NUNAVUT WILDLIFE MANAGEMENT BOARD
Agenda: Regular Meeting 004-2021
December 8, 2021 (Day 1)
Iqaluit, Nunavut

	No:	Item:	Tab:	Presenter:	Maximum Time
9:00 AM - 9:02 AM	1	Open Meeting		Chairperson	2 Minutes
9:02 AM - 9:03 AM	2	Declaration of Conflict of Interest		Chairperson	1 Minute
9:03 AM - 9:05 AM	3	Agenda Review and Approval of RM004-2021 Meeting	1	Chairperson	2 Minutes
9:05 AM - 10:00 AM	4	Request for Decision on the proposed listing of Barren-ground Caribou as *Threatened* under the federal *Species at Risk Act* [For Decision]	2	Environment and Climate Change Canada	55 Minutes
10:00 AM - 10:15 AM		**BREAK**			15 Minutes
10:15 AM - 12:00 PM	4	Request for Decision on the proposed listing of Barren-ground Caribou as *Threatened* under the federal *Species at Risk Act* [For Decision]	2	Environment and Climate Change Canada	1 Hr & 45 Minutes
12:00 PM - 1:15 PM		**LUNCH**			1 Hr & 15 Minutes
1:15 PM - 2:05 PM	4	Request for Decision on the proposed listing of Barren-ground Caribou as *Threatened* under the federal *Species at Risk Act* [For Decision]	2	Environment and Climate Change Canada	50 minutes
2:05 PM - 3:00 PM	5	Dolphin and Union Caribou Harvest Management [For Decision]	3	Government of Nunavut	55 Minutes
3:00 PM - 3:15 PM		**BREAK**			15 Minutes

3:15 PM - 4:00 PM	6	Inuit Qaujimajatuqangit, knowledge, and perspectives on M'Clintock Channel and Gulf of Boothia Polar Bears [Information]	4	Kitikmeot Regional Wildlife Board	45 Minutes
4:00 PM - 4:30 PM	7	2022 Walrus Sport Hunt Applications [For Decision]	5	NWMB	30 Minutes
	8	Adjournment of RM004-2021 Meeting		Chairperson	

NUNAVUT WILDLIFE MANAGEMENT BOARD
Agenda: Regular Meeting 004-2021
December 9, 2021 (Day 2)
Iqaluit, Nunavut

	No:	Item:	Tab:	Presenter:	Maximum Time
9:00 AM - 9:05 AM	1	Open Meeting		Chairperson	5 Minutes
9:05 AM - 10:00 AM	2	Polar Bear Harvest Administration and Credit Calculation System [For Decision]	6	Government of Nunavut	55 Minutes
		BREAK			15 Minutes
10:15 AM - 12:00 PM	2	Polar Bear Harvest Administration and Credit Calculation System [For Decision]	6	Government of Nunavut	1 Hr & 45 Minutes
		LUNCH			
1:15 PM - 2:00 PM	3	Request for Decision on the proposed listing of Hudsonian Godwit as *Threatened* under the federal *Species at Risk Act* [For Decision]	7	Environment and Climate Change Canada	45 Minutes
2:00 PM - 2:45 PM	4	Operational Updates [For Information]	8	Fisheries & Oceans	45 Minutes
		BREAK			15 Minutes
3:00 PM - 3:30 PM	5	Update - Bowhead Stranding Events [For Information]	9	Fisheries & Oceans	30 Minutes
3:30 PM - 4:00 PM	6	Juvenile redfish (*Sebastes mentella* and *Sebastes fasciatus*) bycatch in the Northern Shrimp Fishery in the Eastern Assessment Zone [For Information]	10	Fisheries & Oceans	30 Minutes

	7	Adjournment of RM004-2021 Meeting		Chairperson	

Environment and Climate Change Canada
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Canada

Submission to the Nunavut Wildlife Management Board

For

Information: **Decision: X**

Issue: Request for decision on the proposed listing of Barren-ground Caribou as Threatened under the federal *Species at Risk Act*.

Background:

<u>Distribution</u>

- The range of Barren-ground Caribou in Canada extends from the Yukon to Baffin Island, and south into northern Alberta, Saskatchewan and Manitoba.
- In Nunavut, Barren-ground Caribou are found across the Kitikmeot, Kivalliq and Qikiqtaaluk regions.
- There are 11 herds in Nunavut: the Bluenose-East, Bathurst, Beverly, Ahiak, Qamanirjuaq, Lorillard, Boothia Peninsula, Wager Bay, Southampton Island, Coats Island, and Baffin Island herds.

<u>Assessment and Threats</u>

- The Committee on the Status of Endangered Wildlife in Canada assessed Barren-ground Caribou as Threatened in November 2016 because of steep population declines. According to the Committee on the Status of Endangered Wildlife in Canada criteria, the known decline in seven subpopulations is 56.8% over the last three generation (around 2 million individuals in the early 1990s to about 800,000 in 2016).

Prepared by:
Canadian Wildlife Service, Iqaluit

October 2021

- Barren-ground Caribou could have been assessed as Endangered due to this reduction (greater than or equal to 50%). However, the assessment was downgraded to Threatened due to existing co-management efforts by governments, wildlife management boards and communities, and because Barren-ground Caribou do not appear to be facing imminent extinction at this time. A Threatened species is likely to become Endangered unless threats are addressed.
- Abundance surveys that have occurred since the Committee on the Status of Endangered Wildlife in Canada assessment have shown further declines in some populations, including the Bluenose-East, Bathurst, and Beverly herds.
- Herds are more vulnerable and sensitive to threats when their populations are low.
- Inuit knowledge indicates that caribou cycle through population highs and lows. New threats, such as development and climate change, may make it more difficult for populations to cycle back to peak levels and there are no indications that populations are making rapid recoveries at this time.

- Potential threats include:
    - Climate and weather changes affecting forage availability, predation, parasites and diseases.
    - Industrial exploration and development.
    - Fragmentation of habitat in their winter range from forest fires and increasing human presence.
    - Increased human population and an increased demand for caribou meat.

Implications of the proposed listing

- If Barren-ground Caribou are listed as Threatened under the federal *Species at Risk Act*, a national recovery strategy will be required, which will include a plan detailing how to keep all the herds healthy and available for future generations.
- The recovery strategy will be prepared in cooperation with all management partners (i.e. wildlife management boards, Indigenous governments and organizations, territorial and relevant provincial governments).
- Within the recovery strategy, conservation strategies may be identified and described down to the herd level.
- Critical habitat necessary for the survival or recovery of the species (e.g. calving areas) will need to be identified as a component of the recovery strategy. Environment and Climate Change Canada will work with all management partners to identify critical habitat and discuss methods for protecting it from activities likely to destroy it.
- If listed, prohibitions against killing or harming Barren-ground Caribou will automatically come into force in National Parks, National Wildlife Areas, and Migratory Bird Sanctuaries. These prohibitions do not apply to Inuit harvest.

Prepared by:
Canadian Wildlife Service, Iqaluit October 2021

- The *Species at Risk Act*'s prohibitions do not apply to Inuit exercising harvesting rights under the *Nunavut Agreement*; if Barren-ground Caribou were listed under the *Species at Risk Act*, harvest management decisions would still be made according to the processes established by Article 5 of the *Nunavut Agreement*, and existing wildlife management bodies and processes would remain in place. The current roles and responsibilities of Hunters and Trappers Organizations, Regional Wildlife Organizations, the Nunavut Wildlife Management Board, and the Government of Nunavut in caribou management within Nunavut would not change.
- The profile of caribou would be raised and communities would have more resources available to them to support caribou conservation activities (e.g. monitoring programs, Inuit knowledge collection, herd-specific management plans) through federal funding programs such as the Aboriginal Fund for Species at Risk.

Consultation:

<u>Pre-consultation</u>

- In March 2017, Environment and Climate Change Canada briefed the Nunavut Wildlife Management Board on the upcoming assessment by the Committee on the Status of Endangered Wildlife in Canada of Barren-ground Caribou.
- In November 2017, Environment and Climate Change Canada submitted a Terrestrial Issues Flagging document to the Government of Nunavut and the Nunavut Wildlife Management Board for input on developing a consultation plan. Environment and Climate Change Canada presented a consultation plan to the Nunavut Wildlife Management Board in December 2017 to ask for the Nunavut Wildlife Management Board's recommendations on the consultation approach.
- It was decided that Environment and Climate Change Canada would consult with all but three Nunavut communities (Grise Fiord, Resolute, Sanikiluaq).

<u>Meetings and Materials</u>

- The purpose of the consultations was to 1) explain the Committee on the Status of Endangered Wildlife in Canada assessment, the *Species at Risk Act* -listing process, and the implications of listing, 2) gather comments and formal positions, 3) address questions and concerns raised.
- Environment and Climate Change Canada worked collaboratively with partner organizations in Nunavut, and staff were invited to attend Environment and Climate Change Canada's consultation meetings and attended when feasible.
- The consultation teams typically consisted of an Environment and Climate Change Canada biologist, one or more Environment and Climate Change Canada staff to manage administration, logistics and recordings, an interpreter, and occasionally, when available, representatives from the Government of Nunavut, Nunavut Tunngavik Incorporated, the Regional Wildlife Organizations, the Regional Inuit Associations and the Nunavut Wildlife Management Board.

- During each consultation meeting, Environment and Climate Change Canada staff had open discussions during which board members and attendees asked questions, voiced opinions, and shared knowledge about caribou in their area.
- Hunters and Trappers Organizations and the public were asked to provide comments, other information and a formal position on the *Species at Risk Act* -listing proposal (i.e. support, do not support, or are indifferent).

Round 1 (January 2018-February 2019)

- Consultation packages were sent by email and mail to 22 Nunavut communities and partners within the range of the species in January 2018. The packages included a letter, a factsheet, a PowerPoint presentation, and a questionnaire in English and Inuktitut.
- Environment and Climate Change Canada held the first round of consultation meetings from February 2018 to February 2019 in the Qikiqtaaluk, Kivalliq and Kitikmeot regions.
- Environment and Climate Change Canada consulted with the Hunters and Trappers Organizations, as the local authority for wildlife management in each community, and when requested public meetings were also held.
- Key presentation points included: 1) the assessment of Barren-ground Caribou was conducted by the Committee on the Status of Endangered Wildlife in Canada, not by the government, using best available information, 2) no decision has been made yet, 3) consultation is required with the Government of Nunavut, the Nunavut Wildlife Management Board, Hunters and Trappers Organizations and other organizations before any decision is made (Inuit input is critical), 4) the purpose of the consultations (explained the Committee on the Status of Endangered Wildlife in Canada assessment, the *Species at Risk Act* -listing process, the implications of listing, gathered comments, and formal positions, addressed questions and concerns), 5) the *Nunavut Agreement* takes precedence over the *Species at Risk Act*, if Barren-ground Caribou were listed under the *Species at Risk Act*, harvest management decisions would still be made according to the processes established by Article 5 of the *Nunavut Agreement*, 6) if Barren-ground Caribou were listed, a recovery strategy would be developed and critical habitat identified.

