act applies to any wild animal, plant, or other species for which the Government of the Northwest Territories has management authority. It applies everywhere in the NWT, on both public and private lands, including private lands owned under a land claims agreement, in accordance with the land claims agreements.

What is the Conference of Management Authorities?

The Conference of Management Authorities (the Conference) was established under the Act and is made up of the wildlife co-management boards and governments in the NWT that share responsibility for the conservation and recovery of species at risk in the NWT (referred to as 'Management Authorities'). The purpose of the Conference is to build consensus among Management Authorities on the conservation of species at risk and to provide direction, coordination, and leadership with respect to the assessment, listing, conservation, and recovery of species at risk while respecting the roles and responsibilities of Management Authorities under land claim and self-government agreements. The Conference develops consensus agreements on listing species at risk, conservation measures, management strategies, and recovery plans. Only Management Authorities that have jurisdiction for a species are involved in making the decisions.

What is a Threatened species?

Under the Act, a Threatened species is a species that is likely to become Endangered in the NWT if nothing is done to reverse the factors leading to its extirpation or extinction.

What is a recovery strategy?

Under the Act, a recovery strategy is a document that recommends objectives for the conservation and recovery of a Threatened species. It also recommends approaches to achieve those objectives. It includes a description of threats and positive influences on the species and its habitat. Under the Act, a recovery strategy must be done for Threatened species within two years after the species is added to the NWT List of Species at Risk.

PREFACE

This *Recovery Strategy for Barren-ground Caribou in the Northwest Territories* (recovery strategy) is the result of a collaborative effort among diverse groups representing many different perspectives across the range of barren-ground caribou in the NWT. It is important to acknowledge that the species at risk approach, and more broadly, perspectives on “managing” caribou, are part of a scientific framework that may not necessarily represent how some Indigenous individuals and organizations would characterize their relationships with caribou. In particular, there is a strong belief in some northern Indigenous communities that talking about caribou too much or in a negative way can make them go away. The draft Łutsel K’e Dene First Nation’s caribou stewardship plan entitled, Yúnethé Xá ʔetthën Hádi¹, notes the following:

Etthën hurétth’q (the caribou are listening to us) – We shouldn’t talk too much about ʔetthën; they are listening to us; we must speak good words for them; and we must help protect them. The ʔetthën have their own natural laws and, as such, we have to respect the ways of the ʔetthën and all life forms.

Generally, using terms like “threatened”, “at risk”, or “dramatic declines” can be seen to be negative. Discussions about “managing” caribou can also be seen as inappropriate; it is at times preferable to clarify that while caribou can look after themselves, it is peoples’ activities that need to be managed. This topic is addressed in Délı̨ne’s *Belare Wı̨le Gots’é ʔekwé - Caribou for All Time*² plan:

Goʔó begho gots’edé nı̨dé dza ɔt’e (when people talk about caribou too much, it’s not good) – The talk disturbs ʔekwé and they don’t like it. This is true for all animals. When ʔekwé move away, this is a sign that they want to be left alone. ʔekwé make their own decisions – we’re not the boss of them. We need to give them a rest for as long as it takes for them to recover. Dene ʔehtséokə say that when they decide to return, ʔekwé nı̨ʔah, they make a thundering sound.

Differing perspectives such as these can be difficult to reconcile in species at risk discussions and documentation, yet there is also alignment between scientific and Indigenous knowledge regarding caribou not being as available currently as they were in the past. For the immediate purposes of helping to protect caribou and create conditions in which they can recover, those involved in the development of this recovery strategy chose to work within the scientific framework, sharing a language and terminology that helps us understand each other and facilitate important discussion.

This recovery strategy constitutes advice to:

- other jurisdictions with management and guardianship responsibilities for the herds and their habitats;
- all potential partners or organizations whose activities may impact the herds or their habitats, including industry, communities, and individuals; and

- organizations that play a role in influencing the extent to which the herds are impacted, including community organizations, co-management boards, environmental assessment and regulatory bodies, and environmental non-government organizations.

This recovery strategy will outline overall goals, objectives, and approaches for barren-ground caribou conservation and recovery across the NWT. This recovery strategy applies to all barren-ground caribou herds that occur either entirely or partially in the NWT, with the exception of the Porcupine herd, which is considered geographically distinct and not at risk at this time.

Management tools and actions specific to the needs of individual barren-ground caribou herds are outlined in herd-specific management plans (either existing or under development). The recovery strategy will therefore provide overarching guidance on management and stewardship of barren-ground caribou in the NWT over the long term, while ensuring that herd-specific requirements are met through more detailed herd-specific management plans. This approach recognizes the huge amount of work that governments, co-management authorities, communities, and stakeholders have already put in, and are still putting in, to developing herd-specific management plans.

Background information on barren-ground caribou and threats is summarized from *Caribou Forever - Our Heritage, Our Responsibility: A Barren-ground Caribou Management Strategy for the Northwest Territories 2011-2015* (ENR 2011³) (CMS) and the Species at Risk Committee's (SARC) 2017 *Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahik, and Qamanirjuaq herds)* (*Rangifer tarandus groenlandicus*) in the Northwest Territories⁴ (status report). To avoid repetitive citations, it can be assumed that the information was taken from the CMS and/or the status report, unless another reference is given.

This recovery strategy does not commit any party to actions or resource expenditures; implementation of this strategy is subject to the appropriations, priorities, and budgetary constraints of the participating Management Authorities.

Success in the recovery of this species depends on the commitment and cooperation of the many groups who will be involved in implementing the approaches set out in this strategy and cannot be achieved by the Management Authorities or any other group alone. All NWT residents and others who use NWT lands and waters are encouraged to join in supporting and implementing this strategy for the benefit of barren-ground caribou, communities that have traditionally relied on these herds, and NWT society as a whole.

ACCEPTANCE STATEMENT

To be completed as a final step once the recovery strategy is finalized.

The Wildlife Management Advisory Council (NWT), Gwich'in Renewable Resources Board, Sahtú Renewable Resources Board, Wek'èezhìi Renewable Resources Board, Tłı̨chǫ Government, and the Government of the Northwest Territories accepted this recovery strategy on DATE through a Conference of Management Authorities consensus agreement under the *Species at Risk (NWT) Act*.

ACKNOWLEDGEMENTS

Two five-year management strategies were developed for barren-ground caribou in the NWT by Environment and Natural Resources (ENR) and its partners: *Caribou Forever - Our Heritage, Our Responsibility: A Barren-ground Caribou Management Strategy for the Northwest Territories 2006-2010* (ENR 2006⁵) and *2011-2015* (ENR 2011³). These caribou management strategies recognized the collaborative nature of management for barren-ground caribou in the NWT along with the importance of herd-specific management strategies. In May 2018, the Conference of Management Authorities met and agreed to adapt and update the 2011-2015 caribou management strategy as the recovery strategy for barren-ground caribou in the NWT, in accordance with the *Species at Risk (NWT) Act*.

Preparation of this strategy was funded by ENR. We would like to thank ENR, and particularly Jan Adamczewski (Wildlife Biologist, Ungulates), for their work on the earlier caribou management strategies, along with the partners and reviewers who provided extensive input on earlier drafts of this recovery strategy.

Background information in this document is also summarized from the 2017 *Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahlak, and Qamanirjuaq herds)* (*Rangifer tarandus groenlandicus*) *in the Northwest Territories*⁴. We would like to thank the NWT Species at Risk Committee for their work on this detailed and extensive assessment of the status of barren-ground caribou in the NWT.

We would also like to thank the Species at Risk Secretariat for adapting the caribou management strategy to address the requirements of a recovery strategy, as required by the *Species at Risk (NWT) Act*. The principal preparers of the adapted strategy were Michele Grabke (Species at Risk Implementation Specialist) and Claire Singer (Species at Risk Implementation Supervisor).

Finally, we thank the many individuals who reviewed and provided input on earlier drafts; this work significantly improved the recovery strategy. We thank the following organizations for providing helpful comments:

- Wildlife Management Advisory Council (NWT)
- Gwich'in Renewable Resources Board
- Sahtú Renewable Resources Board
- Wek'èezhii Renewable Resources Board
- Tłıchq Government
- Government of the Northwest Territories
- Government of Canada
- Beverly and Qamanirjuaq Caribou Management Board
- Athabasca Denesuline Né Né Land Corp.

EXECUTIVE SUMMARY

The social, cultural, and economic value of barren-ground caribou to the people of the Northwest Territories (NWT) is immense; the relationship between people and caribou dates back thousands of years. Barren-ground caribou that occur in the NWT have been harvested by Indigenous and non-Indigenous people from nearly all regions of the NWT, as well as by Indigenous people from adjacent jurisdictions (Nunavut, Saskatchewan, Manitoba, and Alberta).

There are nine barren-ground caribou herds^a that reside partially or entirely in the NWT. Historically, herds have undergone large fluctuations in population size and their abundance has been known to cycle. Recent decreases have been dramatic and estimates indicate historically low numbers. For example, the Bathurst herd has declined as much as 98 percent from peak numbers. As of 2018, the Cape Bathurst and Bluenose-West herds appeared roughly stable but at lower numbers than observed in historic surveys. The Tuktoyaktuk Peninsula, Bluenose-East, and Bathurst herds were declining at a substantial rate. The Beverly herd was declining slowly, and the Qamanirjuaq herd was either stable or declining slowly. These herds are at historically low numbers and are facing unprecedented pressure from a range of threats and cumulative effects.

This *Recovery Strategy for Barren-ground Caribou in the Northwest Territories* was prepared by the Conference of Management Authorities and is designed to meet the requirement for a barren-ground caribou recovery strategy under the *Species at Risk (NWT) Act*. The recovery strategy emphasizes collaboration among co-management boards, Indigenous governments and organizations (IGOs), territorial/provincial/federal governments, caribou management boards, and communities.

This strategy defines overall goals, objectives, and approaches to guide conservation and recovery of barren-ground caribou in the NWT. The long-term vision of this strategy is to conserve barren-ground caribou and to ensure that barren-ground caribou remain a cultural and ecological keystone species. The vision includes ensuring that barren-ground caribou are able to move freely on the land within their historic ranges to ensure natural habitat use and migration. The overall goals of the recovery strategy are:

1. Maintain or restore self-sustaining, resilient populations of each barren-ground caribou herd, such that no herd is lost.
2. Support unobstructed movement and migration of barren-ground caribou across historic ranges.
3. Promote the social, cultural, and environmental conditions necessary for recovery.

^a Scientific knowledge designates barren-ground caribou into herds based on identifiable and distinct calving grounds. Traditional knowledge holders and Indigenous communities vary in the interpretation of herds; some distinguish among different herds using a variety of techniques (direction of travel, range, colour/size/body condition and the taste of the meat), while others do not identify barren-ground caribou as belonging to distinct units or groups at all.

The strategy recognizes herd-specific management plans as having a key role in defining detailed monitoring and management requirements. It also recognizes that management actions in the NWT for barren-ground caribou are carried out in a collaborative process with co-management boards, IGOs, territorial/provincial/federal governments, and communities located on or near the current and historical ranges of herds and for which barren-ground caribou have and continue to play a key role socially, culturally, spiritually, and economically.

The strategy recommends the following objectives and approaches:

Objective 1: Partners collaborate on the development and implementation of management, monitoring, guardianship, and conservation plans for barren-ground caribou in the NWT.

- Approach 1.1: Implement herd-specific management plans for the Cape Bathurst, Bluenose-West, Bluenose-East, Beverly, and Qamanirjuaq herds to promote recovery and conserve habitat.
- Approach 1.2: Complete and implement herd-specific management plans for the Tuktoyaktuk Peninsula and Bathurst herds to promote recovery and conserve habitat.
- Approach 1.3: Continue working with partners in Nunavut on effective conservation of the Ahiak herd.
- Approach 1.4: Review and update herd-specific management plans as required.
- Approach 1.5: Support community-based barren-ground caribou monitoring, guardianship, and conservation plans.
- Approach 1.6: Continue working to secure adequate resources and ongoing support from governments and other partners (including industry, co-management and regulatory boards, and non-government organizations) for the implementation of this recovery strategy and the management, monitoring, guardianship, and conservation plans noted in approaches 1.1 to 1.5.
- Approach 1.7: Increase capacity among Indigenous partners to participate equally and meaningfully in the conservation of barren-ground caribou.
- Approach 1.8: Cooperate in the development and implementation of the national barren-ground caribou recovery strategy, including identification and protection of critical habitat, and defining population and distribution objectives.

Objective 2: Monitor barren-ground caribou, their habitat, and key factors and threats that may be affecting the status and health of herds in the NWT.

- Approach 2.1: Monitor size, trend, and health of all NWT barren-ground caribou herds.
- Approach 2.2: Monitor predator populations that may affect barren-ground caribou, assess predator-prey relationships and predation rates.

Approach 2.3: Monitor the impacts of other key factors affecting barren-ground caribou and their habitat, including, for example, disease, parasites, insects, and climate change.

Approach 2.4: Monitor changes in habitat quality, quantity, and availability for caribou resulting from natural and human-caused landscape changes.

Approach 2.5: Monitor the status of the relationship between people and caribou as an indicator of caribou well-being.

Objective 3: Fill knowledge gaps, using traditional, community, and scientific knowledge, to enhance responsible and respectful barren-ground caribou conservation.

Approach 3.1: Update or develop population models using current information.

Approach 3.2: Promote the collection and exchange of information on caribou ecology, status, and threats.

Approach 3.3: Promote the collection and exchange of information on the relationships among barren-ground caribou, predators, competitors, and their wider environment.

Approach 3.4: Assess cumulative impacts of natural and human-caused landscape change on barren-ground caribou and their habitat.

Objective 4: Conserve and protect barren-ground caribou populations and their habitat.

Approach 4.1: Work with industry, governments, and co-management and regulatory boards to develop and implement best practices to minimize impacts of human land use on barren-ground caribou.

Approach 4.2: Consider responsible predator management options that may benefit barren-ground caribou recovery.

Approach 4.3: Develop accurate and complete reporting of barren-ground caribou harvest across the NWT along with estimates of unrecovered kills and wounding losses.

Approach 4.4: Promote respectful harvest of caribou, including respect for traditional laws and protocols, and compliance with harvest management measures.

Approach 4.5: Develop range-level approaches for management of cumulative impacts on barren-ground caribou and their habitat from natural and human-caused landscape change.

Approach 4.6: Conserve integrity of barren-ground caribou habitat through participation in key environmental assessment and land use planning processes in the NWT and other jurisdictions where projects may affect NWT herds.

Approach 4.7: Identify and protect essential and important barren-ground caribou habitats such as calving grounds, post-calving ranges, and important water crossings.

Approach 4.8: Ensure that barren-ground caribou habitat is a key value that is integrated into environmental assessment decisions and conservation planning initiatives in the NWT and other jurisdictions where proposed decisions/initiatives may affect NWT herds.

Objective 5: Provide education and promote respect for barren-ground caribou, their habitat, and conservation initiatives.

Approach 5.1: Develop and implement hunter education programs to share information on barren-ground caribou and promote hunter excellence.

Approach 5.2: Support programs centred around barren-ground caribou that bring elders and youth together in schools and on the land.

Approach 5.3: Promote educational programs for diverse audiences to increase understanding of conservation initiatives and management of threats to barren-ground caribou.

TABLE OF CONTENTS

PREFACE	2
ACCEPTANCE STATEMENT	4
ACKNOWLEDGEMENTS.....	5
EXECUTIVE SUMMARY	6
TABLE OF CONTENTS.....	10
RECOVERY STRATEGY	12
1. INTRODUCTION.....	12
1.1. Background.....	12
1.1.1. About the Recovery Strategy	14
1.1.2. Collaboration and Management for Barren-ground Caribou	16
2. HISTORICAL AND SOCIAL PERSPECTIVES.....	17
3. HOW DO WE KNOW ABOUT BARREN-GROUND CARIBOU?.....	17
4. SPECIES INFORMATION	18
4.1. Species Description, Biology, and Habitat Needs.....	18
4.2. Population and Distribution.....	20
4.2.1. Changes in Distribution.....	20
4.2.2. Changes in Population.....	22
5. LIMITING FACTORS, THREATS, AND POSITIVE INFLUENCES.....	24
5.1. Natural Limiting Factors	24
5.2. Threats.....	24
5.2.1. Management Complexity.....	25
5.2.2. Land Use Activities	25
5.2.3. Forest Fires.....	26
5.2.4. Climate and Range Conditions.....	27
5.2.5. Parasites and Disease	28
5.2.6. Predation.....	29
5.2.7. Disrespectful Harvesting Practices	30
5.2.8. Environmental Contaminants and Pollution.....	31
5.2.9. Cumulative Effects	32
Recovery Strategy for Barren-ground Caribou	10

5.3.	<i>Factors That May Have a Positive Influence</i>	32
5.4.	<i>Knowledge Gaps</i>	34
6.	CONSERVATION AND RECOVERY	36
6.1.	<i>Conservation and Recovery Goals and Objectives</i>	36
6.2.	<i>Approaches to Achieve Objectives</i>	37
6.3.	<i>Measuring Progress</i>	42
6.4.	<i>Socioeconomic, Cultural, and Environmental Effects of Management</i>	46
7.	NEXT STEPS	47
8.	REFERENCES	48
APPENDIX A – SPECIES STATUS AND ASSESSMENTS		51
APPENDIX B – PLANNING PARTNERS		56
APPENDIX C – GUIDING PRINCIPLES		60

RECOVERY STRATEGY

1. INTRODUCTION

1.1. Background

Barren-ground caribou (*Rangifer tarandus groenlandicus*) are an ecological and cultural keystone species^b, and are a critical part of northern ecosystems. Barren-ground caribou have been a central part of Indigenous cultures for many generations and all languages across the range of barren-ground caribou have words for the iconic species: tuktu/tuktut (Inuvialuktun), tuktuviailuit/tuktuit (Inuinnaqtun and Siglitun), tuttuviailuk (Ummarmiutun), vadzaih (Teetl'it and Gwichya Gwich'in), ʔekwò or hozʔekwò (Tłıchʔ), ʔekwé, ʔepé, ʔedə (Sahtú Dene – Délıne, Tulít'a, and Fort Good Hope/Colville Lake), nódi (South Slavey - Kátł'odeeche dialect), ʔetthén (Chipewyan – Deninu Kué and Łutsel K'e), etthén (Dënesų́łiné), atihk (Cree), and caribou de la toundra (French).

Barren-ground caribou are often classified in terms of 'herds'. Scientific knowledge defines herds based on identifiable and distinct calving grounds (Figure 1), although some mixing and movement does occur. Traditional knowledge holders and Indigenous communities vary in their interpretation of barren-ground caribou herds. Some distinguish among different herds using a variety of techniques (e.g. direction of travel, range, colour/size/body condition, and the taste of the meat). Other interpretations stress fluidity and interconnectedness and do not identify barren-ground caribou as belonging to distinct units or groups. Indigenous stewards of the land, management authorities, and governments have been working within the scientific designations of herds to facilitate collaboration on managing threats for barren-ground caribou and to guide recovery.

Across the global range of barren-ground caribou, 14-15 barren-ground caribou herds are recognized, extending from northeastern Alaska to western Hudson Bay and Baffin Island.^b The NWT is considered home, either entirely or partially, to nine of these herds, or approximately 45% of the global population of barren-ground caribou (Porcupine^c, Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahik, and Qamanirjuaq herds).

^b An ecological keystone species is a species that plays an important role in an ecosystem, such that if it was lost, the ecosystem would change significantly. A cultural keystone species is a species of exceptional significance to a culture/people.

^c The Porcupine herd is not included within the scope of this recovery strategy, see *Preface*.

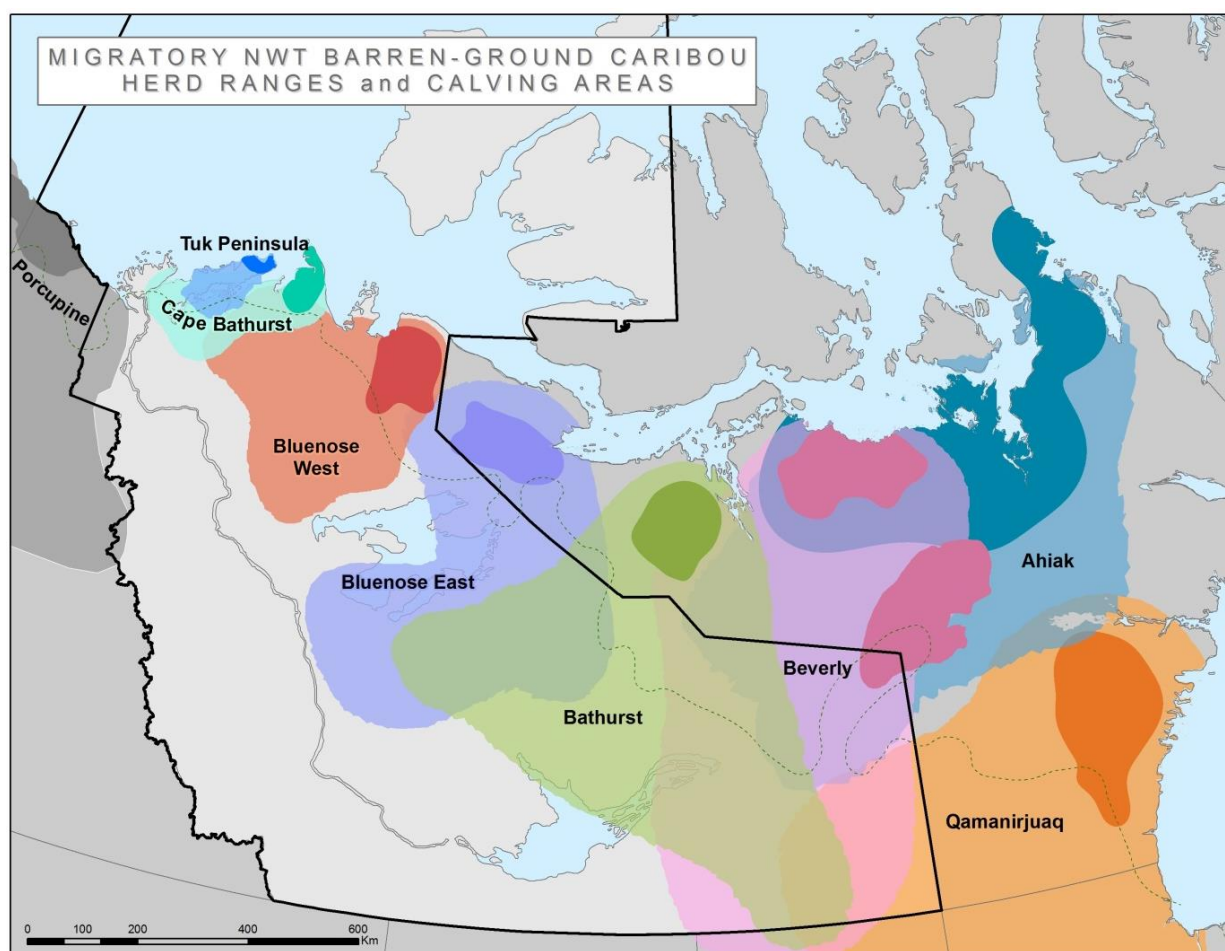


Figure 1: Barren-ground caribou annual ranges (pale colours) and calving grounds (dark colours) for herds that occur in the NWT based on collar data.^{d,e} Polygons were derived using collar data from the Government of the Northwest Territories (GNWT), Government of Nunavut, Yukon Environment, and United States Fish and Wildlife Service. The composite shapefile was developed by GNWT-ENR, Yellowknife.^f

Barren-ground caribou herds have historically undergone large fluctuations in population size and their abundance has been known to cycle. However, recent decreases have been dramatic and estimates indicate historically low numbers (Table 3, section 4.2.2). The reasons for these recent declines are complex and due to multiple

^d Qamanirjuaq range based on radio-collar data from 1993-2008; Qamanirjuaq calving ground based on compilation of all data from government surveys (1963-2008) and telemetry (1993-2012). Tuktoyaktuk Peninsula range based on collar data from 2006-2012. Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, and Ahik ranges based on collar data from 1996-2008. Beverly range based on collar data from 1995-2008; Beverly calving ground based on compilation of all data from government surveys (1957-2011) and telemetry (1996-2012). The inland Beverly calving ground (southern of the two dark pink polygons) has not been used by the herd since 2010.

^e The range of the Porcupine herd is included (greyscale) for completeness, however, as noted in the Preface, this geographically distinct population is not included in the recovery strategy.

^f Annual range use varies for each herd, and actual annual ranges since 2000 have been smaller, corresponding with smaller herd sizes. This figure does not necessarily reflect the historic extent of barren-ground caribou ranges.

interacting factors. These declines have raised concerns about caribou conservation, well-being, herd viability, and have highlighted the importance of long-term monitoring and management.

In light of the observed declines, barren-ground caribou were assessed as Threatened by both the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Species at Risk Committee (SARC) in December 2016 and April 2017, respectively⁹. Habitat changes due to climate, predation, industrial development, and forest fires were identified as threats to barren-ground caribou, according to both science and traditional knowledge. SARC noted that “the cumulative effects from multiple interacting threats are considered unprecedented⁴.” For details of these assessments, please see APPENDIX A – SPECIES STATUS and ASSESSMENTS. Currently, a decision on listing under the federal *Species at Risk Act* is pending the completion of Aboriginal consultation and public engagement. In the NWT, barren-ground caribou were added to the NWT List of Species at Risk as Threatened in July 2018.

1.1.1. About the Recovery Strategy

Recovery strategies are required for Threatened species within two years of their designation under the *Species at Risk (NWT) Act*. This recovery strategy will provide overall guidance on recovery and stewardship of barren-ground caribou in the NWT over the long term. Existing and under development herd-specific and community management plans will provide more detailed, herd-specific guidance. This approach recognizes the work that barren-ground caribou management partners have put into developing existing management plans.

Guiding principles were followed in preparing this recovery strategy. They are provided in APPENDIX C – GUIDING PRINCIPLES.

Table 1 lists the herds included in this recovery strategy along with corresponding herd-specific and community management plans (if applicable). These plans support cross-regional action planning by providing specific guidance on what management for barren-ground caribou looks like from a community perspective. They also offer a community vision, community perspectives on the key problems to be addressed, and actions that communities can help to lead, with support from their co-management partners.

⁹ Note that the scope of COSEWIC’s assessment was of the Designatable Unit of barren-ground caribou, including the Porcupine herd, some islands (e.g. Baffin Island), and some northeast mainland populations in Nunavut. As noted in *Preface*, SARC’s assessment included all barren-ground caribou herds that occur partially or entirely within the NWT, with the exception of the Porcupine herd, which is considered geographically distinct and not at risk at this time.

Table 1: Existing or under development herd-specific and community management plans for barren-ground caribou in the NWT.

Herd	Management Plan	Lead Organization	Review Period
Tuktoyaktuk Peninsula	To be developed	Wildlife Management Advisory Council (NWT)	To be determined
Cape Bathurst	Taking Care of Caribou: the Cape Bathurst, Bluenose-West, and Bluenose-East Barren-ground Caribou Herds Management Plan (November 2014) ⁷	Advisory Committee for Cooperation on Wildlife Management (ACCWM)	5-year review (2019); 10-year intervals thereafter
Bluenose-West			
Bluenose-East			
	Belarewile Gots'ę ęekwę (Délne caribou conservation plan) ²	Délne Belarewile Gots'ę ęekwę Planning Participants	To be determined
Bathurst	Draft Bathurst Caribou Range Plan (under development) ⁸	Bathurst Caribou Range Plan Working Group	5-year review
	Yúnethé Xá ęetthën Hádı - Caribou Stewardship Plan	Łutsel K'e Dene First Nation	To be determined
	Bathurst Caribou Management Plan (under development)	Bathurst Caribou Advisory Committee	To be determined
Beverly	Beverly and Qamanirjuaq Caribou Management Plan 2013-2022 (March 2014) ⁹	Beverly and Qamanirjuaq Caribou Management Board (BQCMB)	Ongoing for objectives and actions; overall review in 2021-2022
Qamanirjuaq			
	Yúnethé Xá ęetthën Hádı - Caribou Stewardship Plan	Łutsel K'e Dene First Nation	To be determined
Ahiak	Not applicable	Management of the Ahiak herd is under the jurisdiction of the Government of Nunavut.	To be determined
	Yúnethé Xá ęetthën Hádı - Caribou Stewardship Plan (Łutsel K'e Dene First Nation)	Łutsel K'e Dene First Nation	To be determined

1.1.2. Collaboration and Management for Barren-ground Caribou

The recovery strategy recognizes the collaborative and interjurisdictional nature of barren-ground caribou conservation in the north and the shared responsibility to care for caribou by Indigenous governments and organizations (IGOs), federal/territorial/provincial governments, co-management boards, and caribou management boards (APPENDIX B – PLANNING PARTNERS).

Under the *Species at Risk (NWT) Act*, the responsibility for developing the recovery strategy rests primarily with the Conference of Management Authorities (CMA). The CMA is the group of renewable resources boards and governments in the NWT that share management responsibility for the conservation and recovery of species at risk. In addition, other IGOs and management boards have been invited to participate in CMA meetings and to provide input into the development of the recovery strategy. Table 2 lists Management Authorities and other IGOs who were invited to participate in the development of this recovery strategy.

Table 2: Members and participants/observers of the Conference of Management Authorities.

Management Authorities for barren-ground caribou in the NWT	Wildlife Management Advisory Council (NWT) Gwich'in Renewable Resources Board Sahtú Renewable Resources Board Wek'èezhìi Renewable Resources Board Tłı̨chǫ Government Government of the Northwest Territories Government of Canada
Invited participants or observers	Acho Dene Koe First Nation Akaitcho Territory Government Athabasca Denesų́liné Beverly and Qamanirjuaq Caribou Management Board Dehcho First Nations Kátł'odeeche First Nation North Slave Métis Alliance Northwest Territory Métis Nation Salt River First Nation

2. HISTORICAL AND SOCIAL PERSPECTIVES

The people of the NWT are intrinsically linked to and share a sacred relationship with barren-ground caribou. Barren-ground caribou are a cultural keystone species and for many Indigenous peoples and communities, no other animal has such a large influence socially, culturally, spiritually, or economically on their way of life and indigeneity, in the past and for present and future generations. The relationship between Indigenous peoples and caribou is intertwined both historically and currently. Caribou provide essential resources such as food, clothing, tools, shelter, and connections to the land, animals, community, and ancestors. Since time immemorial, Indigenous peoples have maintained a relationship of reciprocity with barren-ground caribou, forming their cultural identities, spiritual practices, seasonal rounds, trails and travel-ways, and habitation sites around the relatively dependable health and well-being of barren-ground caribou. This experience is of vital importance to the effective management of barren-ground caribou.