This map shows the Nunavut communities that were consulted and the Barren-ground Caribou range

Round 2 (March 2019-May 2021)

- In March 2019, Environment and Climate Change Canada presented to the Nunavut Wildlife Management Board on the consultations. The consultation package, meeting notes and meeting summaries were all included. To accommodate concerns shared by several communities and to ensure their questions were addressed, it was decided that Environment and Climate Change Canada would conduct further consultations in Nunavut.

- Environment and Climate Change Canada worked closely with Nunavut Tunngavik Incorporated and the Government of Nunavut to modify the consultation approach and review presentation materials. The result of this was presentation materials were adapted to provide additional information and emphasis put into addressing outstanding concerns and clarifying misconceptions about the proposed *Species At Risk Act*-listing.
- Presentations now also included: 1) summaries of previous consultation feedback, 2) Committee on the Status of Endangered Wildlife in Canada's assessment process and the *Species at Risk Act*-listing processes, 3) the role of Inuit Qaujimajatuqangit and Inuit involvement, 3) Inuit harvesting rights and wildlife management processes under the *Nunavut Agreement*, 4) the potential benefits to listing, 5) local herd information, and 6) the addition of a Government of Nunavut biologist at all meetings to provide additional information on local herds.
- Through a discussion with Nunavut Tunngavik Incorporated and the Government of Nunavut, it was decided that Environment and Climate Change Canada would consult with the regional wildlife boards at their fall 2019 annual general meetings.
- Environment and Climate Change Canada met with the Qikiqtaaluk Wildlife Board at their Annual General Meeting in the fall of 2019 and there was no request for additional meetings in the region.
- Environment and Climate Change Canada attended the Kivalliq Wildlife Board Annual General Meeting in the fall of 2019. At the meeting, it was determined that additional meetings would be necessary with Kivalliq Hunters and Trappers Organizations. Environment And Climate Change Canada had a second round of meetings with Hunters and Trappers Organizations in the Kivalliq region in February 2020.
- Due to the federal election, in the fall of 2019, Environment and Climate Change Canada was unable to attend the Kitikmeot Regional Wildlife Board annual general meeting and as a result, reached out to Hunters and Trappers Organizations individually. Due to COVID-19 travel restrictions, Environment and Climate Change Canada was unable to have in-person meetings in May 2020 as was planned, but was able to have the second round of meetings virtually, with all but one of the Kitikmeot region Hunters and Trappers Organizations and with the Kitikmeot Regional Wildlife Board, from January 2021 to June 2021.
- Consultation meetings with additional organizations (i.e. Nunavut Tunngavik Incorporated, the Kivalliq Inuit Association and the Beverly and Qamanirjuaq Caribou Management Board) were also held between 2018 and 2021.

<u>Post-consultation</u>

- After each meeting, Environment and Climate Change Canada prepared meeting summaries, and Hunters and Trappers Organizations were provided an opportunity to review and validate the summaries before they were finalized.

- Environment and Climate Change Canada followed up with Hunters and Trappers Organization's and other organizations to request their official position either by email or through the provided questionnaire.

Table 1: Summary of consultation meetings on the proposed listing of Barren-ground Caribou held in each community between 2018 and 2021.

Region	Community	Meeting Group	1st Round of Meetings			2nd Round of Meetings		
			Public meeting	Hunters And Trappers Organization meeting	Number of attendees from community	Public meeting	Hunters And Trappers Organization meeting	Number of attendees from community
Qikiqtaaluk	Pangnirtung	Pangirtung Hunters and Trappers Association	Y	Y	Unknown[2]	N	N	N/A
Qikiqtaaluk	Qikiqtarjuaq	Qikiqtarjuaq Hunters and Trappers Association	Y	Y	24	N	N	N/A
Qikiqtaaluk	Clyde River	Clyde River Hunters and Trappers Organization	Y	Y	23	N	N	N/A
Qikiqtaaluk	Mattimatalik (Pond Inlet)	Pond Inlet Hunters and Trappers Organization	Y	Y	11	N	N	N/A
Qikiqtaaluk	Ikajutit (Arctic Bay)	Arctic Bay Hunters and Trappers Organization	Y	Y	23	N	N	N/A
Qikiqtaaluk	Aiviq (Cape Dorset)	Cape Dorset Hunters and	Y	Y	34	N	N	N/A

		Trappers Organization						
Qikiqtaaluk	Hall Beach	Hall Beach Hunters and Trappers Association	Y	Y	24	N	N	N/A
Qikiqtaaluk	Igloolik	Igloolik Hunters and Trappers Organization	Y	Y	52	N	N	N/A
Qikiqtaaluk	Iqaluit	Iqaluit Hunters and Trappers Association	N	Y	7	N	N	N/A
Qikiqtaaluk	Kimmirut	Kimmirut Hunters and Trappers Organization	Y	Y	50	N	N	N/A
Kitikmeot	Kugluktuk	Kugluktuk Hunters and Trappers Association	N	Y	9	N	Y[1]	8
Kitikmeot	Cambridge Bay (Ekaluktutiak) Bathurst Inlet (Qinqaut) Bay Chimo (Omingmaktok)	Ekaluktutiak Hunters and Trappers Association Burnside Hunters and Trappers Association Omingmaktok Hunters and	Y	Y	29	N	Y[1,3]	10

		Trappers Association						
Kitikmeot	Taloyoak (Spence Bay)	Spence Bay Hunters and Trappers Association	Y	Y	58	N	Y[1,3]	10
Kitikmeot	Kugaaruk (Qutairuruaq)	Qutairuruaq Hunters and Trappers Association	N	Y	8	N	Y[1,3]	7
Kitikmeot	Gjoa Haven (Usqsuqtuuq)	Gjoa Haven Hunters and Trappers Association	N	Y	7	N	N	N/A
Kivalliq	Rankin Inlet (Kangiqtiniq)	Aqiggiag Hunters and Trappers Organization	N	Y	4	N	Y	5
Kivalliq	Arviat	Arviat Hunters and Trappers Organization	N	Y	6	N	Y	Unknown[2]
Kivalliq	Whale Cove (Issatik)	Issatik Hunters and Trappers Organization	N	Y	3	N	Y	6
Kivalliq	Coral Harbour (Aiviit)	Aiviit Hunters and Trappers Organization	Y	Y	28	N	Y	10

Kivalliq	Naujaat (Arviq)	Arviq Hunters and Trappers Organization	Y	Y	24	N	Y	10
Kivalliq	Chesterfield Inlet (Aqigiq)	Aqigiq Hunters and Trappers Organization	N	Y	5	N	Y	13
Kivalliq	Baker Lake	Baker Lake Hunters and Trappers Organization	N	Y	7	N	Y	9

[1]Meeting held virtually.
[2]Presentation delivered by the Government of Nunavut staff, Environment and Climate Change Canada attendance by phone.
[3]Joint virtual meeting (multiple Hunters and Trappers Organization's in attendance)

Table 2: Summary of meetings on the proposed listing of Barren-ground Caribou held with each organization between 2018 and 2021. The Government of Nunavut and Nunavut Tunngavik Incorporated were met with on multiple occasions throughout the entire process.

Organization	1st Meeting Date	2nd Meeting Date
Qikiqtaaluk Wildlife Board	November 17th 2019	N/A
Kivalliq Wildlife Board	October 23th 2019	N/A
Kitikmeot Regional Wildlife Board	March 23th 2021	N/A
Nunavut Wildlife Management Board	March 2019*	March 2020
Beverly and Qamanirjuaq Caribou Management Board	May 9th 2018	April/May 2019
Kivalliq Inuit Association	February 7th 2020	N/A

*ECCC first met with NWMB in 2017

Results and responses:

- Environment and Climate Change Canada received four written responses from organizations/boards:
  - Qikiqtani Inuit Association - does not want to be engaged in the proposed listing;
  - Beverly and Qamanirjuaq Caribou Management Board - supports the proposed listing;
  - Kitikmeot Regional Wildlife Board – does not support the proposed listing, and;
  - Government of Nunavut - does not support the proposed listing.
- The written responses received from the Hunters and Trappers Organization boards in response to the proposed listing of Barren-ground Caribou are as follows:

Table 3: Summary of written responses received from the HTO boards in response to the proposed listing of Barren-ground Caribou.

Region	Hunters And Trappers Organization	Position
Qikiqtaaluk	Pangnirtung	No Response
Qikiqtaaluk	Qikiqtarjuaq	No Response
Qikiqtaaluk	Clyde River	Indifferent
Qikiqtaaluk	Pond Inlet	No Response
Qikiqtaaluk	Arctic Bay	No Response
Qikiqtaaluk	Cape Dorset	Indifferent
Qikiqtaaluk	Hall Beach	No Response
Qikiqtaaluk	Igloolik	No Response

Qikiqtaaluk	Iqaluit	Do not support
Qikiqtaaluk	Kimmirut	Do not support
Kitikmeot	Kugluktuk	No response
Kitikmeot	Ekaluktutiak	No response
Kitikmeot	Burnside	No response
Kitikmeot	Omingmaktok	No response
Kitikmeot	Spence Bay	Does not support
Kitikmeot	Qutairuruaq	Does not support
Kitikmeot	Gjoa Haven	No response
Kivalliq	Aqiggiag	No response
Kivalliq	Arviat	No response
Kivalliq	Issatik	Does not support*
Kivalliq	Aiviit	Does not support
Kivalliq	Arviq	Does not support
Kivalliq	Aqigiq	No response
Kivalliq	Baker Lake	Does not support**

* Disagrees with Threatened assessment, believes it should be Special Concern.
** Verbal response given

- Written responses received from members of the public in response to the proposed listing of Barren-ground Caribou included nine “Do not support” responses, one “Support” response, and one “Indifferent” response.

- Core comments and concerns (shared by at least 50% of the communities and shared in all regions, though there is regional variability in the prevalence of input) were as follows:

Table 4: Summary of core input (concern, knowledge, comment etc.) received during consultation meeting. Core input was shared by at least 50% of communities and was shared in all regions (Qikiqtaaluk, Kivalliq, and Kitikmeot).