Even with the documented changes in harvesting in recent years, the importance of barren-ground caribou to Indigenous peoples and communities cannot be overstated. Indeed, many Indigenous peoples feel a tremendous responsibility to care for caribou and feel immense loss when caribou well-being is threatened.

3. HOW DO WE KNOW ABOUT BARREN-GROUND CARIBOU?

Barren-ground caribou range widely throughout circumpolar North America, including throughout the majority of the NWT. The extensive network of caribou trails carved into the landscape of the NWT reflects the traditional range of barren-ground caribou. Traditional knowledge explains the importance of these caribou life-ways and how the survival of “caribou people” depended on their expertise of knowing caribou trails, crossings, and ways of being at any given time.

Traditional understandings of respectful relationships, including things like laws and harvesting protocols, are fundamental to the continued survival of people and caribou as well as their relationship with the land. In this context, traditional knowledge provides detailed, direct, seasonal observations about caribou and their habitat. Additionally, traditional knowledge spans very long timeframes, and is often a strong source of up-to-date information on trends, behaviour, herd movements, predators, health, and body condition.

Periodic scientific estimates of herd size provide key quantitative benchmarks for management, and comparison of two or more consecutive surveys shows whether a herd is increasing, stable, or declining. Currently, most NWT herds are surveyed every 3 years; this frequency reflects low herd numbers and increased concern over herd status. This affirms what traditional knowledge holders have already observed.

Population size is estimated using visual and photographic calving ground surveys in June for the eastern barren-ground caribou herds in the NWT (Bathurst, Bluenose-East, Beverly, Ahiak, and Qamanirjuaq). The Government of the Northwest Territories

(GNWT) uses estimates of breeding females in the herd and pregnancy rates to extrapolate to overall herd size for the Bluenose-East and Bathurst herds. A similar method is used for the Beverly and Qamanirjuaq herds by the Government of Nunavut to extrapolate total herd size based on an estimate of all adult females in the herd. For western herds (Bluenose-West, Cape Bathurst, and Tuktoyaktuk Peninsula), photographic post-calving surveys in July are used to provide an estimate of adult caribou in the herd, based on photos of large aggregations that form in response to biting flies. Both methods are considered to be accurate and the results are comparable.

Additional information may also be collected by biologists, harvesters, and elders (e.g. body condition, survival rates, sex ratio, pregnancy rates, the proportion of cows calving in June, condition of habitat or changes to habitat, fat thickness, colour of marrow, colour of organs, signs of disease or parasites in harvested caribou, and predator abundance) to assess factors that may affect trend and condition of caribou or caribou habitat. Population models can be useful for integrating various kinds of information and providing insight into past and likely future trends. All this information helps wildlife managers and Indigenous guardians identify possible reasons for caribou declines and increases, understand the potential impacts of key factors, and decide on monitoring and management actions.

4. SPECIES INFORMATION

Common name in English:	Barren-ground caribou
Name(s) in other languages:	Tuktu/tuktut (Inuvialuktun)
	Tuktuvialuit/Tuktuit (Inuinnaqtun and Siglitun)
	Tuttuvialuk (Ummarmiutun)
	Vadzaih (Teetl'it and Gwichya Gwich'in)
	ᔨᔨᔨᔨ or ᔨᔨᔨᔨᔨᔨ (Tłı̨chǫ)
	ᔨᔨᔨᔨ, ᔨᔨᔨ, ᔨᔨᔨ (Sahtú Dene – Délı̨ne Tulı́t'a and Fort Good Hope/Colville Lake)
	Nódi (South Slavey - Kátł'odeeche dialect)
	ᔨᔨᔨᔨ (Chipewyan – Deninu Kué and Łutsel K'e)
	Etthén (Denesų́líné)
	Atihk (Cree)
	Caribou de la toundra (French)
Scientific name:	<i>Rangifer tarandus groenlandicus</i>

4.1. Species Description, Biology, and Habitat Needs

Barren-ground caribou are a medium-sized member of the deer family and are slightly smaller than the closely related boreal woodland caribou (*Rangifer tarandus caribou*). Barren-ground caribou have the largest antlers relative to their size of any species of deer. Caribou and reindeer are the only deer species in which females grow antlers, but breeding males may have larger antlers for display and contest during the rut (breeding season).

There can be wide variation in colouring within and between herds. Both males and females have light-coloured hair around their tails and on their stomachs, and their coats become progressively darker towards the spine. Mature males have a striking white neck and mane, a brown back, and a distinct band along the flank separating the brown back from the white belly. Females and juveniles show a more muted version of the males' colours. Females have smaller antlers, shorter necks, and smaller bodies, and are typically lighter in colour than the males. Variation in the flavour of the caribou meat also exists among different herds in the NWT.

Barren-ground caribou males usually reach maturity between the ages of 2 and 4 years but may not reach full size and weight until they are 4-6 years old. Males may not begin breeding at that age though, as large dominant males do most of the breeding. Female caribou usually first breed at 2-3 years of age and will typically have one calf per year (in very rare cases, twins), although breeding pauses may occur when females are in poor condition. Rut (breeding) - and consequently calving - are highly synchronized, with most calves born within a few days of each other. Calves are typically born eight to nine months after the fall rut, in late May or the first two weeks of June, after the spring migration northwards to the barrens. The reproductive lifespan of caribou is likely about 12 years, with some females living as long as 12-17 years, and males for a few years less.

An array of predators and scavengers depend on barren-ground caribou. Wolves are considered the primary predators of barren-ground caribou, though grizzly bears, wolverines, and possibly lynx and eagles also prey on or scavenge barren-ground caribou. The role and impact of predation on caribou probably differs among herds, and has a stronger influence during declines and when herds are at low numbers. Grizzly bears may have a greater impact on newborn caribou on calving grounds than wolves in some herds, but wolves are effective year-round predators of all sex and age classes of caribou. Parasites may also have an important impact on caribou. High numbers of insects in July can cause stress for caribou, resulting in decreased body condition and, in extreme cases, death from heat exhaustion as caribou attempt to find refuge.

Typically, barren-ground caribou prefer colder temperatures, which they are very well adapted to: in winter, cold weather prevents icing conditions and inaccessibility of forage, while in summer it reduces insect activity, resulting in less stress for the caribou and better body condition overall.

Barren-ground caribou calve on the tundra near the Arctic coast in the NWT and Nunavut and winter below the treeline of the NWT and in the northern regions of Manitoba, Saskatchewan, and (historically) Alberta. Barren-ground caribou require the use of large annual ranges to support their seasonal migrations, to be able to use alternate ranges (e.g. when some winter habitat burns), and to support large populations. Their twice-annual migration between calving grounds and wintering grounds is, in part, a response to seasonal changes in the suitability of their habitat (food becomes unavailable, movement becomes difficult, etc.) as well as a means of reducing predation risk, especially for cows during calving.^{10,11}

All ranges used during the year are important to barren-ground caribou, but calving and post-calving ranges have been consistently identified as necessary to the survival of barren-ground caribou, and hence essential to recovery of herds at low numbers. Calving and post-calving ranges have been identified from scientific knowledge and traditional knowledge as highly sensitive habitat that should not be disturbed.^{8,12,13,14} Displacement from preferred calving ranges has been linked, through simulation modeling, to negative effects on calf survival and population trend.^{15,16}

Other important parts of the range include:^{8,12,13}

- Key water crossings and land bridges: Some water crossings have a history of use by caribou and hunters dating back thousands of years.^{17,18} These areas are well known to Indigenous peoples who have long set up camps at these key locations. Land bridges are considered key travel and migration corridors.⁸
- Centre of habitation or core range: The centres of habitation or core ranges are used even at times of low herd numbers. This concept was first defined by Skoog¹⁹ for Alaskan caribou, but the idea was recognized much earlier by Indigenous elders.^{18,20} The Bathurst herd's restricted annual range at low numbers, effectively its core range or centre of habitation, was recognized in the Bathurst Caribou Range Plan⁸ and given a high priority as an important area through times of scarcity and abundance.
- Large, strategically located patches of unburned winter range: The importance of lichen-rich, unburned, older forests has been recognized by multiple Indigenous communities in the north and identified in the Bathurst Caribou Range Plan.

4.2. Population and Distribution

4.2.1. Changes in Distribution

Written descriptions from traditional knowledge and spatial data from scientific knowledge indicate that the historic range^h of barren-ground caribou has contracted substantially (several hundred kilometers) since the 1970s-1980s with a large movement north and east (Figure 2). Historically, the winter range of barren-ground caribou in the NWT extended further to the south, including northern Alberta, Saskatchewan, and Manitoba. Migration routes and calving grounds have also shifted slightly or changed over time.

^h Historic ranges are areas that barren-ground caribou were known to use in the past. The historic maximum range is the outermost area that barren-ground caribou once occupied but are not currently using, for one or multiple reasons.



Figure 2: Historic maximum barren-ground caribou range, compiled based on spatial data and written descriptions of range, derived from traditional and community knowledge.

Distribution changes are often linked to changes in population numbers, in that fewer caribou will occupy a smaller area. However, measuring changes in distribution over time is complicated due to gaps in historical trend information, variation in annual range use, changes or shifts in winter distribution among years, and overlapping winter distribution among neighbouring herds. Also, as some herds contract, other herds may move into and occupy adjacent ranges.

In addition to changes in population numbers, distribution changes may be the result of forest fires, food availability, and hunting pressure. Localized contractions in range resulting from human development in the form of roads, mines, mineral exploration camps, towns, oil and gas, hydro projects, and utility corridors have also been documented.

Traditional knowledge holders often mention the disappearance of barren-ground caribou populations. In some instances, it is said that caribou go underground or underwater, and when they become lonely for people they will return. Caribou may also disappear as a result of disrespectful treatment by humans. This is the lesson at the

heart of the frequently told story of the man hitting a caribou with a stick, and the caribou's subsequent shunning of that region for an extended period of time.

Although the distribution of barren-ground caribou has changed over time, it is important that the habitat throughout the historic distribution of the herds is maintained. Even if barren-ground caribou do not currently use the full extent of their historic distribution, they may need to use those areas again in the future.

4.2.2. Changes in Population

It is generally understood that barren-ground caribou undergo large, natural fluctuations in population numbers. These fluctuations are likely driven by interactions among factors such as climate, food availability, predation, and parasites. Periods between high and low numbers can be decades in duration, although the timing and extent of peaks and troughs are not reliably predictable. Traditional and community knowledge suggests that the difference between high and low population numbers within these cycles can be quite large. Although the natural range of variation in barren-ground caribou population cycles has not been quantified beyond scientific surveys over the past 50 years, traditional and community knowledge holders have stated that the population highs are not as high as they used to be and, if recent declines are the result of permanent changes to the landscape, the ability of herds to return to historic highs may be impeded.

In terms of more recent trends in barren-ground caribou populations, traditional and community knowledge does not typically speak to numerical abundance; rather, traditional knowledge holders observe general trends in their region or around their community. Where changes in abundance have been noted, it was often understood to be changes in migration patterns, rather than changes in absolute numbers. From these accounts, there is some indication that the Tuktoyaktuk Peninsula herd may be increasing. The Bathurst and Bluenose-East herds are likely decreasing and there is some evidence of recent declines in the Beverly and Qamanirjuaq herds. Trends for the Cape Bathurst and Bluenose-West herds are not clear based on available resources and there is no available trend information for the Ahiak herd. In the area of the Athabasca Denesūliné (northern Saskatchewan), knowledge holders suggest a recent decline in caribou in their region.

Scientific surveys and population estimates indicate that barren-ground caribou numbers were generally low from the 1950s to the 1970s, after which numbers began to increase. By the mid-1980s to mid-1990s, populations were peaking in abundance. Declines were underway during the late 1990s and 2000s. Numbers stabilized for some herds between 2009 and 2012, but the declines of the 1990s-2000s (70-90%) continued through 2012-2018. As of 2018, two herds appeared roughly stable at low numbers (Cape Bathurst, Bluenose-West), three were declining at a substantial rate (Tuktoyaktuk Peninsula, Bluenose-East, and Bathurst), and the Beverly and Qamanirjuaq herds were declining slowly (Table 3). Trends in the Ahiak herd cannot be determined. Declines in several herds have been extensive (Cape Bathurst, Bluenose-

West, and Bluenose-East), with the largest decline having been seen in the Bathurst herd (98% decline from peak population in 1986).

Table 3. Barren-ground caribou herd population estimates and trends in the NWT.ⁱ $\pm$ indicates 95% confidence interval on estimate, except where standard error (SE) is noted. Population estimates are based on scientific surveys completed since the 1980s.

Barren-ground caribou herd	Population estimates			Recent trend	Short-term approach to address recent trend
	High (year)	Low (year)	Most recent		
Tuktoyaktuk Peninsula	3,320 $\pm$ 623 (2006) ²¹	1,499 $\pm$ 614 (2018)	1,499 $\pm$ 614 (2018)	Continued decline since 2006	More information required
Cape Bathurst	16,813 $\pm$ 18,119 (1987) ²²	2,039 $\pm$ 319 (2006) ²³	4,521 $\pm$ 876 (2018)	Roughly stable 2006-2015; increasing 2015-2018	Maintain current trend
Bluenose-West	140,083 $\pm$ 31,828 (1987) ^{24, 25}	21,011 $\pm$ 4,602 (2018)	21,011 $\pm$ 4,602 (2018)	Roughly stable since 2006	Increase trend
Bluenose-East	120,880 $\pm$ 13,398 (2010) ²⁶	19,294 $\pm$ 3,230 (2018)	19,294 $\pm$ 3,230 (2018)	Continued decline since 2010	Stop the decline
Bathurst	472,000 $\pm$ 147,017 (1986)	8,210 $\pm$ 3,604 (2018)	8,210 $\pm$ 3,604 (2018)	Continued decline since 1986	Stop the decline
Beverly ^{j,k}	276,000 $\pm$ 106,600 SE (1994) ²⁷	103,372 $\pm$ 5,109 SE (2018) ²⁸	103,372 $\pm$ 5,109 SE (2018)	Slow decline since 2011-2018 ²⁹ ; decline since 1994	Stop the decline
Ahiak ^l	Not available	Not available	71,340 $\pm$ 3,882 SE (2011) ²⁹	Unknown	More information required
Qamanirjuaq ^m	496,000 $\pm$ 105,400 SE (1994) ³⁰	264,718 $\pm$ 21,913 SE (2014) ³¹	288,244 $\pm$ 22,439 SE (2017) ³²	Roughly stable 2014-2017; slow decline from 2008-2017; decline since 1994	Stop the decline

ⁱ High and low estimates (if known) are based on surveys since the 1980s. Population estimates for 2017 and 2018 are based on unpublished data from the GNWT and Government of Nunavut.

^j The Beverly herd was defined by calving ground surveys up to 1994 based on an inland calving ground south of Garry Lake. The Beverly herd was redefined in 2011 as calving in Queen Maud Gulf and may not be equivalent to the Beverly herd as defined to 1994.

^k The 1994 Beverly estimate used a different method to extrapolate total herd size (based on breeding females) than the method used for 2011 and 2018 surveys (based on all females).

^l The Ahiak herd as defined in 2011 does not correspond to earlier Ahiak surveys in the 1990s and 2000s.

^m The 1994 Qamanirjuaq estimate used a different method to extrapolate total herd size (based on breeding females) than the method used for 2008, 2014, and 2017 surveys (based on all females).

5. LIMITING FACTORS, THREATS, AND POSITIVE INFLUENCES

5.1. Natural Limiting Factors

Barren-ground caribou are a resilient and adaptable species and occupy diverse habitats. In general, they are adapted to a range of environments, temperatures, and forage, and they have the long, slender legs and endurance to walk hundreds of kilometers. However, barren-ground caribou prefer and are well-adapted to colder temperatures. They may be vulnerable to extreme heat and there has been some speculation in traditional knowledge sources that barren-ground caribou may begin to range further north in an effort to avoid stresses related to this kind of heat. Cold weather also helps prevent icing conditions and inaccessibility of forage. Traditional knowledge studies indicate that barren-ground caribou do not tolerate noise or human disturbance well, resulting in changes in behaviour and stress. Minimizing noise disturbance is important for barren-ground caribou.

Barren-ground caribou are generalist foragers, particularly in the snow-free period, however, their preferred winter forage is lichen. Lichens are high in digestible carbohydrates, but low in protein and minerals. Caribou are able to offset low protein content by recycling nitrogen and by also selecting for vascular plants higher in protein. As well, a mixed diet of lichen and vascular plants stimulates digestion of the lichen. Therefore, while not an obligate relationship, the availability of lichen on the winter range likely limits caribou distribution. In situations where lichen is substantially disturbed or removed (e.g. from forest fires), regrowth of lichen is very slow.

5.2. Threats

Indigenous peoples have co-existed for a long time with barren-ground caribou and with the certainty that although their numbers may go up and down, caribou eventually come back. However, changing conditions across barren-ground caribou ranges reduce that certainty and make predicting caribou movements, behaviour, and migrations more challenging.

Barren-ground caribou are affected by multiple threats and each herd is exposed to these threats to varying degrees. Threats that can be managed to some extent include predation, harvest, land use activities, forest fires, and environmental contaminants and pollution. Other threats are more difficult to manage, such as parasites/disease and climate change. Combined climate change impacts are perhaps the greatest single threat.

The combined influence of these threats is acting in addition to large natural population fluctuations. The cumulative effects from multiple interacting threats are considered unprecedented. As the importance of these threats differs among herds, it is important to monitor and manage the threats that each herd is exposed to separately.

The below subsections describe each threat in more detail. They are presented in no particular order.

5.2.1. Management Complexity

The extensive range and transboundary nature of barren-ground caribou herds leads to interjurisdictional complexity. In the NWT, caribou conservation involves the participation of many IGOs, territorial/provincial/federal governments and agencies, co-management boards, various stakeholder organizations, and communities. Differences in political, cultural, economic, land management, and wildlife management interests create a net effect where management on caribou seasonal ranges can be fragmented, disjointed, and partial.

However, progress has been made to facilitate the challenges encountered by transboundary partners working towards the conservation of barren-ground caribou. As discussed earlier (subsection 1.1.1), herd-specific management plans and community conservation plans support cross-regional action planning by providing specific guidance on what management for barren-ground caribou looks like from a community perspective. Co-management organizations have also been established to bring together representatives from public governments, IGOs, and cultures that share conservation responsibilities. The Beverly and Qamanirjuaq Caribou Management Board was established in 1982, in part, to help provide a consistent approach to the conservation of the Beverly and Qamanirjuaq herds and to promote communication among diverse participants. The Advisory Committee for Cooperation on Wildlife Management (ACCWM) was created to share information and coordinate wildlife management between inter-jurisdictional wildlife management boards, with a particular focus on the management of trans-boundary caribou herds.

In addition to interjurisdictional complexity, obtaining some information, such as herd size/composition and harvest levels, affects the ability of governments and co-management boards to respond rapidly to declines. When declines are initially reported, there is an understandable desire to first confirm and then an obligation to consult on the declines before taking actions. The Bathurst herd's decline was first identified in 2003, but limited actions were undertaken until 2010, by which time the decline had accelerated and population size was further reduced. Further, interweaving traditional knowledge with scientific knowledge in a timely, meaningful, appropriate, and respectful way presents more challenges.

Although some herds have management plans and guardianship programs in place, a key challenge is the lack of long-term management plans for all herds, especially in the context of cumulative effects.

5.2.2. Land Use Activities

Land use activities have the potential to increase access for harvesters and predators, create energetically costly disturbances, and/or create barriers to movement. Disturbances (low flying aircraft, people on foot, and vehicles) can increase caribou energetic costs, particularly if caribou are feeding, resting, or migrating. Roads and development sites may be avoided or act as barriers to movement (altering migration routes). Concerns about cumulative effects and development footprints are an ongoing concern. There still remains considerable uncertainty about when, how, and if there is a

threshold for cumulative effects at which clear and predictable effects on herd size and trend can be expected. Many traditional knowledge holders see these combined activities as being disrespectful to caribou and link them to changes in caribou populations.

The NWT remains relatively undisturbed compared to most Canadian jurisdictions. Land use in some barren-ground caribou ranges is relatively low (e.g. Bluenose-West and Bluenose-East). Other ranges have experienced more substantial land use activities. Industrial development activities (exploration, mining, and oil and gas) have varied over time, in a boom and bust cycle dependent upon the global economy. Following peaks in the 1990s and mid- to late 2000s (prior to the 2008 market crash), exploration and development activity has, for the most part, been declining in the NWT. However, the NWT has large undeveloped oil and gas reserves that could represent a significant portion of Canada's marketable petroleum resources. There has been some recent increase in prospecting and mineral claims as a result of interest in diamond, gold, base metal, rare earth element, and uranium exploration. Mineral exploration and mining have increased in areas such as the Kitikmeot and Kivalliq regions of Nunavut.

The range of the Bathurst herd, which has experienced the greatest population decline, has also experienced the greatest amount of pressure from human activity. Exploration within the Bathurst range increased rapidly through the early to mid-2000s to peak at 95 exploration camps in 2006. Winter roads, all-season roads, and highways totalling over 2,100 km in length occur within the Bathurst herd's range. Within the next two decades, development is forecasted to increase on the tundra in the range of the Bathurst herd.

Despite decades of concerns, calving grounds remain mostly unprotected by legal mechanisms, with the exception of the Bluenose-West herd's calving ground, which is largely protected by Tuktoyaktuk National Park, and the Beverly and Ahik herd's calving grounds, which are provided partial protection by the Queen Maud Gulf Migratory Bird Sanctuary.

Developments on calving grounds are a significant potential threat as almost all the females of a herd are in one relatively small area during calving. Intact calving grounds are generally accepted as being essential for the continued survival of the herds. Well-known trails and water crossings are also used repeatedly by migrating barren-ground caribou. Water crossings are extremely important and play a large role in dictating the direction caribou travel across the landscape. Water crossings are particularly sensitive to human disturbances such as the construction of camps, cabins, mines, roads, or other infrastructure in their vicinity, and if crossings become blocked or are subject to major disturbances, migration routes may shift to less familiar and less desirable areas.

5.2.3. Forest Fires

Forested winter range offers caribou more shelter during winter months, and potentially better lichen forage than can be found on the tundra. Community members have stated that caribou that winter in the forest are larger than caribou that spend all their time on the tundra.³³

Fire renews forest stands and is a normal occurrence in the boreal forest ecosystem. However, forest fires can affect the availability of forage, especially slow-growing lichen. In the NWT, regeneration of lichen-supporting forest stands can take 70-230 years. Caribou have adapted to fire over thousands of years by shifting from recently burned areas to unburned older forests. Traditional knowledge holders explain that caribou tend to avoid recently burned areas and may not return to a burned site for upwards of 100 years, when the habitat may be suitable again. Recent studies on the Bathurst winter range indicate that caribou do use recently burned areas more than expected, possibly to access nutritious regenerating vegetation. Caribou are also known to use unburned or little-burned areas within burns.

Forest fires disturb an average of 600,000 hectares (ha) of NWT forest annually. A warming climate may mean an increase in the intensity, duration, and frequency of big fire years like 2014 (approximately 3.4 million ha were disturbed), and potentially a shift to a younger forest overall, with less of the prime, older, lichen-rich forests that caribou prefer.

Some community observers from the NWT and Saskatchewan have identified loss of barren-ground caribou winter range to fire as a serious concern for caribou and have asked for protection for key unburned winter range areas in important migratory corridors. Some of these areas have been mapped and will be considered in fire management practices, including values at risk fire planning. In big fire years like 2014, with exceptionally dry and warm conditions, some fires will burn regardless of fire-fighting activities and NWT communities and infrastructure will remain the priority for fire suppression. Suppressing all fires is unrealistic and in the past, in the south, has resulted in building fuel for fires that may then be more intense.

5.2.4. Climate and Range Conditions

A rapidly changing climate means that the pace of change in environmental variables (temperature, precipitation, etc.) is accelerating, as are changes in vegetation and habitat on the tundra and in the boreal forest. It is difficult to know what impact climate-related changes will have, however, changes to the ecology of barren-ground caribou due to climate change will be complex, consisting of positive and negative effects.

Documented changes to the range of barren-ground caribou include longer growing seasons, increases in shrub cover, changes in the timing of spring green-up, and decreases in lichen. Precipitation has also changed, with increases in wet snow or freezing rain in the Arctic tundra that have been linked to mortality of caribou. Some NWT barren-ground caribou ranges have experienced increased drought in the summer. Elders have observed more freeze-thaw cycles that trap tundra vegetation under ice, meaning that barren-ground caribou must work harder to get at their food. Deep or wind-packed snow and ice crusts make it hard or even impossible to access forage and may also influence the ability of caribou to move across the landscape. Melting or thawing permafrost has also been noted, as well as increases in the number of insects. Changes in the presence and abundance of other ungulates and predators

have been observed and further changes are anticipated, however, predicting future trends is difficult.

Climate change signals are particularly strong in the Arctic and the Mackenzie River valley. In the Mackenzie District (western and southwestern NWT), the increase is so pronounced that it drives national averages: between 1948 and 2011, winter temperatures increased by 4.5°C.³⁴ During hot, dry summers, plant growth may be of poor quality for caribou and abundant insects may interfere with caribou feeding, resulting in poor physical condition in cows and lower pregnancy rates. Traditional knowledge holders have extensive experience observing this behaviour and explain how caribou can run around in a frenzy and then collapse in exhaustion - the link between increased temperatures, insects, and caribou exhaustion is well understood. Hot, dry summers will also likely mean more large fire years and altered winter foraging conditions for caribou in the boreal forest. These factors are likely to be of increasing importance to NWT barren-ground caribou herds in the future and will need to be monitored and understood better. A changing climate may also mean an influx of diseases and parasites previously uncommon in the NWT, as well as more favourable conditions for disease outbreaks, parasitism, and invasive species. Further, traditional knowledge holders talk about how caribou can change their range when competitors such as moose and deer expand their ranges.

As climate change is a global phenomenon, climate change needs to be addressed at a global scale. However, while total emissions in the NWT are low on a national scale, the NWT economy depends heavily on fossil fuels to meet its energy needs. This dependence on fossil fuels results in significant greenhouse gas emissions per capita in the NWT.³⁵ Taking shared action on this threat is therefore important.

5.2.5. Parasites and Disease

Parasites such as warble flies have been shown to significantly influence barren-ground caribou behaviour, body condition, pregnancy rates, and ultimately productivity and survival. Barren-ground caribou also harbour a diverse array of gastro-intestinal nematodes and tapeworms, muscle and lung worms, as well as blood parasites, but their interrelationships are not well described or understood. Some parasites (i.e. bot flies) are commonly found in harvested caribou, but are not considered overly harmful.

Although it is very unusual for caribou to be killed by insects outright, excessive harassment by mosquitoes can impact caribou through stress-related effects that may further impact behaviour, body condition, and productivity.

Warbles bite caribou and lay their eggs under the skin. The eggs then hatch into larvae, which bore holes into the hide. The stress caused by these insects can result in less time spent resting and foraging. The level of infestation is partly determined by weather. Adult flies are active only when the temperatures and wind speed are suitable. Warble fly activity on the summer range of the Bathurst herd has shown a significant increase as summers have become warmer, especially after the early 1980s. In this manner, climate change may therefore increase the incidence of parasites and disease.

Territory expansion by other species, including wood bison and white-tailed deer, may increase the potential for disease transmission to barren-ground caribou. Chronic wasting disease (CWD) is transmitted between species and is considered a potential threat to barren-ground caribou. CWD has not been recorded in the NWT, however, if it reaches the range of barren-ground caribou herds it is expected to have devastating effects.³⁶ CWD is transmitted and spread through both direct (animal to animal) and indirect environmental (animal-to-premises-to-animal) transmission. CWD is a progressive and fatal disease of the nervous system and it is known to naturally infect white-tailed deer, mule deer, moose, red deer, elk, and reindeer.³⁷ Other interspecific diseases that caribou may be susceptible to include anthrax, Johne's disease (*Mycobacterium avium paratuberculosis* (MAP)), brucellosis, and foot rot.

Harvesters and community members have reported numerous instances of poor body condition, including changes in the flavour, colour, and smell of the meat (e.g. yellow/white pus on the meat, cysts or white spots in the meat, blister-like spots) and abnormalities in the meat and internal organs (lungs stuck to rib cages, swollen joints, sandpaper skin, sores and puss, watery joints, bad livers). Information from hunters and observers on the land provides key insights into caribou health.

Monitoring of harvested caribou provides general assessments of health and disease in NWT herds. In addition, assessing potential threat risks would be beneficial to barren-ground caribou health monitoring.

5.2.6. Predation

Barren-ground caribou are an integral part of the ecosystem and a number of predators rely on caribou as a prey species, including wolves, grizzly bears, wolverines, lynx, and possibly golden eagles. Predation is a limiting factor in barren-ground caribou ecology as it can affect adult and calf survival rates, thus ultimately affecting abundance.

The role of predation on barren-ground caribou abundance differs among herds. Predation rates are influenced by barren-ground caribou life stage, seasonal distribution, and environmental conditions. Predation likely has a greater impact on barren-ground caribou populations during declines and the phase of low numbers (i.e. mortality has a greater effect on lower populations). In addition, when predation pressure is combined, or interacts, with other factors (climate change, parasites, disease, loss of habitat, harvest) it may threaten the ability of barren-ground caribou populations to recover.

Wolves are considered the primary predator of barren-ground caribou throughout the year. Wolves and caribou are linked in that wolf abundance and productivity are in part limited by the caribou population. However, there is uncertainty as to how and when wolf abundance responds to changes in caribou abundance because there is limited information on wolf abundance available in the NWT. Traditional knowledge holders from several communities have indicated that in some areas the number of wolves is increasing in the NWT. Increases in wolf populations may occur in response to increases in alternate prey abundance (e.g. moose, muskoxen) or in response to decreases in the

number of people hunting wolves. In other areas of the NWT, wolf populations may be declining. Scientific studies on wolf-caribou dynamics were completed on the summer range of the Bathurst caribou herd from 1996 to 2012. This work suggested that wolf numbers and productivity declined as caribou numbers declined. Despite the decline, it is likely that wolves continue to have an impact on caribou populations.

Grizzly bear predation on barren-ground caribou has been described by traditional knowledge holders as occurring during the calving period when the calves are young and vulnerable. Some surveys suggest that there are more grizzly bears than wolves on the calving grounds. There are also reports of increasing numbers of grizzly bears in some areas of the NWT (Mackenzie Mountains, mainland of the Inuvialuit Settlement Region, and the Arctic Archipelago),⁴ including within the ranges of the Bluenose-East, Bluenose-West, Cape Bathurst, and Tuktoyaktuk Peninsula herds.

As barren-ground caribou population numbers have fallen to historic lows, there have been increasing calls for action to reduce predator populations that may be limiting the ability of herds to recover. Predator control or removal has been highly controversial in Canada and views about predator removal vary in the NWT. In 2016/2017, the Wolf Feasibility Assessment Technical Working Group was established and compiled information on wolf management options in the Bathurst herd's range and associated costs, likely effectiveness, risks, and uncertainties.³⁸ There has also been interest in predator management on the ranges of other herds.