Input (Topics, concerns and comments)	All Communities	Qikiqtaaluk	Kitikmeot	Kivalliq
Caribou distribution is always changing, they use different areas/are found in different places	86%	80%	100%	86%
Predation is the main threat or cause of decline; increase in predator population a threat	77%	70%	100%	71%
Concerns about the lack of Inuit participation and traditional knowledge in the assessment process.	64%	80%	100%	14%
Caribou populations undergo natural fluctuations	64%	90%	40%	43%
Concerned over the way the Committee on the Status of Endangered Wildlife In Canada	59%	60%	40%	71%

established the Barren-ground Caribou designatable unit, want individual herd assessments				
Caribou are not declining/not at risk or threatened	59%	60%	60%	57%

Accommodations

During its consultations in Nunavut on the proposed *Species At Risk Act*-listing of Barren-ground Caribou (2018-2021), Environment and Climate Change Canada responded to the concerns, feedback, and requests raised by Inuit communities and organizations, in a number of ways that are highlighted below.

<u>Having additional meetings</u>

- During the first round of consultations, a number of questions and concerns arose by communities and Hunters and Trappers Organizations. To accommodate those concerns and to ensure that questions were adequately addressed, it was decided that Environment and Climate Change Canada would conduct further consultations in Nunavut.
- Environment and Climate Change Canada worked with Nunavut Tunngavik Incorporated and the Government of Nunavut and developed a plan to consult with regional wildlife boards at their fall 2019 annual general meetings and to determine how to adapt the presentation materials to address concerns and misconceptions.
- This resulted in Environment and Climate Change Canada meeting with the Qikiqtaaluk Wildlife Board and the Kivalliq Wildlife Boards in the fall of 2019 and having an additional round of meetings in the Kivalliq (2020) and the Kitikmeot (2021) including a meeting with the Kitikmeot Regional Wildlife Board (2021).
- This meant additional, meaningful consultations, and the ability to answer any outstanding questions and concerns.

<u>Providing Detailed Responses to Questions</u>

- Through the consultation process, three organizations (Qikiqtaaluk Wildlife Board, the Beverly and Qamanirjuaq Caribou Management Board and the Kitikmeot Regional Wildlife Board) posed detailed questions about the listing process and the implications of listing Barren-ground as Threatened.
- Environment and Climate Change Canada provided detailed answers to all of the questions posed and in the case of the Beverly and Qamanirjuaq Caribou Management Board there was significant and substantive communications to clarify and address questions.
- Environment and Climate Change Canada also had open, in-depth discussions during each consultation meeting where attendees asked questions, voiced opinions and shared knowledge.

- This led to the Hunters and Trappers Organizations, community members, organizations and Environment and Climate Change Canada becoming more informed and led to the Beverly and Qamanirjuaq Caribou Management Board, Hunters and Trappers Organizations and community members being able to determine their position on the listing.

Adapting Presentations

- During our first round of consultations it became clear that Environment and Climate Change Canada's presentation materials needed improvement to anticipate and address key questions and concerns raised by Hunters and Trappers Organizations and communities.
- Environment and Climate Change Canada worked closely with the Government of Nunavut and Nunavut Tunngavik Incorporated to create a new presentation that included additional information and emphasis regarding summaries of previous consultation feedback; the Committee on the Status of Endangered Wildlife in Canada's assessment process and the *Species At Risk Act*-listing processes; the role of Inuit Qaujimajatuqangit and Inuit involvement; Inuit harvesting rights and wildlife management processes under the *Nunavut Agreement*; the potential benefits of listing Barren-ground Caribou under the *Species At Risk Act*; and local herd information.
- This meant a more focused and individualized presentation for each community and led to a more meaningful discussion of the *Species At Risk Act*-listing proposal.

Inviting Experts

- During our first round of consultations, Hunters and Trappers Organizations and communities were interested in hearing herd-related information beyond Environment and Climate Change Canada's mandate and that Environment and Climate Change Canada staff were unable to answer. This led to the Government of Nunavut regional biologists being invited to attend Environment and Climate Change Canada's meetings to provide information related to local herds, survey data and methodology.
- This accommodated the requests for herd specific information that Environment and Climate Change Canada received and led to a more meaningful discussion in which Hunters and Trappers Organization members could discuss a more complete picture of caribou management, beyond just Environment and Climate Change Canada's mandate for the *Species at Risk Act*.

Collaboration with Partners

- Throughout consultations, Environment and Climate Change Canada worked collaboratively with partner organizations in Nunavut and their staff (Government Of Nunavut, Nunavut Wildlife Management Board, Nunavut Tunngavik Incorporated,

Regional Inuit Associations, Regional Wildlife Organizations and Parks Canada), and they were invited to attend Environment and Climate Change Canada's consultation meetings whenever possible.
- Environment and Climate Change Canada also developed a funding agreement with Nunavut Tunngavik Incorporated to facilitate internal dialogue amongst Inuit communities and organizations on caribou management and conservation.

Delayed Submission to Nunavut Wildlife Management Board

- The initial consultation period for the *Species At Risk Act*-listing proposal, ending October 2018, was extended significantly due to the need for additional consultation meetings in Nunavut.
- This extension allowed for more in-depth engagement with Hunters and Trappers Organizations and other partners to occur.
- Environment and Climate Change Canada also delayed their submission to the Nunavut Wildlife Management Board, to allow adequate time to address concerns and questions, and to allow partners to develop their views and positions.
- These delays allowed more time for Hunters and Trappers Organizations and other organizations to determine their position with their constituents.

Next Steps:

We are requesting a decision from the Nunavut Wildlife Management Board on the proposed listing of Barren-ground Caribou as Threatened under the federal *Species at Risk Act* as per the *Nunavut Agreement* s.5.2.34(f) and 5.3.16-5.3.23.

Following the Board's decision, the Minister will make a recommendation to the Governor in Council that takes into account the Committee on the Status of Endangered Wildlife in Canada's assessment, consultations with wildlife management boards authorized for that species by a lands claims agreement (including the Nunavut Wildlife Management Board), and the regulatory impact analysis statement. The final decision or final decision as varied, as arrived at through 5.3.16 of the *Nunavut Agreement*, must be respected in the Minister's recommendation to the Governor in Council.

As part of the federal regulatory process, a 30-day comment period follows the publication of the proposed decision in Canada Gazette, Part 1. The final step in the process is for the Governor in Council to make a final listing decision. If the Governor in Council decides to list a species, it is at this point that it becomes legally included on Schedule 1. The decision and the regulatory impact analysis statement will be published in the next edition of the Canada Gazette, Part II.

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October 2021

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Nunavut Consultation Report

Consultations on the Proposed Listing of Barren-ground Caribou as Threatened under the federal *Species at Risk Act*

Submitted to the Nunavut Wildlife Management Board on November 5th 2021

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Northern Region
November 2021

1871 | 2021
1971 | 2021

Canada

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Summary

Barren-ground Caribou was assessed as a Threatened species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2016 because of steep population declines. According to the COSEWIC criteria, Barren-ground Caribou could have been assessed as Endangered but were downgraded due to existing co-management efforts by governments, wildlife management boards and communities, and because Barren-ground Caribou do not appear to be facing imminent extinction at this time. Most Barren-ground Caribou herds have shown large declines since 1990. Across Canada, Barren-ground Caribou have declined from around 2 million individuals in the early 1990s to about 800,000 in 2016 - a 56.8% decline over three generations (between 1989 and 2016). Recent abundance surveys, since the COSEWIC assessment, have shown further declines in some populations, including the Bluenose-East, Bathurst, and Beverly herds. A Threatened species is likely to become Endangered unless threats are addressed. Potential threats to Barren-ground Caribou include: climate and weather changes affecting forage availability, predation, parasites and diseases; industrial exploration and development; fragmentation of habitat in their winter range from forest fires and increasing human presence; increased human population and an increased demand for caribou meat.

Under the *Species at Risk Act (SARA),* the federal Minister of the Environment must consult relevant provinces, territories and wildlife management boards before making a recommendation to the Governor in Council on whether to accept COSEWIC's assessment and add Barren-ground Caribou to *SARA* as a Threatened species. It is important to note that no decision regarding the *SARA*-listing proposal has been made to date. To inform the federal Minister's recommendation regarding the *SARA*-listing proposal, Environment and Climate Change Canada (ECCC) consulted Hunter and Trapper Organizations, Regional Wildlife Organizations, communities, and other organizations (i.e. Nunavut Tunngavik Incorporated, Regional Inuit Associations, Beverly and Qamanirjuaq Caribou Management Board) in Nunavut from 2018 to 2021. The purpose of the consultations was: 1) to explain the COSEWIC assessment, the *SARA*-listing process, and the implications of listing Barren-ground Caribou as a Threatened species under *SARA*; 2) to gather comments, other information, and formal positions from implicated parties regarding the *SARA*-listing proposal, to inform the federal Minister's recommendation to the Governor in Council; and 3) to address questions and concerns raised.

Under the *Nunavut Agreement*, ECCC consults Hunter and Trapper Organizations (HTOs), Regional Wildlife Organizations (RWOs), Nunavut communities, and other organizations before seeking a decision from the Nunavut Wildlife Management Board (NWMB). Prior to initiating consultations, ECCC presented its consultation plan to NWMB and sought feedback from NWMB on the proposed consultation approach (December 2017). Information updates were presented periodically to NWMB during the consultation process (March 2019 and March 2020), and ECCC worked closely with the Government of Nunavut (GN) and Nunavut Tunngaviik Incorporated (NTI) to improve the consultation approach following the first round of consultations. Throughout the consultations, ECCC worked collaboratively with partner organizations in Nunavut, and staff from partner organizations (NWMB, NTI, Regional Inuit Associations, RWOs, etc.) were invited to attend ECCC's consultation meetings, and attended when able. To help build capacity for Inuit engagement regarding the *SARA*-listing proposal, ECCC also developed a funding agreement with NTI to facilitate internal dialogue amongst Inuit communities and organizations on caribou management and conservation.

On January 25, 2018, written consultation materials were distributed to communities and partners outlined in the consultation plan. ECCC held the first round of consultation meetings from February 2018 to February 2019 in the Qikiqtaaluk, Kivalliq and Kitikmeot regions. As HTOs are the local authority for wildlife management in each community, ECCC consulted the HTO for each Nunavut community within the Barren-ground Caribou range. ECCC's consultation meetings with HTOs were held with the HTO members and if requested, a public meeting was also held during the first round of consultations. At each meeting, ECCC presented information to explain the COSEWIC assessment, the *SARA*-listing process, and the implications of listing Barren-ground Caribou as a Threatened species under *SARA*.