Whether predator populations are increasing or decreasing, there is a desire to better understand the impact predation has on barren-ground caribou. There is little recent information available about predation rates of wolves or grizzly bears on barren-ground caribou in the NWT. Information on predation has been collected primarily through sightings during aerial surveys and through the number of predators harvested. Management decisions and actions would benefit from a holistic approach that incorporates information on predator abundance and predation rates.

5.2.7. Disrespectful Harvesting Practices

Since time immemorial, Indigenous peoples have harvested barren-ground caribou for subsistence, sustenance, clothing, tools, materials, and more. The relationship between people and caribou was fostered through respectful practices such as honouring caribou that "give" themselves so that people can survive. Many traditional knowledge holders talk about harvesting caribou as defining what it means to be a northern Indigenous person such that cultural identity is threatened without maintaining this cultural practice. No other animal has had such a profound influence on northern Indigenous peoples socially, culturally, or economically in most NWT communities. However, harvest has a direct impact on barren-ground caribou numbers and is an important factor to consider in management for this keystone species.

Harvest alone is not considered a threat to the ability of barren-ground caribou populations to recover, particularly when herds have stable to increasing populations and harvest rates are low. However, when populations are declining or when herd numbers are low, harvest can negatively influence the ability of a herd to recover,

particularly where roads enable easy access for hunters. Further, when traditional harvesting protocols are not taught or practiced, caribou well-being is threatened.

Changes to hunting practices, such as technological enhancements (powerful snow-machines, air-supported hunts, knowledge of caribou locations from satellite collars) or increasing access (development and use of winter and all-season roads) have the potential to adversely affect population recovery. These disrespectful harvest practices are considered a threat.

Measuring the impact of this threat requires successful harvest monitoring to detect trends, including information on how many animals are being taken and whether those animals are cows, calves, or bulls. Continuous, reliable, long-term information on harvesting will help Management Authorities better understand how harvest influences herds. Developing effective means of communicating and sharing information is also critical for informing management decisions. In the NWT, harvest information is collected by government and IGOs, but there are regional differences in the approach and scale of harvest monitoring in different areas. Community guardianship/monitoring initiatives have a role in collecting this important information.

Concerns related to non-traditional harvest practices should also be considered. These include reckless shooting, inappropriate or heavy use of motorized vehicles (pickup trucks versus snowmobiles), wasting meat and leaving carcasses on the ground, not sharing meat, and not using the entire carcass. Other concerns include the sale of barren-ground caribou meat and traditional harvest shifting from declining herds to adjacent herds (e.g. shifting harvest from Bathurst to Bluenose-East, Beverly, Ahlak, and Qamanirjuaq herds). The impact of these threats is unknown, but they are recognized as likely affecting caribou populations.

Ensuring that barren-ground caribou remain a cultural and ecological keystone species will require a concerted effort towards respectful harvest, harvest education, promotion of traditional laws and values, harvest management measures, and harvest reporting that is both accurate and complete.

5.2.8. Environmental Contaminants and Pollution

Contaminants can affect caribou health and condition and the effect of pollution, including tailings ponds, hazardous waste, and airborne particulates from mines, is identified as an important concern for traditional knowledge holders. However, monitoring for more than 20 years suggests that contaminant levels in herds across the NWT, Nunavut, and Yukon are generally low and stable. Caribou are monitored for the presence and concentration of contaminants, such as heavy metals like cadmium and mercury, and various chemicals used as pesticides and herbicides. Variation in concentrations of heavy metals among herds is apparent and possibly related to the proportion of lichen in the diet.

5.2.9. Cumulative Effects

Cumulative effectsⁿ have become an increasing concern for NWT communities, particularly for herds at low numbers where any impediments to recovery are problematic.⁷ Most barren-ground caribou herd populations are now at low points and they are facing an unprecedented level of cumulative effects from multiple interacting threats. These include development and industrial activity (including mines, mills, roads, and powerlines), disrespectful treatment by humans not following traditional laws and harvesting protocols, use of advanced hunting equipment, increased access for harvesters and predators, and climate change. Each major development project that is subject to environmental assessment includes a cumulative effects assessment, but a range-wide approach is needed to properly assess and manage the threat from multiple interacting factors.

5.3. Factors That May Have a Positive Influence

The immense importance that barren-ground caribou have had to NWT Indigenous cultures, in some cases for thousands of years, means that safeguarding caribou habitat and giving herds at low numbers a chance to recover are high priorities for Indigenous peoples. In some cases, Indigenous governments and organizations have taken a lead role in developing plans that define their own limits to harvesting and set out other actions such as guardianship programs to promote herd recovery and healing the relationship between people and caribou.

A number of management instruments are already in place for herds in the NWT. A management plan called *Taking Care of Caribou: the Cape Bathurst, Bluenose-West, and Bluenose-East Barren-ground Caribou Herds Management Plan* was developed by a group of co-management boards called the Advisory Committee for Cooperation on Wildlife Management (ACCWM) and finalized in late 2014. Action plans for all three herds were completed in 2018 and these are updated annually. In 2014, the Beverly and Qamanirjuaq Caribou Management Board (BQCMB) finalized an updated *Beverly and Qamanirjuaq Caribou Management Plan: 2013-2022*, the fourth management plan produced by the BQCMB and supported by the GNWT since 1982. These herd-specific plans are comprehensive and include actions that may be taken to address harvest, predators, land use, habitat protection, threats to caribou, and the need to respect caribou.

A *Bathurst Caribou Range Plan* has been drafted and is scheduled to be finalized in 2019 following approval by the Tłıchǫ Government and GNWT. The range plan is focused on developing an approach to range-wide management of development that considers key habitats like calving grounds, water crossings, and core ranges used by the Bathurst herd at low numbers.

ⁿ Cumulative effects refer to changes to the environment that are caused by an action in combination with other past, present, and potential future human actions. Cumulative effects are usually greater than the sum of individual effects.

In addition to these plans, most NWT herds have been subject to measures implemented by governments and co-management boards between 2006 and 2016. Hearings held by co-management boards have been a key part of reviewing information and determining actions to be taken for each herd. Harvest has been restricted on most NWT herds' ranges since 2007-2010 and was closed on the Cape Bathurst range in 2007 and the Bathurst range in 2015. Various forms of subsistence and resident harvest restrictions or protections are in place for the Tuktoyaktuk Peninsula (seasonal protection – Inuvialuit harvest restricted between April 1 to June 15 to permit the migration of the Cape Bathurst herd), Bluenose-West (Indigenous harvest limited by quota), Bluenose-East (voluntary restriction of Indigenous harvest), Beverly (NWT resident harvest is limited to one male per year), and Ahiak (NWT resident harvest is limited to one male per year). Currently, there is no commercial harvesting of any barren-ground caribou herd in the NWT^o. These restrictions, along with collaborative co-management planning and application of traditional laws and protocols, have contributed to stabilizing trends in the Cape Bathurst and Bluenose-West herds since 2006.

Habitat protection for barren-ground caribou in the NWT is currently offered through existing protected areas, while proposals for protected areas may offer additional future protection (Thaidene Nene, Ezditi, Thelon Wildlife Sanctuary, Edajjila, Saoyú-ᓖehdacho National Historic Site, Tukut Nogait National Park, Yambahti). Range planning processes and regional land use planning processes (Gwich'in, Sahtú, Tłı̨chǫ, and Nunavut land use plans, and the six community conservation plans in place in the Inuvialuit Settlement Region) may also offer some protection. The GNWT and Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) have developed a draft Terms of Reference for a land use planning committee for the public lands in Wek'èezhìi, and are working towards the start-up phase to plan for the public lands in Wek'èezhìi. In the southeastern NWT, the GNWT and CIRNAC are working in partnership with the Akaitcho Treaty 8 Tribal Corporation, the Athabasca Denesųłiné, and the Northwest Territory Métis Nation on the Terms of Reference to design a land use planning process based on future land claim settlements being negotiated in this area. The GNWT is engaging with IGOs with traditional territories in this area to understand their interests in future planning. The Dehcho Land Use Planning Committee, made up of representatives from the Dehcho First Nations, Canada, and the GNWT is leading the development of an Interim Dehcho Land Use Plan pursuant to the Dehcho Interim Measures Agreement.

The direct and indirect effects of climate change are important factors influencing barren-ground caribou recovery and health. The GNWT has developed a territorial climate change mitigation and adaptation framework to guide mitigation and adaptation activities within the NWT.

^o Note that there is commercial harvest of the Bathurst and Qamanirjuaq herds in Nunavut for Nunavut outfitters (Bathurst) and the Rankin Inlet meat plant (Qamanirjuaq).

5.4. Knowledge Gaps

1. **Climate change impacts:** Climate change may act as a continuing threat to barren-ground caribou through a complex mechanism involving shifts in timing of green-up, changes in summer forage quality, rain-on-snow and icing events on the winter range, longer fire seasons, melting permafrost and erosion, changes to freeze-up and thaw timing, and increasing shrub cover. Parasites and diseases are a potential and complex threat under a warmer climate. Shifts in ranges of deer, moose, and other species will also affect caribou ranges. A better understanding of the impacts of climate change on barren-ground caribou habitat is needed.
2. **Predator-prey dynamics:** Predation plays a stronger role when barren-ground caribou are at low numbers, but the impact of predators is unclear. Predation can affect survival of adult and calf caribou and therefore abundance, and there are reports of increasing predator populations in some areas. Information on predator abundance and distribution, as well as on the effectiveness of predator management actions, would benefit management decisions. Information on the impact of predators on caribou numbers and herd dynamics, the impact of different predators, which age/sex class(es) of caribou are most affected, and how predation impacts recovery is also required.
3. **Impacts of human-caused disturbance:** Industrial development is considered to be a significant factor affecting barren-ground caribou, however, a clear link has not been established. Activities and infrastructure associated with exploration and development may disturb caribou and affect their behaviour (e.g. migration patterns, gregarious calving behaviour), reduce the quantity, quality, and availability of habitat and forage, and facilitate access to caribou for hunters and predators. This can contribute to reduced caribou reproduction and survival rates and population declines. Further, many community members talk about disturbance as being disrespectful and harmful to overall caribou well-being. Additional information is needed.
4. **Natural disturbance regimes:** Forest fires represent the most visible factor driving habitat fragmentation and change, impacting forage availability and movement. This threat is particularly important in the winter range. Climate change may lead to even hotter and drier summers in the NWT, possibly increasing the frequency, size, and intensity of fires. Recognizing uncertainties, it is important in the interim to pursue an experimental approach, with companion research to determine effectiveness over time. Research into the implications of climate change on wildfire frequency, intensity, and extent is also required.⁸
5. **Population/demography:** Barren-ground caribou populations undergo large fluctuations over periods of several decades. Caribou can respond to changes in climate and the ecosystem, as well as to human-caused disturbance, through changes in abundance, productivity, and distribution. However, the extent to which caribou can adapt to rapid and often complex changes and fluctuations is poorly understood (for example frequency and rate of herd switching).

6. **Cumulative effects:** The impact of multiple interacting threats to barren-ground caribou and their habitat is considered unprecedented and the implications to barren-ground caribou are unknown. More information is required to understand the scope and scale of cumulative effects from natural and human-caused stressors.
7. **Harvest information:** Harvest plays a stronger role when barren-ground caribou are declining or at low numbers. Management actions such as hunting restrictions have contributed to stabilizing trends in some herds, however, the relationship between harvest and population trends is complex and difficult to measure. Improved harvest information, including information about wastage, would help guide management actions. The practice of traditional laws around harvesting is critical to caring for caribou.
8. **Health (including nutrition, disease, parasites, toxicology, and contaminants):** It is not known if the decline in reproductive rate is due to body condition, energy use/availability, or overall nutrition from the diet. A better understanding of general health (pregnancy rates, mortality rates, etc.), condition, diseases, parasites, and insect harassment would help guide management decisions.
9. **Identification of important/preferred habitat:** It is generally recognized that some areas of the seasonal and annual ranges are more important to barren-ground caribou.⁸ Additional research on habitat use, forage availability, and habitat importance and sensitivity would help to identify key areas and habitats for barren-ground caribou. An improved understanding may help provide better spatial and temporal resolution for identifying sensitive habitats and times for barren-ground caribou that can be incorporated into mitigation measures and habitat protection.

6. CONSERVATION AND RECOVERY

6.1. Conservation and Recovery Goals and Objectives

The long-term vision of this strategy is to conserve barren-ground caribou and to ensure that barren-ground caribou remain a cultural and ecological keystone species. The vision includes ensuring that barren-ground caribou are able to move freely on the land within their historic ranges to ensure natural habitat use and migration. The overall goals of the recovery strategy are to:

1. Maintain or restore self-sustaining, resilient populations of each barren-ground caribou herd, such that no herd is lost.
2. Support unobstructed movement and migration of barren-ground caribou across historic ranges.
3. Promote the social, cultural, and environmental conditions necessary for recovery.

As noted in subsection 4.2.2, the natural range of variation for population numbers is difficult to quantify. Barren-ground caribou herds have undergone large fluctuations in population size in the past, but it is not known how high or how low their numbers were. Population estimates are only available for the recent past (within the last 50 years, or one population cycle). These documented low and high numbers are presented in Table 3, along with the recent trend for each herd.

Short-term milestones towards reaching the recovery strategy goals are listed below (also see Table 3 in subsection 4.2.2, *Changes in Population*).

- Tuktoyaktuk Peninsula herd – more information is required to determine short-term milestones
- Cape Bathurst herd – maintain current trend
- Bluenose-West herd – increase trend
- Bluenose-East herd – stop the decline
- Bathurst herd – stop the decline
- Beverly herd – stop the decline
- Ahik herd – more information is required to determine short-term milestones
- Qamanirjuaq herd – stop the decline

In order to accomplish the recovery strategy goals, five objectives have been established (Table 4), combined with recommended approaches to achieve these objectives. Progress toward achieving these objectives will be evaluated every five years.

Table 4. Conservation and recovery objectives.

No.	Conservation and Recovery Objectives
1	Partners collaborate on the development and implementation of management, monitoring, guardianship, and conservation plans for barren-ground caribou in the NWT.
2	Monitor barren-ground caribou, their habitat, and key factors and threats that may be affecting the status and health of herds in the NWT.
3	Fill knowledge gaps, using traditional, community, and scientific knowledge, to enhance responsible and respectful barren-ground caribou conservation.
4	Conserve and protect barren-ground caribou populations and their habitat.
5	Provide education and promote respect for barren-ground caribou, their habitat, and conservation initiatives.

6.2. Approaches to Achieve Objectives

This recovery strategy recommends the following approaches to achieve the conservation and recovery objectives:

Objective 1: Partners collaborate on the development and implementation of management, monitoring, guardianship, and conservation plans for barren-ground caribou in the NWT.

In the NWT, caribou management involves interactions among many IGOs, territorial/provincial/federal governments and agencies, co-management boards, various stakeholder organizations, industrial interests, and communities. Successfully managing threats to barren-ground caribou in the NWT requires collaborative decision-making with these partners.