Following the first round of consultations, ECCC worked closely with GN and NTI to modify the consultation approach and review presentation materials, in order to respond to questions and concerns that were raised during the first round. Presentation materials were adapted to provide additional information and emphasis put into addressing outstanding concerns and clarify common misconceptions and questions about the proposed *SARA*-listing. Additional information was included and emphasis put on the summaries of previous consultation feedback; COSEWIC's assessment process and the *SARA*-listing processes; the role of IQ and Inuit involvement; Inuit harvest rights and wildlife management processes under the *Nunavut Agreement*; the potential benefits of listing Barren-ground Caribou under *SARA*; and local herd information. Through discussions with NTI and the GN, ECCC developed a plan to consult with the regional wildlife boards at their fall 2019 annual general meetings (AGM), in order to provide an update on consultations to date and seek guidance on the need for further consultations in each region. ECCC attended the Kivalliq and Qikiqtaaluk Wildlife Board AGMs in the fall of 2019, but was unable to attend the Kitikmeot Regional Wildlife Board AGM in 2019 due to the federal election. At the Kivalliq Wildlife Board AGM, it was suggested that additional meetings in the Kivalliq region were required, and a second round of in-person meetings was held with HTOs in the Kivalliq region in February 2020. Through discussions with KRWB's Regional Coordinator, it was suggested that additional meetings in the Kitikmeot region were also required. Due to Covid-19 restrictions, only virtual meetings were conducted with all but one of the Kitikmeot region HTOs from January 2021 to June 2021. ECCC also attended the Kitikmeot Regional Wildlife Board AGM in March 2021 to provide a brief update on the current status of consultations in the Kitikmeot, which were ongoing at the time. There was no request for additional meetings from the Qikiqtaaluk Wildlife Board. Consultation meetings with additional organizations (i.e. NTI, Regional Inuit Associations, Beverly and Qamanirjuaq Caribou Management Board) were also held between 2018 and 2021.

Over the course of the consultations, ECCC adjusted its approach and provided a number of accommodations in order to better address the concerns, feedback, and requests raised by Inuit communities and organizations. These accommodations included having additional meetings, providing detailed responses to all questions received, altering and adapting presentations based on feedback received, inviting experts to meetings, collaboration with partners, and delaying the timing of the submission to NWMB for decision.

Results

During each consultation meeting, ECCC staff had open discussions during which board members and attendees asked questions, voiced opinions, and shared knowledge about caribou in their area. Attendees were invited to provide comments, other information or a formal position on the *SARA*-listing proposal. After each meeting, ECCC prepared meeting summaries, and HTOs were provided an opportunity to review and validate the summaries before they were finalized. A range of common comments and concerns were received during the consultations. Core concerns shared by at least 50%

of the communities across all regions included that caribou distribution is always changing; that predation is the main threat or cause of decline; the need for Inuit involvement in all stages of the *SARA* process and the importance of including IQ in all stages of the *SARA* process; that caribou populations undergo natural fluctuations; the need for herd-level assessments; that caribou are not declining; potential prohibitions on harvesting rights; and a limited understanding of the *SARA* process. Additional input that was shared by less than 50% of the communities and usually not by all regions, included disagreeing with the survey methodology; disagreeing with the current regulations, restrictions or quotas; the need for more information to support decisions (both western science and IQ); observed increases and decreases in local herds; concerns about scientists disturbing caribou; and that Inuit harvest is done properly.

Results can be seen below, with more detailed tables available in Section 4 Summary of Feedback. Those parties who have not submitted a response are not included below but can be seen in Section 4.

	Response Type		
	Do Not Support	**Support**	**Indifferent**
Wildlife Boards	Kitikmeot Regional Wildlife Board	-	-
BQCMB	-	X	-
Government of Nunavut	X	-	-
Hunters and Trappers Organizations	Iqaluit, Kimmirut, Spence Bay, Qutairuruaq, Issatik, Aiviit, Arviq, Baker Lake	-	Clyde River, Cape Dorset
Community Responses	Aiviq (Cape Dorset) (8). Naujaat (Arviq) (1)	Kimmirut (1)	Clyde River (1)

Although not all organizations and HTO’s submitted a formal position, ECCC still received extensive comments, questions and feedback during consultation meetings, which provide insight into Inuit views regarding the *SARA*-listing proposal. Inuit organizations engaged in open, thoughtful dialogue with ECCC to express their ideas and views on the proposal.

The following report and appendices summarize the results of the Nunavut consultations. This document is being submitted to NWMB for its decision on the proposed listing of Barren-ground Caribou as Threatened under the federal *Species at Risk Act* (*SARA*) as per the *Nunavut Agreement* s.5.2.34 (f) and 5.3.16-5.3.23.

1. Introduction

Barren-ground Caribou was assessed as a Threatened species by the Committee on the Status of the Endangered Wildlife in Canada (COSEWIC) in November 2016 because of steep population declines. According to the COSEWIC criteria, Barren-ground Caribou could have been assessed as Endangered but were downgraded due to existing co-management efforts by governments, wildlife management boards and communities, and because Barren-ground Caribou do not appear to be facing imminent extinction at this time. Most Barren-ground Caribou herds have shown large declines since 1990. Across Canada, Barren-ground Caribou have declined from around 2 million individuals in the early 1990s to about 800,000 in 2016 - a 56.8% decline over three generations. Abundance surveys that have occurred since the COSEWIC assessment have shown further declines in some populations, including the Bluenose-East, Bathurst, and Beverly herds. A Threatened species is likely to become Endangered unless threats are addressed. Potential threats to Barren-ground Caribou include: climate and weather changes affecting forage availability, predation, parasites and diseases; industrial exploration and development; fragmentation of habitat in their winter range from forest fires and increasing human presence; increased human population and an increased demand for caribou meat.

Under the *Species at Risk Act* (*SARA*)*,* the Minister of the Environment must consult relevant provinces, territories and wildlife management boards before making a recommendation to the Governor in Council on whether to accept COSEWIC's assessment and add Barren-ground Caribou to *SARA* as a Threatened species. It is important to note that no decision regarding the *SARA*-listing proposal has been made to date. To inform the federal Minister's recommendation regarding the *SARA*-listing proposal, Environment and Climate Change Canada (ECCC) consulted Hunter and Trapper Organizations, Regional Wildlife Organizations, communities, and other organizations (i.e. Nunavut Tunngavik Incorporated, Regional Inuit Associations, Beverly and Qamanirjuaq Caribou Management Board) in Nunavut from 2018 to 2021. The purpose of the consultations was: 1) to explain the COSEWIC assessment, the *SARA*-listing process, and the implications of listing Barren-ground Caribou as a Threatened species under *SARA*; 2) to gather comments, other information, and formal positions from implicated parties regarding the *SARA*-listing proposal, to inform the federal Minister's recommendation to the Governor in Council; and 3) to address questions and concerns raised.

Under the *Nunavut Agreement*, ECCC consults Hunter and Trapper Organizations (HTOs), Regional Wildlife Organizations (RWOs), Nunavut communities, and other organizations before seeking a decision from the Nunavut Wildlife Management Board (NWMB). Prior to initiating consultations, ECCC presented its consultation plan to NWMB and sought feedback from NWMB on the proposed consultation approach (December 2017). Information updates were presented periodically to NWMB during the consultation process (March 2019 and March 2020), and ECCC worked closely with the Government of Nunavut (GN) and Nunavut Tunngaviik Incorporated (NTI) to modify the consultation approach following the first round of consultations. Throughout the consultations, ECCC worked collaboratively with partner organizations in Nunavut, and staff from partner organizations (GN, NWMB, NTI, Regional Inuit Associations, RWOs, Parks Canada)) were invited to attend ECCC's consultation meetings, and attended when feasible. To help build capacity for Inuit engagement regarding the *SARA*-listing proposal, ECCC also developed a funding agreement with NTI to facilitate internal dialogue amongst Inuit communities and organizations on caribou management and conservation.

This report summarizes the results of the Nunavut consultations and is being submitted to NWMB for its decision on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*.

As Barren-ground Caribou are a national species, ECCC has also undertaken consultations in other provinces and territories and with other wildlife management boards that have responsibility for the management of Barren-ground Caribou populations. A summary of the status of consultations in other regions is available in Appendix F.

2. Consultation Procedures

Pre-consultation

In March 2017, ECCC briefed NWMB on COSEWIC's upcoming assessment of Barren-ground Caribou. In November 2017, ECCC submitted the Terrestrial Issues Flagging document to GN and NWMB for input on developing a consultation plan, to identify which communities and partners to engage throughout the consultation process. Subsequently, ECCC presented a proposed consultation plan to NWMB on December 5, 2017 and asked for NWMB's recommendations on the proposed approach. It was decided that ECCC would consult with all communities in or near the range of Barren-ground Caribou on the *SARA*-listing proposal for Barren-ground Caribou by holding in-person consultation meetings. Only three Nunavut communities, Grise Fiord, Resolute and Sanikiluaq, would not be consulted as they are outside the range, and hunters from these communities don't encounter Barren-ground Caribou regularly. Consultations

ECCC consulted HTOs, RWOs, the GN, communities, NTI, Regional Inuit Associations and the Beverly and Qamanirjuaq Caribou Management Board in Nunavut from 2018 to 2021. The purpose of the consultations was: 1) to explain the COSEWIC assessment, the *SARA*-listing process, and the implications of listing Barren-ground Caribou as a Threatened species under *SARA*; 2) to gather comments, other information, and formal positions from implicated parties regarding the *SARA*-listing proposal, to inform the federal Minister's recommendation to the Governor in Council; and 3) to address questions and concerns raised.

Throughout the consultations, ECCC worked collaboratively with partner organizations in Nunavut, and staff from partner organizations (NWMB, NTI, Regional Inuit Associations, RWOs, etc.) were invited to attend ECCC's consultation meetings, and attended when feasible (see Table 1 in Section 3). To help build capacity for Inuit engagement regarding the *SARA*-listing proposal, ECCC also developed a funding agreement with NTI to facilitate internal dialogue amongst Inuit communities and organizations on caribou management and conservation. The HTOs in each community provided logistical support to ECCC, including help to ensure that meetings were well advertised and the materials could be shared with, and collected from, the public after the community meeting took place.

The consultation team was comprised of an ECCC biologist who led the presentations and responded to questions, one or more ECCC staff to manage the administration, logistics and recording (audio and written), an interpreter, and occasionally, when available, representative(s) from the GN, NTI, the Regional Wildlife Organization, and NWMB (see Table 1 in Section 3).

During each consultation meeting, ECCC staff had open discussions during which board members and attendees asked questions, voiced opinions, and shared knowledge about caribou in their area. Attendees were invited to provide comments, other information or a formal position on the *SARA*-listing proposal. Responses and comments from HTOs and the public were collected in the form of comments at the meetings, which were noted and recorded. Public response forms were distributed at the public meetings and were also left at the HTO offices after the meetings to collect written responses. HTOs were invited to submit an official written response following the meetings and HTOs and the public were also invited to submit written responses in the form of letters. Many HTO's expressed wanting to discuss the proposal amongst themselves in subsequent meetings.

Round 1 (January 2018 - February 2019)
Written consultation materials were distributed to communities and partners in January 2018. The written consultation materials (Appendix A) contained information on the proposed listing, including a letter, a factsheet, a PowerPoint presentation (narrated and in print), and a questionnaire in English and Inuktitut. ECCC held the first round of consultation meetings from January 2018 to February 2019 in the Qikiqtaaluk, Kivalliq and Kitikmeot regions. As the local authority for wildlife management in each community, ECCC consulted the HTO for each Nunavut community within the Barren-ground Caribou range. ECCC's consultation meetings with HTOs were held with HTO members and directors and if requested, a public meeting was also held during the first round of consultations. At each meeting, ECCC presented information to explain the COSEWIC assessment, the *SARA*-listing process, and the implications of listing Barren-ground Caribou as a Threatened species under *SARA*. Key points from ECCC's presentations included:

- The assessment of Barren-ground Caribou as Threatened was conducted by COSEWIC, not by the government, using available information.
- No decision has been made yet regarding the proposed listing of Barren-ground Caribou under *SARA* (i.e. Barren-ground Caribou are not currently listed under *SARA*); the federal Environment Minister must now consider whether or not to take COSEWIC's advice and recommend that Barren-ground Caribou be added to *SARA* as Threatened.
- Consultation is required with GN, NWMB, HTOs and other organizations before any decision is made on the proposed listing of Barren-ground Caribou. Inuit input in the consultations is critical and ECCC is committed to seeking Inuit input into the *SARA*-listing proposal.
- The purpose of the consultations is: 1) to explain the COSEWIC assessment, the *SARA*-listing process, and the implications of listing Barren-ground Caribou as a Threatened species under *SARA*; 2) to gather comments, other information, and formal positions from implicated parties regarding the *SARA*-listing proposal, to inform the federal Minister's recommendation to the Governor in Council; and 3) to address questions and concerns raised.
- The *Nunavut Agreement* takes precedence over *SARA*. *SARA*'s prohibitions do not apply to Inuit exercising harvest rights under the *Nunavut Agreement*; If Barren-ground Caribou were listed under *SARA,* harvest management decisions would still be made according to the processes established by Article 5 of the *Nunavut Agreement*, and existing wildlife management bodies and processes would remain in place. The current roles and responsibilities of HTOs, RWOs, NWMB, and GN in caribou management in NU would not change;
- If Barren-ground Caribou were listed under *SARA*, a national recovery strategy would need to be developed cooperatively with all key wildlife management partners, and critical habitat would need to be identified;

Round 2 (March 2019 - May 2021)
In March 2019, ECCC provided an update on consultations in Nunavut to the NWMB. The initial consultation package, meeting notes and meeting summaries from each community were included in the submission. To accommodate concerns shared by several communities and to ensure their questions were addressed, it was decided that ECCC would conduct further consultations in Nunavut.

Following the first round of consultations, ECCC worked closely with GN and NTI to modify the consultation approach and review presentation materials, in order to respond to questions and concerns that were raised during the first round. Presentation materials were adapted to provide additional information and emphasis put into addressing outstanding concerns and clarify common misconceptions and questions about the proposed *SARA*-listing. GN regional biologists were invited to

attend meetings to provide information related to local herds and topic areas related to GN's mandate (see Table 1 in Section 3). Additional information was included and emphasis put on the summaries of previous consultation feedback; COSEWIC's assessment process and the *SARA*-listing processes; the role of IQ and Inuit involvement; Inuit harvest rights and wildlife management processes under the *Nunavut Agreement*; the potential benefits of listing Barren-ground Caribou under *SARA*; and local herd information.

Through discussions with NTI and GN, ECCC developed a plan to consult with the regional wildlife boards at their fall 2019 annual general meetings (AGM), in order to provide an update on consultations to date and seek guidance on the need for further consultations in each region. ECCC attended the Kivalliq and Qikiqtaaluk Wildlife Board Annual General Meetings in the fall of 2019, but was unable to attend the Kitikmeot Regional Wildlife Board AGM due to the 2019 federal election. At the Kivalliq Wildlife Board AGM, it was suggested that additional meetings in the Kivalliq region were required, and a second round of in-person meetings was held with HTOs in the Kivalliq region in February 2020. A second update on the consultations, including a summary of feedback received, was provided to NWMB in March 2020.

Through discussions with KRWB's Regional Coordinator, it was suggested that additional meetings in the Kitikmeot region were also required. A second round of in-person meetings with HTOs in the Kitikmeot region was not possible due to Covid-19 restrictions, but virtual meetings were held with all but one of the Kitikmeot region HTOs from January 2021 to June 2021 with the assistance of GN biologists. ECCC also attended the Kitikmeot Regional Wildlife Board AGM in March 2021 to provide a brief update on the current status of consultations in the Kitikmeot, which were ongoing at the time. Staff from GN, RWOs, Regional Inuit Associations, NTI, and NWMB were invited to attend the virtual meetings in the Kitikmeot region, and attended when available (see Table 1 in Section 3). There was no request for additional meetings from the Qikiqtaaluk Wildlife Board. Consultation meetings with additional organizations (i.e. NTI, Regional Inuit Associations, Beverly and Qamanirjuaq Caribou Management Board) were also held between 2018 and 2021.

Appendix A contains samples of materials used during consultations.

Post-consultation

After each meeting, ECCC prepared meeting summaries, and HTOs were provided an opportunity to review and validate the summaries before they were finalized.

In the cases when feedback and positions were not provided by attendees at the meeting, ECCC followed up with HTOs to request their official written position on the proposed listing either by email or through the provided questionnaire. Members of the public were able to submit public response forms or letters directly to ECCC or via the HTO after the meetings. ECCC also followed up with the Qikiqtaaluk, Kivalliq and Kitikmeot Regional Wildlife Boards, Kivalliq and Kitimeot Inuit Associations, Nunavut Tunngavik Incorporated, the Beverly Qamanirjuaq Caribou Management Board, and the Government of Nunavut to obtain their position on the proposed listing. Qikiqtani Inuit Association stated early on that they did not want to be engaged in the proposed listing of Barren-ground Caribou.

3. Consultation Dates and Attendance

Table 1: Summary of consultation meetings on the proposed listing of Barren-ground Caribou held in each community between 2018 and 2021.

Region	Community	Meeting Group	1st Round of Meetings							2nd Round of Meetings						
			Public meeting	HTO meeting	Number of attendees from community	Dates	Organizations in attendance			Public meeting	HTO meeting	Number of attendees from community	Dates	Organizations in attendance		
							NWMB	GN	Others					NWMB	GN	Others
Qikiqtaaluk	Pangnirtung	Pangirtung HTA	Y	Y	Unknown[2]	2018-12-03	N	N	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qikiqtaaluk	Qikiqtarjuaq	Qikiqtarjuaq HTA	Y	Y	24	2018-10-23/24	Y	N	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qikiqtaaluk	Clyde River	Clyde River HTO	Y	Y	23	2018-10-18	Y	N	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qikiqtaaluk	Mattimatalik (Pond Inlet)	Pond Inlet HTO	Y	Y	11	2018-10-17	Y	Y	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qikiqtaaluk	Ikajutit (Arctic Bay)	Arctic Bay HTO	Y	Y	23	2018-10-16	Y	N	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qikiqtaaluk	Aiviq (Cape Dorset)	Cape Dorset HTO	Y	Y	34	2019-01-23	Y	N	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qikiqtaaluk	Hall Beach	Hall Beach HTA	Y	Y	24	2018-09-26	N	N	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qikiqtaaluk	Igloolik	Igloolik HTO	Y	Y	52	2018-09-25	N	Y	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qikiqtaaluk	Iqaluit	Iqaluit HTA	N	Y	7	2018-10-22	Y	Y	Parks Canada, Nunavut Tunngavik Inc.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qikiqtaaluk	Kimmirut	Kimmirut HTO	Y	Y	50	2019-01-24	Y	N	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kitikmeot	Kugluktuk	Kugluktuk HTA	N	Y	9	2018-02-27	N	Y	Kitikmeot Regional Wildlife Board	N	Y[1]	8	2021-03-31	Y	Y	Kitikmeot Regional Wildlife Board, Nunavut Tunngavik Incorporated, Kivalliq Inuit Association
Kitikmeot	Cambridge Bay (Ekaluktutiak) Bathurst Inlet (Qinqaut) Bay Chimo (Omingmaktok)	Ekaluktutiak HTA Burnside HTA Omingmaktok HTA	Y	Y	29	2018-02-26	N	N	Kitikmeot Regional Wildlife Board	N	Y[1]	10	2021-01-07[3]	Y	Y	Kitikmeot Regional Wildlife Board, Nunavut Tunngavik Incorporated, Kivalliq Inuit Association