Management plans have been completed and implementation is underway for the Cape Bathurst, Bluenose-West, Bluenose-East, Beverly, and Qamanirjuaq herds. Implementation of these plans needs to be continued and resourced adequately. Work remains to be done to complete and implement herd-specific management plans for the Tuktoyaktuk Peninsula and Bathurst herds. As most NWT herds range into neighbouring jurisdictions, transboundary agreements and collaboration are necessary for consistent and effective management. The Ahik herd is not currently subject to a co-management agreement or management plan, and monitoring and management is primarily the responsibility of the Government of Nunavut and other Nunavut organizations. However, management of this herd is done collaboratively between the Government of Nunavut and GNWT. Further to these management plans, Indigenous

monitoring programs based on traditional knowledge of elders, harvesters, and community members have been developed to collect field knowledge of barren-ground caribou and their habitat. Indigenous-led caribou conservation and guardianship programs can be a key component in caring for caribou. Indigenous guardians can play an important role in monitoring caribou health and conditions on the land, respectful harvesting, and promoting conservation.

Meaningful participation in management for wildlife in the NWT, and particularly management for caribou, will be enhanced if IGOs have sufficient resources to participate meaningfully and the commitment that their contributions and understandings will be considered fully and equally.

Approach 1.1: Implement herd-specific management plans for the Cape Bathurst, Bluenose-West, Bluenose-East, Beverly, and Qamanirjuaq caribou herds to promote recovery and conserve habitat.

Approach 1.2: Complete and implement herd-specific management plans for the Tuktoyaktuk Peninsula and Bathurst caribou herds to promote recovery and conserve habitat.

Approach 1.3: Continue working with partners in Nunavut on effective conservation of the Ahiak herd.

Approach 1.4: Review and update herd-specific management plans as required.

Approach 1.5: Support community-based barren-ground caribou monitoring, guardianship, and conservation plans.

Approach 1.6: Continue working to secure adequate resources and ongoing support from governments and other partners (including industry, co-management and regulatory boards, and non-government organizations) for the implementation of this recovery strategy and the management, monitoring, guardianship, and conservation plans noted in approaches 1.1 to 1.5.

Approach 1.7: Increase capacity among Indigenous partners to participate equally and meaningfully in the conservation of barren-ground caribou.

Approach 1.8: Cooperate in the development and implementation of the national barren-ground caribou recovery strategy including identification and protection of critical habitat, and defining population and distribution objectives.

Objective 2: Monitor barren-ground caribou, their habitat, and key factors and threats that may be affecting the status and health of herds in the NWT.

Difficult harvest management decisions were required when declines in barren-ground caribou became apparent. Since then, herd numbers have been monitored more closely compared to when population numbers were high. This kind of monitoring is expensive but it provides key information on herd status and range use. Monitoring of indicators like late-winter calf-cow ratios, cow survival and pregnancy rates, health and condition

of harvested caribou, disturbance on the land, industrial development impacts, range and vegetation condition, trends in environmental variables, harvest levels, and predator abundance has also intensified. Monitoring of this kind is often done using scientific methods, but information from elders and harvesters on the land can also contribute important information, knowledge, and context. Guardianship programs, as well as Indigenous-led monitoring and health programs, increase both interest in and opportunities to collect baseline information.

Approach 2.1: Monitor size, trend, and health of all NWT barren-ground caribou herds.

Approach 2.2: Monitor predator populations that may affect barren-ground caribou, assess predator-prey relationships and predation rates, and consider responsible predator management options that may benefit barren-ground caribou recovery.

Approach 2.3: Monitor the impacts of other key factors affecting barren-ground caribou and their habitat, including, for example, disease, parasites, insects, and climate change.

Approach 2.4: Monitor changes in habitat quality, quantity, and availability for caribou resulting from natural and human-caused landscape changes.

Approach 2.5: Monitor the status of the relationship between people and caribou as an indicator of caribou well-being.

Objective 3: Fill knowledge gaps, using traditional, community, and scientific knowledge, to enhance responsible and respectful barren-ground caribou conservation.

Although monitoring of herd size and trend is essential for management, the reasons underlying declines are not fully understood, and projecting herd trend into the future remains difficult. This recovery strategy recognizes the importance of supporting research that may help improve our understanding of factors underlying declines of NWT herds. As Management Authorities have limited capacity for in-depth research, resources should be directed towards increased partnerships with communities, academic researchers, including graduate students, and towards cost-sharing of research projects.

Population models have been used to integrate demographic information to improve understanding of declines, and to assess the likely impacts of various levels of harvest and harvest sex ratio on caribou herds. The Cumulative Impact Monitoring Program and cumulative effects models have helped improve our understanding of how development affects caribou and how future development scenarios may affect caribou.

Large-scale declines in migratory caribou are not limited to the NWT, and there are traditional knowledge holders, researchers, biologists, and managers across North America, Europe, and Russia with shared interests and useful knowledge. Continuing exchange of knowledge and information will begin to heal the relationship between people and caribou and benefit conservation of caribou, habitat, and ecosystems in the NWT and elsewhere. It will be important to share results of herd monitoring and

research with co-management partners quickly so that management is based on the best knowledge available.

Approach 3.1: Update or develop population models using current information.

Approach 3.2: Promote the collection and exchange of information on caribou ecology, status, and threats.

Approach 3.3: Promote the collection and exchange of information on the relationships among barren-ground caribou, predators, competitors, harvest, and their wider environment.

Approach 3.4: Assess cumulative impacts of natural and human-caused landscape change on barren-ground caribou and their habitat.

Objective 4: Conserve and protect barren-ground caribou populations and their habitat.

The impact mines, roads, and other exploration and development activities have on barren-ground caribou and their habitat is a concern to many people, particularly on the range of the Bathurst herd. In this context, it is important to develop range-level approaches for managing cumulative impacts and to minimize the effects of development as part of promoting the conditions necessary for recovery.

There have also been increasing calls for action to reduce predator populations that might limit the ability of herds to recover. Predator removal has often been controversial in Canada and views on predator control measures are diverse in the NWT.

Forest fires disturb an average of 600,000 ha of NWT forest annually. A warming climate may mean an increase in the intensity, duration, and frequency of forest fires. The loss of barren-ground caribou habitat to fire is of serious concern to many people. Additional ecological changes associated with climate change will be complex and it is difficult to predict whether the sum of these changes will be positive or negative for barren-ground caribou. Harvest restrictions have been implemented for conservation reasons in the NWT ranges of barren-ground caribou herds: Cape Bathurst (since 2007), Bluenose-West (since 2007), Bluenose-East (since 2016), and Bathurst (since 2014-15). Implementation of harvest closures or restrictions will need adequate monitoring to ensure compliance. Accurate, consistent, and complete harvest reporting will be necessary to ensure effective caribou management in the NWT. Ensuring respectful harvest of caribou, including respect for traditional laws and harvesting protocols, will also be necessary.

Most barren-ground caribou herds are now at low points in their abundance and they are facing cumulative effects from multiple interacting threats that are considered unprecedented.

Approach 4.1: Work with industry, governments, and co-management and regulatory boards to develop and implement best practices to minimize impacts of human land use on barren-ground caribou.

Approach 4.2: Consider responsible predator management options that may benefit barren-ground caribou recovery.

Approach 4.3: Develop accurate and complete reporting of barren-ground caribou harvest across the NWT along with estimates of unrecovered kills and wounding losses.

Approach 4.4: Promote respectful harvest of caribou, including respect for traditional laws and protocols, and compliance with harvest management measures.

Approach 4.5: Develop range-level approaches for management of cumulative impacts on barren-ground caribou and their habitat from natural and human-caused landscape change.

Approach 4.6: Conserve integrity of barren-ground caribou habitat through participation in key environmental assessment and land use planning processes in the NWT and other jurisdictions where projects may affect NWT herds.

Approach 4.7: Identify and protect essential and important barren-ground caribou habitats such as calving grounds, post-calving ranges, and important water crossings.

Approach 4.8: Ensure that barren-ground caribou habitat is a key value that is integrated into environmental assessment decisions and conservation planning initiatives in the NWT and other jurisdictions where proposed decisions/initiatives may affect NWT herds.

Objective 5: Provide education and promote respect for barren-ground caribou, their habitat, and conservation initiatives.

Indigenous elders have taught that becoming knowledgeable about the land and the caribou is the way that respect is shown to caribou. Widespread caribou declines and harvest restrictions have meant a loss of opportunities to learn traditional respect and culture through caribou harvesting, but the need to respect caribou and their habitat has never been greater. Public education programs carried out in collaboration with Indigenous organizations, especially with youth in schools and on the land, can promote respect for caribou and ensure that all NWT residents understand the status of caribou herds, traditional protocols around caring for caribou, and the measures necessary for herd recovery.

Approach 5.1: Develop and implement hunter education programs to share information on barren-ground caribou and promote hunter excellence.

Approach 5.2: Support programs centred around barren-ground caribou that bring elders and youth together in schools and on the land.

Approach 5.3: Promote educational programs for diverse audiences to increase understanding of conservation initiatives and management of threats to barren-ground caribou.

6.3. Measuring Progress

At least every five years, a report will be produced focusing on the activities carried out by all parties and the progress made towards meeting the objectives of this recovery strategy. The first such report will be due in 2026. The recovery strategy may also be updated at that time.

Overall progress and success can be measured using various factors, for example: adherence to traditional laws and protocols, renewed relationship between caribou and people, population trends (stable or increasing), species distribution (species continues to be found in its historical range and range recession has not occurred, or has been reversed), and species status (species has not become at risk or further at risk when assessed/re-assessed). These are long-term indicators of success.

Recovery will be considered successful if barren-ground caribou are conserved and their place as a cultural and ecological keystone species is maintained. They should be able to move freely on the land within their historic ranges, facilitating natural habitat use and migration. Healing the relationship between people and caribou will be critical to barren-ground caribou conservation.

Table 4. Recommended approaches for conservation and recovery of barren-ground caribou in the NWT.

Objective	Management approaches	Threats and/or knowledge gaps addressed	Relative Priority ^p / Time frame ^q
Objective #1: Partners collaborate on the development and implementation of management, monitoring, guardianship, and conservation plans for barren-ground caribou in the NWT.	Approach 1.1: Implement herd-specific management plans for the Cape Bathurst, Bluenose-West, Bluenose-East, Beverly, and Qamanirjuaq caribou herds to promote recovery and conserve habitat.	All	Critical/Short-term
	Approach 1.2: Complete and implement herd-specific management plans for the Tuktoyaktuk Peninsula and Bathurst caribou herds to promote recovery and conserve habitat.	All	Critical/Short-term
	Approach 1.3: Continue working with partners in Nunavut on effective conservation of the Ahik herd.	All	Beneficial/Ongoing
	Approach 1.4: Review and update herd-specific management plans as required.	All	Necessary/Ongoing
	Approach 1.5: Support community-based barren-ground caribou monitoring, guardianship, and conservation plans.	All	Necessary/Ongoing
	Approach 1.6: Continue working to secure adequate resources and ongoing support from governments and other partners (including industry, co-management and regulatory boards, and non-government organizations) for the implementation of this recovery strategy and the management, monitoring, guardianship, and conservation plans noted in approaches 1.1 to 1.5.	Management complexity	Necessary/Ongoing
	Approach 1.7: Increase capacity among Indigenous partners to participate equally and meaningfully in the conservation of barren-	All	Necessary/Ongoing

^p **Relative priority** can be *critical*, *necessary* or *beneficial*. Critical approaches are the highest priority for the conservation of caribou and should be implemented sooner rather than later. Necessary approaches are important to implement for the conservation of caribou but with less urgency than critical. Beneficial approaches help to achieve management goals but are less important to the conservation of the species compared to critical or necessary.

^q **Relative timeframe** can be short-term, long-term, or ongoing. Short-term approaches should be completed within five years (2026) and long-term approaches require more than five years to complete. Ongoing approaches are long-term actions carried out repeatedly on a systematic basis.

	ground caribou.		
	Approach 1.8: Cooperate in the development and implementation of the national barren-ground caribou recovery strategy, including identification and protection of critical habitat, and defining population and distribution objectives.	All	Critical/Short-term
Objective #2: Monitor barren-ground caribou, their habitat, and key factors and threats that may be affecting the status and health of herds in the NWT.	Approach 2.1: Monitor size, trend, and health of all NWT barren-ground caribou herds.	All	Critical/Ongoing
	Approach 2.2: Monitor predator populations that may affect barren-ground caribou, assess predator-prey relationships and predation rates.	All	Necessary/Ongoing
	Approach 2.3: Monitor the impacts of other key factors affecting barren-ground caribou and their habitat, including, for example, disease, parasites, insects, and climate change.	All	Necessary/Short-term
	Approach 2.4: Monitor changes in habitat quality, quantity, and availability for caribou resulting from natural and human-caused landscape changes.	All	Necessary/Ongoing
	Approach 2.5: Monitor the status of the relationship between people and caribou as an indicator of caribou well-being.	All	Necessary/Ongoing
Objective #3: Fill knowledge gaps, using traditional, community, and scientific knowledge, to enhance responsible and respectful barren-ground caribou conservation.	Approach 3.1: Update or develop population models using current information.	All	Beneficial/Short-term
	Approach 3.2: Promote the collection and exchange of information on caribou ecology, status, and threats.	All	Necessary/Ongoing
	Approach 3.3: Promote the collection and exchange of information on the relationships among barren-ground caribou, predators, competitors, and their wider environment.	All	Necessary/Ongoing
	Approach 3.4: Assess cumulative impacts of natural and human-caused landscape change on barren-ground caribou and their habitat.	Cumulative effects	Necessary/Ongoing
Objective #4: Conserve and protect barren-ground caribou populations and their habitat.	Approach 4.1: Work with industry, governments, and co-management and regulatory boards to develop and implement best practices to minimize impacts of human land use on barren-ground caribou.	Land use activities	Necessary/Ongoing
	Approach 4.2: Consider responsible predator management options that may benefit barren-ground caribou recovery.	Predation	Necessary/Ongoing
	Approach 4.3: Develop accurate and complete reporting of barren-ground caribou harvest across the NWT along with estimates of unrecovered kills and wounding losses.	Disrespectful harvesting practices	Critical/Ongoing

	Approach 4.4: Promote respectful harvest of caribou, including respect for traditional laws and protocols, and compliance with harvest management measures.	Disrespectful harvesting practices	Critical/Short-term
	Approach 4.5: Develop range-level approaches for management of cumulative impacts on barren-ground caribou and their habitat from natural and human-caused landscape change.	Land use activities	Necessary/Ongoing
	Approach 4.6: Conserve integrity of barren-ground caribou habitat through participation in key environmental assessment and land use planning processes in the NWT and other jurisdictions where projects may affect NWT herds.	Land use activities	Critical/Ongoing
	Approach 4.7: Identify and protect essential and important barren-ground caribou habitats such as calving grounds, post-calving ranges, and important water crossings.	Land use activities	Critical/Short-term
	Approach 4.8: Ensure that barren-ground caribou habitat is a key value that is integrated into environmental assessment decisions and conservation planning initiatives in the NWT and other jurisdictions where proposed decisions/initiatives may affect NWT herds.	Land use activities	Necessary/Ongoing
Objective #5: Provide education and promote respect for barren-ground caribou, their habitat, and conservation initiatives.	Approach 5.1: Develop and implement hunter education programs to share information on barren-ground caribou and promote hunter excellence.	All	Necessary/Ongoing
	Approach 5.2: Support programs centred around barren-ground caribou that bring elders and youth together in schools and on the land.	All	Necessary/Ongoing
	Approach 5.3: Promote educational programs for diverse audiences to increase understanding of conservation initiatives and management of threats to barren-ground caribou.	All	Necessary/Ongoing

6.4. Socioeconomic, Cultural, and Environmental Effects of Management

Barren-ground caribou are of exceptional cultural and ecological significance. The Indigenous people of the NWT are inextricably bound to barren-ground caribou. For Indigenous peoples and many NWT communities, no other animal has such a large influence socially, culturally, spiritually or economically on their way of life, in the past and for current and future generations. The importance of barren-ground caribou to Indigenous peoples and communities cannot be overstated. Caribou provide subsistence and sustenance, including essential resources such as food, clothing, tools, and shelter to survive in the harsh northern environment. Caribou also provide connections to the land, animals, community, and ancestors. Survival would be difficult for many Indigenous people and community members without caribou. Indigenous people honour, respect, and identify with caribou and caribou are fundamental to survival.