Kitikmeot	Taloyoak (Spence Bay)	Spence Bay HTA	Y	Y	58	2019-02-26	N	Y	-	N	Y[1]	10	2021-02-03[3]	Y	Y	Kitikmeot Regional Wildlife Board, Nunavut Tunngavik Incorporated, Kivalliq Inuit Association
Kitikmeot	Kugaaruk	Qutairuruaq HTA	N	Y	8	2018-03-02	N	N	-	N	Y[1]	7	2021-02-03[3]	Y	Y	Kitikmeot Regional Wildlife Board, Nunavut Tunngavik Incorporated, Kivalliq Inuit Association
Kitikmeot	Gjoa Haven (Usqsuqtuuq)	Gjoa Haven HTA	N	Y	7	2018-03-01	N	N	-	NA	NA	NA	NA	-	-	-
Kivalliq	Rankin Inlet (Kangiqtiniq)	Aqiggiag HTO	N	Y	4	2018-03-05	N	N	Nunavut Tunngavik Incorporated	N	Y	5	2020-02-07	N	Y	Kivalliq Wildlife Board, Nunavut Tunngavik Incorporated
Kivalliq	Arviat	Arviat HTO	N	Y	6	2018-03-07	N	Y	-	N	Y	Unknown[2]	2020-02-27	N	Y	Kivalliq Wildlife Board
Kivalliq	Whale Cove (Issatik)	Issatik HTO	N	Y	3	2018-03-06	N	N	-	N	Y	6	2020-02-13	N	Y	-
Kivalliq	Coral Harbour (Aiviit)	Aiviit HTO	Y	Y	28	2019-01-22	Y	N	-	N	Y	10	2020-02-10	N	Y	Kivalliq Wildlife Board
Kivalliq	Naujaat (Arviq)	Arviq HTO	Y	Y	24	2018-09-27	N	Y	-	N	Y	10	2020-02-08	N	Y	-
Kivalliq	Chesterfield Inlet (Aqigiq)	Aqigiq HTO	N	Y	5	2018-03-09	N	Y	-	N	Y	13	2020-02-06	N	Y	-
Kivalliq	Baker Lake	Baker Lake HTO	N	Y	7	2018-03-08	N	Y	-	N	Y	9	2020-02-05	N	Y	-

[1]Meeting held virtually. [2]Presentation delivered by GN staff, ECCC attendance by phone. [3]Joint virtual meeting (multiple HTOs in attendance)

Table 2: Summary of meetings on the proposed listing of Barren-ground Caribou held with each organization between 2018 and 2021. The Government of Nunavut and Nunavut Tunngavik Incorporated were met with on multiple occasions throughout the entire process.

Organization	1st Meeting Date	2nd Meeting Date
Qikiqtaaluk Wildlife Board	November 17 2019	N/A
Kivalliq Wildlife Board	October 23 2019	N/A
Kitikmeot Regional Wildlife Board	March 23 2021	N/A
Nunavut Wildlife Management Board	March 2019 *	March 2020
Beverly Qamanirjuaq Caribou Management Board	May 9 2018	April/May 2019
Kivalliq Inuit Association	February 7th 2020	N/A

*ECCC first met with NWMB in 2017

Figure 1: Range of Barren-ground Caribou in Nunavut and the communities consulted on the proposed listing. Note that Bathurst Inlet and Umingmaktok are not permanent settlements but are seasonal camps and HTOs for these locations were consulted in Cambridge Bay where they are based when not on the land.

4. Summary of Feedback

Note that even though formal positions were not received from all organizations consulted, ECCC still received extensive comments, questions and feedback on the *SARA*-listing proposal during consultation meetings, and Inuit organizations engaged in open, thoughtful dialogue with ECCC to express their ideas and views on the proposal.

A. Written responses received

A number of formal written responses or positions were received from some but not all consulted parties (Appendix C). Written responses from the HTOs include eight HTOs that oppose the *SARA*-listing proposal, two HTOs that are "indifferent", and 14 HTOs did not provide a formal response or position (Table 3). The BQCMB supports the proposed *SARA*-listing. The GN and the Kitikmeot Regional Wildlife Board provided a written response of "does not support" the proposed *SARA*-listing. No other formal responses or positions were received from the other RWO's, or the RIA's or NTI (Table 4. Written responses from members of the public included nine people who oppose the *SARA*-listing proposal, one person who supports the *SARA*-listing proposal, and one "indifferent" response (Table 5).

Table 3: Summary of written responses received from the HTO boards in response to the proposed listing of Barren-ground Caribou.

Region	HTO (Community)	Response Type		
		Do Not Support	Support	Indifferent
Qikiqtaaluk	Pangnirtung HTA	-	-	-
Qikiqtaaluk	Qikiqtarjuaq HTA	-	-	-
Qikiqtaaluk	Clyde River HTO	-	-	X
Qikiqtaaluk	Pond Inlet HTO (Mittimatalik)	-	-	-
Qikiqtaaluk	Arctic Bay HTO (Ikajutit)	-	-	-
Qikiqtaaluk	Cape Dorset HTO (Aiviq)	-	-	X
Qikiqtaaluk	Hall Beach HTA	-	-	-
Qikiqtaaluk	Igloolik HTO	-	-	-
Qikiqtaaluk	Iqaluit HTA	X	-	-
Qikiqtaaluk	Kimmirut HTO	X	-	-
Kitikmeot	Kugluktuk HTA	-	-	-
Kitikmeot	Ekaluktutiak HTA (Cambridge Bay)	-	-	-
Kitikmeot	Burnside HTA (Bathurst Inlet/Qinqaut)	-	-	-
Kitikmeot	Omingmaktok HTA (Bay Chimo)	-	-	-
Kitikmeot	Spence Bay HTA (Taloyoak)	X	-	-
Kitikmeot	Qutairuruaq HTA (Kugaaruk)	X	-	-

Kitikmeot	Gjoa Haven HTA (Usqsuqtuuq)	-	-	-
Kivalliq	Aqiggiag HTO (Rankin Inlet/Kangiqtiniq)	-	-	-
Kivalliq	Arviat HTO	-	-	-
Kivalliq	Issatik HTO (Whale Cove)	X*	-	-
Kivalliq	Aiviit HTO (Coral Harbour)	X	-	-
Kivalliq	Arviq HTO (Naujaat)	X	-	-
Kivalliq	Aqigiq HTO (Chesterfield Inlet)	-	-	-
Kivalliq	Baker Lake HTO	X**	-	-

** Disagrees with Threatened assessment, believes it should be Special Concern.*
***Position provided verbally over the phone*

Table 4: Summary of written responses received from regional organizations and others in response to the proposed listing of Barren-ground Caribou.

Board/Association	Response Type		
	Do Not Support	Support	Indifferent
Qikiqtaaluk Wildlife Board	-	-	-
Kitikmeot Regional Wildlife Board	X	-	-
Kivalliq Wildlife Board	-	-	-
Qikiqtani Inuit Association*	-	-	-
Kitikmeot Inuit Association	-	-	-
Kivalliq Inuit Association	-	-	-
NTI	-	-	-
BQCMB	-	X	-
Government of Nunavut	X	-	-

**Does not want to be engaged*

Table 5: Summary of written responses received from members of the public in response to the proposed listing of Barren-ground Caribou. We have only included communities where a response was heard.

Region	Community	Response Type		
		Do Not Support	Support	Indifferent
Qikiqtaaluk	Clyde River	-	-	1
Qikiqtaaluk	Aiviq (Cape Dorset)	8	-	-
Qikiqtaaluk	Kimmirut	-	1	-
Kivalliq	Naujaat (Arviq)	1	-	-

B. Core Comments and Concerns

Table 6 summarizes the core topics, comments, and concerns (hereafter referred to as “input”) expressed during consultation meetings. This input is considered core as it is shared by at least 50% of the communities and was shared in all regions, though there is regional variability in the prevalence of the input (Table 1). For example, all communities in the Kitikmeot shared that predators are a threat and the main cause of decline for caribou, but this was not shared by all communities in the Qikiqtaaluk and Kivalliq. Overall, the main input received from communities included that caribou distribution is always changing; that predation is the main threat or cause of decline; the need for Inuit involvement in all stages of the *SARA* process and the importance of including IQ in all stages of the *SARA* process; that caribou populations undergo natural fluctuations; the need for herd-level assessments; that caribou are not declining; potential prohibitions on harvesting rights; and a limited understanding of the *SARA* process. Appendix G contains the raw or unconsolidated input.

Table 6: Summary of core input (concern, knowledge, comment etc.) received during consultation meeting. Core input was shared by at least 50% of communities and was shared in all regions (Qikiqtaaluk, Kivalliq, and Kitikmeot).

Input (Topics, concerns and comments)	All Communities	Qikiqtaaluk	Kitikmeot	Kivalliq
Caribou distribution is always changing, they use different areas/are found in different places	86%	80%	100%	86%
Predation is the main threat or cause of decline; increase in predator population a threat	77%	70%	100%	71%
Concerns about the lack of Inuit participation and traditional knowledge in the assessment process.	64%	80%	100%	14%
Caribou populations undergo natural fluctuations	64%	90%	40%	43%
Concerned over the way COSEWIC established the Barren-ground Caribou designatable unit, want individual herd assessments	59%	60%	40%	71%
Caribou are not declining/not at risk or threatened	59%	60%	60%	57%
Concerned that listing will impact harvest rights (even though quotas are not implemented by *SARA*, there could be shifting opinions that could affect harvest)	59%	90%	20%	43%
Traditional Knowledge/IQ needs to be incorporated/valued; elders and hunters have a lot of applicable knowledge/information	59%	90%	20%	43%
Lack of understanding of the COSEWIC process and the methodology of the assessments	55%	50%	60%	57%
Inuit want to be involved in the *SARA* process including drafting recovery documents and identifying critical habitat.	55%	50%	80%	43%
Climate change is causing negative impacts	55%	40%	40%	86%

C. Additional Comments and Concerns

Table 7 summarizes the additional topics, comments, and concerns (hereafter referred to as “input”) expressed during consultation meetings. This additional input was shared by less than 50% of the communities and usually was not shared in all regions (Table 1). For example, many communities in the Qikiqtaaluk and some in the Kivalliq shared that they do not agree with the methodology used to survey caribou, but this concern was not shared in the Kitikmeot. The main additional input included disagreeing with the survey methodology; disagreeing with the current regulations, restrictions or quotas; the need for more information to support decisions (both western science and IQ); observed increases and decreases in local herds; concerns about scientists disturbing caribou; and that Inuit harvest is done properly. Appendix G contains the raw or unconsolidated input.

Table 7: Summary of additional input (concern, knowledge, comment etc.) received during consultation meeting. Additional input was shared by less than 50% of communities and usually not in all regions (Qikiqtaaluk, Kivalliq, and Kitikmeot).

Input (Topics, concerns and comments)	Proportion			
	All Communities	Qikiqtaaluk	Kitikmeot	Kivalliq
Don't agree with the survey methodology	45%	80%	0%	29%
Disagree with current regulations, restrictions, or quotas	45%	70%	0%	43%
Need more herd information to make decision (science and IQ)	41%	30%	80%	29%
Population is increasing (regionally)	36%	40%	40%	29%
Caribou are declining/threatened (regionally)	36%	30%	40%	43%
Concerns about caribou being disturbed by scientists, research is a threat	36%	70%	0%	14%
Overharvesting/Harvest is not a threat; Inuit harvest is done responsibly	36%	40%	20%	43%
Does not support the proposed listing (verbal comments)	32%	70%	0%	0%
Inuit and their rights need to be a priority	32%	50%	0%	29%
Mining is a threat to caribou	32%	40%	0%	43%
Diseases are a threat (e.g. Brucellosis), there have been observations of disease/parasites	32%	20%	0%	71%
Want to see greater management of wolves, including incentives	32%	50%	0%	29%
Caribou are an important resource (food, clothing, culture) for Inuit	32%	70%	0%	0%
Caribou experts needed in consultation meetings/reporting and all stakeholders need to attend meetings	27%	50%	20%	0%
Herds are changing and/or mixing	27%	10%	80%	14%

Want to be responsible for the management of their herds	27%	30%	0%	43%
Caribou need to be harvested responsibly to maintain numbers	27%	50%	0%	14%
Threat from competition with other species	23%	0%	20%	57%
Need more communication around survey results, either no communication or not frequent enough	23%	10%	20%	43%
Want a collaborative approach to recovery and protection	23%	30%	0%	29%
Supports the use of quotas or restrictions to manage populations	23%	40%	0%	14%
Population is stable/healthy	18%	0%	20%	43%
Caribou migration routes have changed over time	18%	10%	20%	29%
Need more surveys/more frequent surveys	18%	30%	0%	14%
Community is already taking measures to protect caribou	18%	30%	20%	0%
Education, especially for the younger generations, is needed to ensure responsible harvest	18%	20%	0%	29%
Want additional monitoring to inform assessment, management, and recovery	18%	20%	0%	29%
Listing could provide greater influence over land use decisions	14%	10%	20%	14%
Don't want to discuss herds that are not their own, don't feel they can make decisions on other herds	14%	10%	0%	29%
Climate change is not a threat	14%	20%	0%	14%
Climate is changing	14%	0%	0%	43%
Overharvesting is a threat	14%	20%	20%	0%
Too many animals leads to disease and die-offs	14%	20%	0%	14%
Need more research on non-Inuit/harvest-related threats	14%	10%	20%	14%
Concerns about what caribou are eating/drinking	14%	0%	0%	43%
Concerned about *SARA*'s prohibitions	14%	0%	20%	29%
IQ should be included in research	14%	20%	0%	14%
The community would like to be involved in the scientific research.	14%	30%	0%	0%
Feel the data may be inaccurate	14%	0%	0%	43%
Management and recovery plans are in progress, these should be included in national plan	14%	0%	0%	43%
Hunting is expensive and assistance programs are insufficient	14%	30%	0%	0%
Not enough funding	14%	10%	0%	29%
Support for the proposed listing (verbal comments)	9%	10%	20%	0%
Concerns over lack of surveys to inform assessment	9%	0%	40%	0%
Concerned about caribou recovery	9%	10%	0%	14%
Mines are impacting caribou migration	9%	10%	0%	14%
Unregulated sale of caribou meat is a threat	9%	10%	0%	14%
Concerns about how listing will affect industry	9%	10%	0%	14%
Survey methodology is not clear.	9%	20%	0%	0%

Concerned about the risks to caribou from collaring	9%	10%	0%	14%
Hunting practices are changing	9%	10%	0%	14%
Difficulty understanding the presentation because of translation.	9%	20%	0%	0%
Funding could provide increased capacity for research	9%	20%	0%	0%
Consultation presentation should address what the impacts/benefits to Inuit are (including economic gain).	5%	10%	0%	0%
Caribou have declined in the past	5%	0%	20%	0%
Low numbers mean easier to damage herds	5%	0%	0%	14%
Caribou use scent to follow previous migration routes	5%	0%	0%	14%
Concerns about insects and parasites	5%	0%	0%	14%
Climate is causing changes to animal distribution	5%	0%	0%	14%
Sport hunting is less of a threat than predation	5%	0%	20%	0%
Modern hunting methods lead to greater hunting success	5%	0%	0%	14%
SARA-listing could encourage protection and better land management for caribou	5%	0%	0%	14%
Concerned with the impact of critical habitat protection on Inuit lands	5%	0%	20%	0%
Calving grounds are moving - difficult to define what to protect	5%	0%	20%	0%
Distrust of the government	5%	0%	0%	14%
Support the use of collars to collect data	5%	0%	0%	14%
Generational differences may affect management (i.e. elders and youth have different approach)	5%	10%	0%	0%
Difference in opinion between GN and Inuit	5%	0%	0%	14%
Need proper funding/training to be a part of this (capacity building, wildlife-monitoring, mapping)	5%	0%	0%	14%
Indifferent on proposed listing (verbal comments)	0%	0%	0%	0%

D. Short Meeting Summaries

The following are brief summaries of the consultations meetings in each community.

Pangnirtung

Pangnirtung HTA did not provide a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act.* Interest in having a GN caribou biologist attend consultations was emphasized. They indicated that there are more caribou today than in the past. Community members indicated that caribou are always moving, therefore being missed by the surveys or being scared away by the survey helicopters or planes and would like IQ to be used during research and decision-making. They expressed concerns about impacts to harvest rights. Participants also expressed that communities without quotas should be assessed and given a quota. Predation from wolves was identified as a threat. They also indicated that training on how to identify male and female caribou is needed in order to follow the male/female ratio of quotas.

Qikiqtarjuak

Qikiqtarjuak HTA did not provide a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act.* HTA board members expressed their concerns about the harvesting restrictions and mentioned they want to collaborate to see the caribou population increase again. The HTA and community members mentioned the helicopters from mining companies were an important threat to the caribou. The wolf population is also an important threat to consider. Some strongly believe the caribou will come back on their own and that they migrate long distances and undergo natural cycles of population density.

Clyde River

In the response form it submitted, Clyde River HTO indicated that it is “indifferent” to the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. The reasons for their response included that there was a lack of consultation, and that the quota system should be continued until a permanent plan is in place. They also want Inuit to have a permanent seat in the plan for management. One community member also filled in a questionnaire indicating their position as “indifferent” to the proposed listing. On the questionnaire, the community member stated that there are always declines and rises of every species but climate change causing the predatorial species to come up might be an issue. They also expressed that if you only hunt males, there won’t be enough to mate with females, which could be a reason for decline. During the meeting, the HTO and community members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou and the decision-making process. They would like to see more local management and are concerned about their harvest rights. They would also like the different kinds of Barren-ground Caribou to be assessed separately. Potential causes of the decline that were brought up include the natural cycle of the population, migration, predation by wolves, female:male ratio allowed for hunting (meaning females won’t have a chance to breed), and the use of snowmobiles which scare the caribou away. There were concerns about caribou being further away, and therefore more difficult to hunt, resulting in community members not eating caribou as often. Concerns were expressed about people drowning because they are wearing clothes that

they buy at the store instead of wearing caribou skins, which are warmer. They also indicated that there needs to be more education of youth from elders.

Pond Inlet/Mittimatalik

Pond Inlet HTO did not provide a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act.* Community and HTO members expressed strong concerns about the lack of Inuit participation in the assessment of Barren-ground Caribou and decision-making. They would like to see more local management. There were some doubts regarding the caribou population estimates and the survey methodology, and some participants thought that the population estimate of 2 million in the 1990s might be an exaggeration. People believed the caribou population is going through a natural cycle and will eventually come back on its own. However, one person asked for a further investigation on the actual causes of decline of the Baffin herd. Questions were raised about the impacts to Inuit harvest rights if the species is listed and people pointed out that Inuit harvest is not to blame for the decline of caribou, noting that Inuit do not take more than they need and that caribou also die from disease and starvation. Participants objected to all the herds being combined together for the assessment, and to caribou being managed as one group.

Arctic Bay/Ikajutit

Arctic Bay HTO did not provide a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act.* Participants had concerns about survey methods used to count the caribou, and thought that caribou were being missed in the surveys. Concerns were raised about male-only harvests, noting that females cannot breed if there are no males. Participants also indicated that the low caribou numbers are a temporary fluctuation and that the caribou have migrated to the mainland and will return as they have in the past. Participants pointed out that Inuit harvest is not to blame for the decline of caribou, noting that caribou have other predators, like wolves, that are also responsible for their decrease. They reported seeing more wolves now than in the past. Hunting wolves was suggested as a method of helping caribou. The HTO is working on plans to manage the caribou and want the decision on whether to list caribou to be delayed by a number of years. Participants were worried about their harvest rights, food security and way of life. They felt that listing would have an indirect effect on harvest quotas, which are too small and restrictive. The community members in attendance were unanimously against listing Barren-ground Caribou as threatened at this time.

Cape Dorset/Aiviq

In the response form it submitted, Cape Dorset HTO indicated it is “indifferent” to the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. The reason for their response was that caribou would come back when their food comes back. Eight community members filled in questionnaires indicating that they do not support the proposed listing. Their reasons included that Inuit hunt limited tags and there should be more tags, the need for wolf hunters, the need for caribou meat and that Inuit have hunted caribou their whole lives. A few community members filled out in their response form that hunting only male caribou means no female can have calves and expressed a desire to hunt both males and females. During the meeting, participants questioned the accuracy of the range of Barren-ground Caribou herds shown on the maps and some were concerned that the caribou are not surveyed often enough. Participants indicated that populations will move to other

locations once they have eaten all of the vegetation in one spot and that they are not threatened, they have just moved to another area with food. Others were not sure that caribou populations will cycle up and down as they have in the past because of all the things that have changed. They were concerned about the effect of the mines on caribou and want to find ways to protect the caribou from mining. Participants were also concerned about predation from wolves, and suggested wolf control. Others were concerned about harassment of caribou by helicopters and airplanes. The importance of Inuit Qaujimajungit was stressed. Participants also expressed concerns about the possible impact on Inuit harvesting from *SARA*-listing.

Hall Beach

Hall Beach HTA did not provide a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act.* Community members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou. Community members spoke about the importance of caribou to Inuit. They talked about how caribou is their main source of food, that they depend on caribou for food, clothing and survival, and how they have always existed together with caribou. There were significant concerns about their harvest rights, food security and way of life. Many community members indicated that they believe the caribou population is going through a natural cycle and will eventually come back on its own. Participants noted that the caribou have other predators, like wolves, that are also responsible for their decrease, that fires have had a big impact on caribou, and that disturbance from small planes disrupts caribou migrations. Some people expressed that animals should not be surveyed and that saying anything negative about the animals (like that the population is declining) will cause them to go away. Participants indicated that Inuit know about the land and the caribou, and expressed concern about outsiders interfering with their wildlife management. One community member expressed concern about the new practice of selling meat through social media. Another community member expressed concern about having multiple communities harvesting the same herd, and indicated that the harvest needs to be regulated in order to coordinate between communities.