"One of the first things I was taught as a child is to respect and honour ekwò, because without this herd many of my ancestors would have perished and would be gone. Ekwò give us life, so in return we have to do our best to guard and protect them."⁸⁹

The economic value of barren-ground caribou is also immense; the Beverly and Qamanirjuaq Caribou Management Board estimated that the annual economic value of the harvest alone from the Beverly and Qamanirjuaq herds for 2005-2006 was about \$20 million.⁹

Accepting when a caribou offers itself through harvest and use of caribou are seen as signs of respect in many Indigenous cultures. Traditional laws and harvesting protocols emphasize taking only what you need, using everything you take, and not wasting anything. These protocols help keep populations strong.

Declines in caribou population numbers have initiated restrictions of harvest of some herds. Voluntary and/or land owner-mandated harvest restrictions are considered sacrifices and they have the potential to displace a nutritious food resource, to threaten cultural identity, harm the relationship between people and caribou, and to negatively impact the way of life for Indigenous people. Without caribou, aspects of Indigenous culture are at risk of being lost and connections to the land are also in peril.

In addition, whether voluntary or not, harvest restrictions can cause frustration among harvesters. There are concerns that harvest and hunters are being unfairly targeted for management action and that population numbers are not increasing despite restrictions. These adverse impacts need to be carefully considered and addressed in reference to land claim agreements and Aboriginal and treaty rights.

Similar to harvest, predation has the potential to limit barren-ground caribou population growth. Actions to manage predator populations have been proposed as a potential approach to assisting the recovery of barren-ground caribou. However, predator control is a complex and controversial topic. Responsible predator management will need to consider the impacts on predator population dynamics and on other species (i.e. moose).

7. NEXT STEPS

Management partners will use this recovery strategy to help in assigning priorities and allocating resources to conserve and recover barren-ground caribou in the NWT, as well for engaging other parties (e.g. communities, industry, co-management boards, regulators, caribou management boards, non-government organizations).

This recovery strategy will be followed by a consensus agreement by the Conference of Management Authorities that will lay out the actions the participating Management Authorities intend to undertake to implement it. At least every five years, there will be a report on the actions undertaken to implement the recovery strategy and the progress made towards meeting its objectives. The first such report will be due in 2026.

Success in the conservation and recovery of barren-ground caribou depends on the commitment and cooperation of various groups involved in directing this plan and cannot be achieved by any one agency alone. All NWT residents and others who use NWT lands and waters, including the NWT public, management partners, municipalities, industry, and other organizations are encouraged to join in supporting and implementing this strategy for the benefit of barren-ground caribou, communities that have traditionally relied on these herds, and NWT society as a whole.

8. REFERENCES

1. Łutsel K'e Dene First Nation. 2019. Yúnethé Xá ʔetthën Hádi - Caribou Stewardship Plan (draft). Wildlife, Lands and Environment Department, Łutsel K'e Dene First Nation, Łutsel K'e, NT.
2. Délıne ʔehdzo Got'ıne (Renewable Resources Council). 2016. Belarewılé Gots'é ʔekwé Délıne Caribou Conservation Plan. First edition – January 8, 2016 edition. Website: http://www.srrb.nt.ca/index.php?option=com_docman&view=download&alias=1287-2016-009-deline-caribou-plan-approved-16-01-08-edition&category_slug=proposal-for-decision-and-supporting-documentation&Itemid=697.
3. Environment and Natural Resources. 2011. Caribou Forever - Our Heritage, Our Responsibility: A Barren-ground Caribou Management Strategy for the Northwest Territories 2011-2015. Environment and Natural Resources, Inuvik, NT. 56 pp. Website: https://www.enr.gov.nt.ca/sites/enr/files/strategies/2011-2015_barren-ground_caribou_management_strategy.pdf
4. Species at Risk Committee. 2017. Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahiak, and Qamanirjuaq herds) (*Rangifer tarandus groenlandicus*) in the Northwest Territories. Species at Risk Committee, Yellowknife, NT. Website: https://www.nwtspeciesatrisk.ca/sites/default/files/bgc_and_pch_status_report_and_assessment_final_apr1117_0.pdf
5. Environment and Natural Resources. 2006. Caribou Forever - Our Heritage, Our Responsibility: A Barren-ground Caribou Management Strategy for the Northwest Territories 2006-2010. Environment and Natural Resources, Inuvik, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/strategies/caribou_forever_our_heritage_our_responsibility.pdf.
6. Committee on the Status of Endangered Wildlife in Canada. 2016. COSEWIC Assessment and Status Report on the Caribou *Rangifer tarandus*, Barren-ground Population, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 123 pp. Website: <http://www.registrelep-sararegistry.gc.ca/default.asp?lang=en&n=24F7211B-1>.
7. Advisory Committee for Cooperation on Wildlife Management. 2014. Taking Care of Caribou: the Cape Bathurst, Bluenose-West, and Bluenose-East Barren-ground Caribou Herds Management Plan. Advisory Committee for Cooperation on Wildlife Management, Yellowknife, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/rev_bluenose_caribou_herds_draft_management_plan_v10_final_signed_-_nov_4_2014_0.pdf.
8. Environment and Natural Resources. 2018. Draft Bathurst Caribou Range Plan. Environment and Natural Resources, Yellowknife, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/resources/draft_bathurst_caribou_range_plan.pdf.
9. Beverly and Qamanirjuaq Caribou Management Board. 2014. Beverly and Qamanirjuaq Caribou Management Plan 2013-2022. Beverly and Qamanirjuaq Caribou Management Board, Stonewall, MB. Website: https://arctic-caribou.com/resources/#_management-plan.
10. Heard, D.C., T.M. Williams, and D.A. Melton. 1996. The relationship between food intake and predation risk in migratory caribou and implications to caribou and wolf population dynamics. *Rangifer* Special Issue 2: 37-44.
11. Russell, D.E. and P. McNeil. 2005. Summer Ecology of the Porcupine Caribou Herd. Porcupine Caribou Management Board, 1st Edition December 2002, 2nd Edition March 2005. Website: <http://pcmb.ca/>.
12. International Porcupine Caribou Board. 1993. Sensitive Habitats of the Porcupine Caribou Herd. Website: <https://pcmb.ca/PDF/researchers/Habitat/Sensitive%20Habitats%20of%20the%20Porcupine%20Caribou%20Herd%20booklet.pdf>.
13. Beverly and Qamanirjuaq Caribou Board. 2005. Protecting Calving Grounds, Post-calving Areas and Other Important Habitats for Beverly and Qamanirjuaq Caribou: A Position Paper by the Beverly and Qamanirjuaq Caribou Management Board, September 2004. Website: http://arctic-caribou.com/pdf/Position_Paper.pdf.

14. Gwich'in Tribal Council. 2019. Gwich'in Tribal Council (GTC) comments on Coastal Plain Oil and Gas Leasing Program Draft Environmental Impact Statement (Leasing EIS). Submitted to United States Department of the Interior, Bureau of Land Management (BLM), March 13, 2019.
15. Griffith, B., D.C. Douglas, N.E. Walsh, D.D. Young, T.R. McCabe, D.E. Russell, R.G. White, R.D. Cameron, and K.R. Whitten. 2002. The Porcupine Caribou Herd. Pp. 8-37 in D.C. Douglas, P.E. Reynolds, and E.B. Rhode (eds.). Arctic Refuge Coastal Plain Terrestrial Wildlife Research Summaries. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD BSR-2002-0001.
16. Russell, D. and A. Gunn. 2019. Vulnerability Analysis of Potential Impact of 1002 Development in the Porcupine Caribou Herd. Draft Report to Environment Yukon, Environment and Climate Change Canada, and NWT Environment and Natural Resources.
17. Gordon, B.H.C. 2005. 8000 years of caribou and human seasonal migration in the Canadian barrenlands. *Rangifer* Special Issue 16:155 – 162.
18. Bergerud, A.T., S.N. Luttich, and L. Camps. 2008. The Return of Caribou to Ungava. McGill-Queen's University Press, Montreal, QC and Kingston, ON.
19. Skoog, R.O. 1968. Ecology of the Caribou (*Rangifer tarandus granti*) in Alaska. PhD thesis, University of California, Berkeley, California, USA.
20. Beaulieu, D. 2012. Dene traditional knowledge about caribou cycles in the Northwest Territories. *Rangifer* Special Issue 20: 59-67.
21. Nagy, J.A., and D. Johnson. 2006. Estimates of the Number of Barren-ground Caribou in the Cape Bathurst and Bluenose-West Herds and Reindeer/Caribou on the Upper Tuktoyaktuk Peninsula Derived Using Post Calving Photography, July 2006. Manuscript Report No. 171. Environment and Natural Resources, Yellowknife, NT.
22. Nagy, J.A. 2009. Population Estimates for the Cape Bathurst and Bluenose-West Barren-ground Caribou Herds Using Post-calving Photography. Manuscript Report (in prep.). Environment and Natural Resources, Yellowknife, NT.
23. Boulanger, J., J. Adamczewski, and T. Davison. 2018. Estimates of caribou herd size using post-calving surveys in the Northwest Territories and Nunavut: A meta-analysis. *Rangifer*, 38, (1) 2018.
24. Adamczewski, J., J. Boulanger, B. Croft, T. Davison, H. Sayine-Crawford, and B. Tracz. 2014. A comparison of calving and post-calving photo-surveys for the Bluenose-East herd of barren-ground caribou in the Northwest Territories, Canada in 2010. Manuscript Report No. 244. Environment and Natural Resources, Yellowknife, NT.
25. Adamczewski, J., J. Boulanger, B. Croft, T. Davison, H. Sayine-Crawford, and B. Tracz. 2017. A comparison of calving and post-calving photo-surveys for the Bluenose-East herd of barren-ground caribou in northern Canada in 2010. *Canadian Wildlife Biology and Management* 6:4-30.
26. Gunn, A., J. Dragon, and J. Nishi. 1997 Bathurst Calving Ground Survey 1996. File Report No. 119. Resources, Wildlife and Economic Development, Yellowknife, NT.
27. Williams, T. M. 1995. Beverly calving ground surveys June 5-16, 1993 and June 2-13, 1994. File Report No. 114. Department of Renewable Resources, Yellowknife, NT.
28. Campbell, M., pers. comm. 2019. Correspondence to Leslie Wakelyn, BQCMB. Kivalliq Regional Wildlife Biologist, Department of Environment, Government of Nunavut, Arviat, NU.
29. Campbell, M., J. Boulanger, D.S. Lee, M. Dumond, and J. McPherson. 2012. Calving Ground Abundance Estimates of the Beverly and Ahik Subpopulations of Barren-ground Caribou (*Rangifer tarandus groenlandicus*) – June 2011. Technical Summary. Department of Environment, Government of Nunavut, Iqaluit, NU.
30. Williams, T. M., unpubl. report. 1994. Qamanirjuaq Caribou Calving Ground Survey. Department of Renewable Resources, Yellowknife, NT.
31. Campbell, M., J. Boulanger, D.S. Lee. 2015. Estimating Abundance of the Qamanirjuaq Mainland Migratory Barren-ground Caribou Subpopulation – June 2014. Interim report, Technical Report Series No. 01-2016. Department of Environment, Government of Nunavut, Iqaluit, NU.
32. Boulanger, J., M. Campbell, D.S. Lee. 2018. Estimating Abundance and Trend of the Qamanirjuaq Mainland Migratory Barren-ground Caribou Subpopulation – June 2017. Technical Summary – No: 01-2018. Department of Environment, Government of Nunavut, Iqaluit, NU.
33. Trottier, T., pers. comm. 2019. Correspondence to Leslie Wakelyn (BQCMB). Area Wildlife Ecologist, Saskatchewan Ministry of Environment, La Ronge, SK.

34. Environment and Natural Resources. 2016. NWT State of the Environment Report. Environment and Natural Resources, Yellowknife, NT. Website: <https://www.enr.gov.nt.ca/en/nwt-state-environment-report>.
35. Government of the Northwest Territories. 2018. 2030 NWT Climate Change Strategic Framework. Environment and Natural Resources, Yellowknife, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/resources/128-climate_change_strategic_framework_web.pdf.
36. Fenton, H., pers. comm. 2019. Email correspondence to M. Grabke. April 2019. Wildlife Veterinarian, Wildlife Division, Environment and Natural Resources, Yellowknife, NT.
37. Environment and Natural Resources. 2019. Frequently Asked Questions on Chronic Wasting Disease (CWD), Wildlife Diseases: Chronic Wasting Disease. 2019. Environment and Natural Resources, Yellowknife, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/resources/faq_chronic_wasting_disease_march_2019_en.pdf.
38. Wolf Feasibility Assessment Technical Working Group, unpubl. report. 2017. Wolf Technical Feasibility Assessment – Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd. Environment and Natural Resources, North Slave Métis Alliance, Tłıchǫ Government, Wek'èezhì Renewable Resources Board, Yellowknife, NT. Website: <https://www.wrrb.ca/sites/default/files/FINAL%20Wolf%20Feasibility%20Assessment%20-%202010nov17.pdf>.
39. Sangris 2012 in Species at Risk Committee. 2017. Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahlak, and Qamanirjuaq herds) (*Rangifer tarandus groenlandicus*) in the Northwest Territories. Species at Risk Committee, Yellowknife, NT. Website: https://www.nwt-species-at-risk.ca/sites/default/files/bgc_and_pch_status_report_and_assessment_final_apr1117_0.pdf.

APPENDIX A – SPECIES STATUS AND ASSESSMENTS

Jurisdiction	Status Rank^r (Coarse filter – to prioritize)	Status Assessment^s (Fine filter – to provide advice)	Legal Listing^t (To protect under species at risk legislation)
NWT	S3 – At Risk (2016)	Threatened (2017)	Threatened (2018)
Canada	N4 – Apparently Secure (2016)	Threatened (2016) ^u	Under Consideration
Global	G5T4 – Apparently secure (2016)	N/A	N/A

^r National and global ranks are from the NatureServe conservation status assessments that determine the extinction risk of species and elimination risk of ecosystems at global scales, as well as their extirpation risk at national scales. Website: <http://explorer.natureserve.org/>. For NatureServe definitions of rankings, see:

<http://www.natureserve.org/conservation-tools/conservation-status-assessment>. The NWT status ranks and ranking definitions are from the Working Group on General Status of NWT Species (2016).

^s Status assessments are independent biological assessments. A status assessment in the NWT is determined by the NWT Species at Risk Committee (SARC): <http://www.nwt-species-at-risk.ca/SARC>. Status in Canada is assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC): <http://www.cosewic.gc.ca/> and the species status assessment can be found at: www.sararegistry.gc.ca. Global status is assessed by the IUCN Species Survival Commission (SSC) and is found on the IUCN Red List of Threatened Species: <http://www.iucnredlist.org/>. Status and year in table reflects the most recent assessment.

^t Legal listing is the legal status of the species on the NWT List of Species at Risk under the territorial *Species at Risk (NWT) Act*: www.nwt-species-at-risk.ca and on Schedule 1 of the federal *Species at Risk Act*: www.sararegistry.gc.ca. There is no global legal listing.

^u Note that the scope of the status assessment for Canada is somewhat different than that used for the NWT. See *Preface* for more details.

Species Assessments:

Assessment of Barren-ground Caribou in the NWT by the Species at Risk Committee (SARC 2017⁴).

The Northwest Territories Species at Risk Committee met in Fort Smith, Northwest Territories on April 5, 2017 and assessed the biological status of barren-ground caribou in the Northwest Territories (including the Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahik, and Qamanirjuaq herds). The assessment was based on the approved status report. The assessment process and objective biological criteria used by the Species at Risk Committee are available at: www.nwtspeciesatrisk.ca.

Assessment: Threatened in the Northwest Territories

Likely to become endangered in the Northwest Territories if nothing is done to reverse the factors leading to its extirpation or extinction.

Reasons for the assessment: Barren-ground caribou fit criterion (a) for Threatened.

- (a) There is evidence that the population is declining in such a way that it could disappear from the Northwest Territories in our children's lifetime.

Main factors:

- This means that there is a 10% chance that barren-ground caribou could disappear from the Northwest Territories within 75 years.
- Although about 530,000 barren-ground caribou still reside either entirely or partially within the NWT, overall, the numbers have declined by more than 85% for all herds where we have trend information, except the Qamanirjuaq herd, during the past three caribou generations (about 25 years).
- Overall trend demonstrates a continued population decline even though two herds (Cape Bathurst and Bluenose-West) appear to have recently stabilized at very low numbers.
- The main threats are:
 - Climate change may act as a continuing threat to barren-ground caribou through a complex mechanism involving shifts in timing of green-up, changes in summer forage quality, rain-on-snow and icing events on the winter range, longer fire seasons, melting permafrost and erosion, changes to freeze-up and thaw timing, and increasing shrub cover. Parasites and diseases are a potential and complex threat under a warmer climate.
 - Predation can affect survival and reproduction and therefore abundance, and there are reports of increasing predator populations in some areas.
 - Industrial development is considered to be one of the most significant factors affecting barren-ground caribou. It can disturb caribou and affect

their behaviour, the quality of habitat and forage, and ultimately, the survivability of the species. It can also facilitate access for both humans and predators.

- Forest fires represent the most visible factor driving habitat fragmentation and change, impacting forage availability and movement. This threat is particularly important in the winter range. Climate change may lead to even hotter and drier summers in the NWT, possibly increasing the frequency and intensity of fires.

Additional factors:

- Barren-ground caribou populations undergo large fluctuations over several decades. The causes of these fluctuations in abundance are complex and likely driven by climate interacting with forage availability, predation, and parasites. Harvest and predation play a stronger role when barren-ground caribou are at low numbers.
- The threats mentioned above are acting in addition to these large fluctuations. The cumulative effects from multiple interacting threats are considered unprecedented.

Positive influences on barren-ground caribou and their habitat:

- Collaborative co-management has led to management planning for caribou and resulted in measures to reduce harvest in response to low numbers. Range planning has been initiated for the Bathurst herd.
- Application of traditional laws and harvesting protocols (e.g. respectful harvest, sharing, avoiding wastage, etc.) have, and will continue to have, a positive influence on caribou health, population numbers, and habitat.
- There are community-based conservation measures and community support for management actions.
- Calving grounds of the Bluenose-West and Beverly herds are provided partial protection from development by inclusion in protected areas and sanctuaries. Habitat protection is also offered through land use planning instruments.

Recommendations:

- Complete and implement herd management and action plans.
- Complete or initiate range planning where needed.
- Improve harvest reporting.
- Work with interjurisdictional partners to achieve effective protection of all calving grounds and other key habitat components (e.g. water crossings).
- Consideration should be given to increasing research into causes of barren-ground caribou population decline and habitat changes to better inform effective management actions.
- Climate change is an underlying driver of many of the threats facing barren-ground caribou and their habitat. Action to reduce greenhouse gas emissions is

required for the long term conservation of barren-ground caribou. Actions should be taken to ensure that the impact of climate change on caribou is highlighted through the appropriate regional, national, and international fora and that effects of climate change on caribou are monitored and mitigation actions taken where possible.

Assessment of Caribou - Barren-ground Population in Canada by COSEWIC (COSEWIC 2016⁶)

Assessment Summary - November 2016

Common name

Caribou - Barren-ground population^v

Scientific name

Rangifer tarandus

Status

Threatened

Reason for designation

Members of this population give birth on the open arctic tundra, and most subpopulations (herds) winter in vast subarctic forests. Well-known for its large aggregations, lengthy migrations, and significant cultural and social value to northern Aboriginal peoples and other Canadians, its 14-15 subpopulations range from northeastern Alaska to western Hudson Bay and Baffin Island. Numbering more than 2 million individuals in the early 1990s, the current population is estimated at about 800,000. Most subpopulations have declined dramatically, but two are increasing, including the Porcupine caribou herd. For 70% of the population with sufficient data to quantify trends, the decline is estimated at 56% over the past three generations (since 1989), with several of the largest herds having declined by >80% from peak numbers. Available survey data for an additional 25% of the total population also indicate declines. Evidence from both local Aboriginal people and scientific studies suggests that most herds have undergone natural fluctuations in numbers in the past; however, available demographic data indicate no sign of rapid recovery at this time and cumulative threats are without historical precedent. Status meets criteria for Endangered because of a reduction in numbers of $\geq 50\%$, but Threatened is recommended because, overall, this population does not appear to be facing imminent extinction at this time. Despite worrisome declines across most of the range, the current numerical abundance of the Porcupine caribou herd and the initiation of numerous management actions by governments, wildlife management boards, and communities support Threatened as a more appropriate conservation status. The status of these subpopulations will have to be carefully monitored and may warrant re-assessment

^v Note that the scope of COSEWIC's assessment was somewhat different than the scope of the NWT assessment. See *Preface* for more information.

within five years.

Occurrence

Yukon, Northwest Territories, Nunavut, Alberta, Saskatchewan, Manitoba

Status history

Designated Threatened in November 2016

APPENDIX B – PLANNING PARTNERS

The Wildlife Management Advisory Council (NWT) advises governments on wildlife policy, management, regulation, and administration of wildlife, habitat, and harvesting in the NWT portion of the Inuvialuit Settlement Region (*Inuvialuit Final Agreement*, section 14). The Wildlife Management Advisory Council (NWT) works collaboratively with the Inuvialuit Game Council, hunters and trappers committees, and government in research, monitoring, and management of wildlife and habitat. The Wildlife Management Advisory Council (NWT) consults regularly with the Inuvialuit Game Council and hunters and trappers committees, and these groups assist the Council in carrying out its functions, upon request.

The Gwich'in Renewable Resources Board is the main instrument of wildlife management in the Gwich'in Settlement Area. Its powers include approving plans for the management and protection of particular wildlife populations (including endangered species), particular wildlife habitats, and forests (*Gwich'in Comprehensive Land Claim Agreement*, sections 12 and 13). The Gwich'in Renewable Resources Board works collaboratively with renewable resources councils and government in research, monitoring, and management of wildlife and habitat. The Gwich'in Renewable Resources Board consults regularly with the renewable resources councils, and its management authority may be delegated to renewable resources councils.

The Sahtú Renewable Resources Board is the main instrument of wildlife management in the Sahtú Settlement Area. Its powers include approving plans for the management and protection of particular wildlife populations (including endangered species), particular wildlife habitats, and forests (*Sahtú Dene and Metis Comprehensive Land Claim Agreement*, sections 13 and 14). The Sahtú Renewable Resources Board works collaboratively with renewable resources councils and government in research, monitoring, and management of wildlife and habitat. The Sahtú Renewable Resources Board consults regularly with the renewable resources councils, and management authority may be delegated to renewable resources councils.

The Wek'èezhìi Renewable Resources Board is the wildlife co-management authority responsible for managing wildlife, wildlife habitat, forests, plants, and protected areas in Wek'èezhìi as set out in the *Tłı̨chǫ Agreement* (*Tłı̨chǫ Agreement*, sections 12, 13, 14 & 16). Responsibilities include making determinations or recommendations on management proposals for activities that may affect wildlife and wildlife habitat. The Wek'èezhìi Renewable Resources Board works collaboratively with the Tłı̨chǫ communities and Tłı̨chǫ, territorial, and federal governments in research, monitoring, and management of wildlife and habitat.

The Tłı̨chǫ Government has powers to enact laws in relation to the use, management, administration and protection of lands and renewable resources, on Tłı̨chǫ lands. This includes laws relating to the management and exercise of harvesting rights for wildlife, plants and trees (*Tłı̨chǫ Agreement*, section 7). The Tłı̨chǫ Government has prepared the *Tłı̨chǫ Land Use Plan* to assist in managing approximately 39,000 km² of Tłı̨chǫ lands.

The Plan provides a guide for future development by outlining how Tłı̨chǫ land will be protected and how activities and development on Tłı̨chǫ lands should occur.

The Government of Canada has ultimate responsibility for the management of migratory birds (as described in the *Migratory Birds Convention Act, 1994*), fish, marine mammals, and other aquatic species (as described in the *Fisheries Act*). It also has responsibilities for the implementation of the federal *Species at Risk Act*, including enforcement of the general prohibitions and critical habitat prohibitions where listed species occur on federal lands that belong to her Majesty, in Right of Canada, or under the direct authority of the Minister of the Environment (national wildlife areas and migratory bird sanctuaries) and the Minister responsible for the Parks Canada Agency (national parks, national park reserves, and national historic sites).

The Government of the Northwest Territories (GNWT), represented by the Minister of Environment and Natural Resources (ENR), has ultimate responsibility for the conservation and management of wildlife, wildlife habitat, and forest resources in the NWT, subject to land claims and self-government agreements. It is the Minister of ENR's ultimate responsibility to prepare and complete management plans and recovery strategies under the *Species at Risk (NWT) Act*. Other GNWT departments also have responsibilities, including for land management, resources, communities, public infrastructure, and economic development. ENR engages with other GNWT departments on species at risk issues through the Inter-departmental Species at Risk Committee, inter-departmental committees of Directors and Deputy Ministers, and Executive Council.

Table B1: Shared management for NWT barren-ground caribou herds.

Herd	Co-management organizations	Main management board/instrument
Tuktoyaktuk Peninsula	Government of the Northwest Territories Hunters and trappers committees Inuvialuit Game Council Wildlife Management Advisory Council (NWT)	No main board or instrument
Cape Bathurst	Government of the Northwest Territories Gwich'in Renewable Resources Board Hunters and trappers committees Inuvialuit Game Council Wildlife Management Advisory Council (NWT)	Advisory Committee for Cooperation on Wildlife Management
Bluenose-West	Government of Canada Government of the Northwest Territories Gwich'in Renewable Resources Board Hunters and trappers committees Inuvialuit Game Council Sahtú renewable resource councils Sahtú Renewable Resources Board Tuktut Nogait National Park Management Board Wildlife Management Advisory Council (NWT)	Advisory Committee for Cooperation on Wildlife Management
Bluenose-East	Délı̨ne Renewable Resources Council Government of Canada Government of Nunavut Government of the Northwest Territories	Advisory Committee for Cooperation on Wildlife Management

	Hunters and trappers committees Inuvialuit Game Council Kitikmeot Regional Wildlife Board Kugluktuk Hunters and Trappers Organization Nunavut Tunngavik Inc. Nunavut Wildlife Management Board Sahtú renewable resource councils Sahtú Renewable Resources Board Tłıchq Government Wek'èezhii Renewable Resources Board Wildlife Management Advisory Council (NWT)	
Bathurst	Athabasca Denesųłiné Né Né Land Corporation Deninu Kuę First Nation Government of Canada Government of Nunavut Government of the Northwest Territories Hunters and trappers organizations Kitikmeot Inuit Association Kitikmeot Regional Wildlife Board Łutsel K'e Dene First Nation North Slave Métis Alliance Northwest Territory Métis Nation Nunavut Tunngavik Inc. Nunavut Wildlife Management Board Salt River First Nation Tłıchq Government Wek'èezhii Renewable Resources Board Yellowknives Dene First Nation	Bathurst Caribou Advisory Committee Bathurst Caribou Range Planning Working Group
Beverly	Athabasca Denesųłiné Government of Canada Government of Nunavut Government of Saskatchewan Government of the Northwest Territories Hunters and trappers organizations Kitikmeot Regional Wildlife Board Kivalliq Wildlife Board Łutsel K'e Dene First Nation Northwest Territory Métis Nation Nunavut Tunngavik Inc. Nunavut Wildlife Management Board Tłıchq Government Wek'èezhii Renewable Resources Board	Beverly and Qamanirjuaq Caribou Management Board
Ahiak	Athabasca Denesųłiné Government of Canada Government of Nunavut Government of Saskatchewan Government of the Northwest Territories Hunters and trappers organizations Kitikmeot Regional Wildlife Board Kivalliq Wildlife Board Łutsel K'e Dene First Nation Northwest Territory Métis Nation Nunavut Tunngavik Inc. Nunavut Wildlife Management Board	No main board or instrument

	Tłıchǫ Government Wek'èezhıı Renewable Resources Board	
Qamanirjuaq	Athabasca Denesuline Ghotlnene K'odtineh Dene Government of Canada Government of Manitoba Government of Nunavut Government of Saskatchewan Government of the Northwest Territories Hunters and trappers organizations Kivalliq Wildlife Board Łutsel K'e Dene First Nation Northlands Denesuline First Nation Northwest Territory Métis Nation Nunavut Tunngavik Inc. Nunavut Wildlife Management Board Sayisi Dene First Nation	Beverly and Qamanirjuaq Caribou Management Board

APPENDIX C – GUIDING PRINCIPLES

The following principles guided the development of this recovery strategy:

- Recognize that the biological diversity of the NWT is a legacy to be preserved, and that all NWT residents and others who use NWT lands and waters have a shared responsibility for the protection and conservation of species at risk:
 - Recognize the shared responsibility of the Management Authorities, seek collaborative partnerships, and expect that all responsible parties will contribute.
 - Respect Treaty and Aboriginal rights as well as land claim and self-government agreements.
 - Involve interested parties in developing the plan/strategy, including engagement at the community level throughout the process.
 - Promote engagement by all parties in playing a meaningful role in implementing this strategy and supporting long-term recovery of NWT barren-ground caribou.
- Recognize that conservation measures may have social, economic, or ecological implications.
- Use adaptive management, which is: a systematic approach for continually improving management policies or practices by deliberately learning from the outcomes of management actions.
- Be guided by and implement the Precautionary Principle, which states that a lack of scientific certainty will not be used as a reason to delay measures to alleviate a threat to a species at risk.
- Make full use of the best available information, including traditional, community, and scientific knowledge:
 - Recognize and respect differences and similarities in approaches to the collection and analysis of different types of knowledge.
 - Recognize and address information gaps.
- Have a clear goal and clear, measurable objectives:
 - Include only management approaches that are realistic and biologically feasible.
 - Recognize that conservation and recovery can take a long time; therefore long-term approaches are needed.
- Management actions will be taken at the herd level to maintain population numbers, distribution, and range use of each barren-ground caribou herd, such that no herd is lost and sufficient high quality habitat is maintained to allow for herd recovery into historic range.

- Each caribou herd has value to one or more NWT Indigenous governments and organizations and to others outside the NWT as well, and should be maintained in a healthy state on the landscape.
- Collaboration among governments, co-management boards, caribou management boards, communities, and, where needed, with neighbouring jurisdictions, is essential to ensuring successful and effective management for caribou in the NWT.
- Public education will be necessary to promote respect for caribou and awareness of traditional Indigenous practices so that all NWT residents and others who use NWT lands and waters know how and are encouraged to contribute to the recovery of caribou.