Igloolik

Igloolik HTO did not provide a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act.* Community members spoke about the importance of caribou to Inuit. They talked about how caribou is their main source of food and that they depend on caribou for clothing, tradition, and survival. They spoke of the hardship they suffer when they cannot harvest enough caribou. Participants were worried about their harvest rights and food security; they see this proposed listing as an additional hardship for their community and traditional way of life. It was emphasized that Inuit do not take more than they need. Community and HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou and believe that the caribou population is going through a natural cycle and will eventually come back on its own. The caribou also follow the food and move to other locations once they have eaten all of the vegetation in one location. Participants indicated that Inuit know about the land and the caribou, and expressed concern about outsiders interfering with their wildlife management. They want the herd to be managed locally, instead of having outsiders getting involved. Participants also objected to all the herds being combined together for the assessment and being managed as one group. There was a lack of understanding as to why the caribou was assessed as Threatened before Special Concern. Some people expressed that the population numbers were not trustworthy. Participants also commented that the scientific information

does not go back far enough. Mining was brought up as a problem for caribou and concerns were raised about male-only harvests, noting that males are needed to make calves. One community member talked about how, according to traditional knowledge, it is not good for animals when people talk about the animals too much.

Iqaluit

In the response form it submitted, Iqaluit HTA indicated it “does not support” the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. The reasons for their response included that they are not sure that their caribou are Barren-ground Caribou, as their caribou are Baffin Caribou, and even if their caribou are declining they are still working to bring them back. Additionally, they suggested that the caribou in Nunavut should be listed as “Not at Risk” because we need better survey information on those herds. During the meeting, community and HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou and the decision-making process. They would like the consultation presentation to address what the impacts and benefits of listing would be to Inuit. The survey methodology is not clear to them, and they believe a herd-by-herd assessment would be much more relevant. They believe the caribou populations are going through natural cycle and will eventually go back up on their own. Many were worried about their harvest rights and would like to see investigation on other threats like predation, industry and impact of research. One community member indicated that Inuit should receive compensation when there is a restriction or a ban, because they lose a source of food and income in some cases.

Kimmirut

In the response form it submitted, Kimmirut HTO indicated it “does not support” the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. The reasons for their response included that they already have a quota in the Baffin communities, and they believe the caribou population in south Baffin has increased. One community member filled in the questionnaire indicating that they “support” the proposed listing, because there are less caribou everywhere due to global warming, mining, hunting and other reasons that they do not know about, they also suggested it could be a cycle. Additionally, they stated that it would not be a good thing if they had no more caribou and if Barren-ground Caribou are listed it would be appropriate to give them wolf traps and put a bounty on wolves. This is because wolves are the main predator of caribou, and it is thought that they kill more caribou than humans. During the meeting, HTO members expressed strong concern regarding the listing of all Barren-ground Caribou herds as one unit. They believe South Baffin and North Baffin populations should be considered separately. Several HTO and community members do not believe the South Baffin population is in decline. They believe caribou undergo natural cycles of population density. When populations are too abundant the numbers drop, but increase again when vegetation grows back. Some community members do believe caribou populations on South Baffin Island are in decline, support the listing, and believe more survey efforts are required. Some community members do not wish to discuss herds other than their own. Participants also indicated that they already have a quota system that is respected. Community members expressed concern related to methods used to survey caribou (e.g. helicopter use), and suggest using less intrusive methods. Community members identified parasites and wolves as threats, and expressed an interest in better understanding how parasites (e.g. ticks) have arrived and how they impact the caribou. HTO and community members expressed concern about

their harvest rights and the lack of Inuit participation in the listing process. They also indicated that animals do not belong to us, they belong to themselves. Nobody owns them; they are a part of the world.

Qikiqtaaluk Wildlife Board

Qikiqtaaluk Wildlife Board has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. In November 2019, ECCC presented at the QWB AGM with new material aimed at addressing concerns expressed during the first round of consultations and further clarifying concerns about the proposed listing. Following the presentation, ECCC staff had an open discussion during which board members and attendees asked questions, voiced opinions, and shared knowledge about caribou in their area. Following the discussions, ECCC staff asked board members if they required any follow-up consultations in their communities. We did not receive any such requests or indications of interest. We followed up with QWB staff person Dr. Michael Ferguson in February 2020, and received additional questions about the implications of the proposed listing. ECCC responded to these questions in May 2020, and followed up in June 2020 asking if there were any more questions and to see if further consultations were required. We did not receive a response. In February 2021, ECCC staff spoke with Dr. Ferguson and followed up by email asking if further consultations were required with the Qikiqtaaluk Wildlife Board or the Baffin HTOs, but ECCC staff did not receive a response.

Kugluktuk

Kugluktuk HTA has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC met with the HTA on two occasions to discuss the proposed listing. During the first meeting, members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou and the decision-making process. They expressed a preference for assessments at the herd level, and were concerned about impacts of *SARA*'s prohibitions on Inuit harvesting rights and the application to local management. Members of the HTA raised concerns over increasing wolf and wolverine populations. During the second meeting, the HTO highlighted the management actions already taken to support local herds including restricted commercial and sport harvest and that the HTA is encouraging other sources of country food, such as moose and muskox. They noted that there is traditional knowledge indicating signs of herd recovery including more twins, more calves and overall healthy caribou. There were concerns expressed that the listing would affect the management of Inuit lands and how lands will be protected given devolution. The HTA expressed interest in multiple approaches to protecting critical habitat including non-stationary options like mobile protection areas, since calving areas etc. change locations.

Ekaluktutiak/Cambridge Bay and Burnside/Bathurst Inlet (Qinqaut) and Omingmaktok/Bay Chimo

Ekaluktutiak HTA has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. Omingmaktok HTA and Burnside HTA have also not provided a position on the proposed listing. ECCC met with the three HTOs based out of Cambridge Bay on two occasions and met with the public on one occasion to discuss the proposed listing. During the first meeting, HTA members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou and the

decision-making process. They also want to be involved in the drafting of the recovery strategy. HTA and community members would appreciate a herd-by-herd assessment and in their opinion, their herd is doing fine. HTA and community members have noticed increased predation and would like to see an incentive for wolf harvest. HTA and community members also expressed concern for their income from both subsistence and income hunting. During the second meeting, few concerns were raised about the proposed listing. Questions were asked about how the assessment was completed (i.e. criteria used by COSEWIC) and about the importance of collared caribou in calculating estimates. One member was interested in having surveys completed on the wintering grounds to better understand herd composition when herds overlap. A representative from the Kitikmeot Inuit Association attended the meeting and asked for clarification around funding for Barren-ground Caribou once the species is listed.

Spence Bay/Taloyoak

In the response form it submitted, Spence Bay HTA indicated it “does not support” the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. The reasons for their response included that they need more up-dated information, that Barren-ground Caribou benefits them economically, culturally, spiritually and environmentally and that they do not plan to kill, harm or harass Barren-ground Caribou. Additionally, they stated that they are in the process of protecting Boothia from mining and exploration, that all species are impacted by the ecosystem and that they are one ecosystem with the environment and wildlife. ECCC met with the HTA on two occasions and held a public meeting once to discuss the proposed listing. During the first round of meetings, HTA members did not agree with the delineation of the herds as described in COSEWIC’s assessment. The HTA indicated that the Boothia Peninsula herd extends south of Taloyoak and mixes with caribou to the south that the COSEWIC assessment describes as a separate herd (Beverly/Ahiak herd). The HTA considers caribou in the area as all belonging to a single herd, not separate herds as indicated in the COSEWIC report. HTA and community members identified both wolves and muskox as threats to the herd and expressed an interest in establishing a harvest incentive program for wolves. HTA members were interested to know more about threats and impacts on herds. HTA and community members expressed concerns about their harvest rights and acknowledged that a growing human population will increase harvest pressure and that it is necessary to work together to ensure caribou are conserved. HTA and community members wanted more concrete survey data and caribou population data before providing a position on the listing. During the second meeting, HTA members had questions around the lack of data for herds in their area and had concerns about the assessment given the lack of caribou population data for their area. They expressed concern about disease and an increased muskox population causing declines in caribou. There were concerns about harvesting rights and the establishment of a Total Allowable Harvest limit (TAH) after listing. HTA members raised concerns about mining and how to protect caribou habitat, and wondered whether *SARA* could assist with habitat protection.

Qutairuruaq/Kugaaruk

In the response form it submitted, Qutairuruaq HTA indicated it “does not support” the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. The reasons for their response included that Barren-ground Caribou are abundant in Nunavut therefore they do not feel they are threatened, and there is not enough scientific data on the proposed listing of Barren-ground Caribou that supports Inuit knowledge. The HTO also stated in their response that Barren-ground Caribou have been a source of survival for Inuit for thousands of years and still is, that Inuit

knowledge is being passed down, and that they don't over harvest or harass any wildlife. They also stated that if Barren-ground Caribou were listed it would greatly impact their way of living and asked us to consider Inuit knowledge on the importance of caribou. ECCC met with the HTA on two occasions to discuss the proposed listing. During the first meeting, HTA members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou and the decision-making process. They would appreciate a herd-by-herd assessment and were not aware of any studies completed in their region. They expressed concern about harvest restrictions and food security. They also mentioned various reasons why they are currently seeing less caribou, including increased predation from wolves, more muskox, mining and associated effects (i.e. chemical, planes/helicopters), climate change causing more icing events, the natural population cycle of the caribou and disease. During the second meeting, which was virtual and also held with the Spence Bay HTA, the HTA did not raise any concerns or comments.

Gjoa Haven/Usqsuqtuuq

Gjoa Haven HTA has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC met with the HTA on one occasion to discuss the proposed listing. During the meeting, HTA members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou and the decision-making process. They expressed concerns about caribou declining, as the species is critical for their way of like and food security. They are interested in collaborating to help the species recover. They mentioned various reasons why they are currently seeing less caribou, including increased predation from wolves, wolverine and grizzly bear, more muskox, and from climate change because it makes caribou more vulnerable to migration on thin ice. They also want to improve youth education around hunting practices.

Kitikmeot Regional Wildlife Board

In the response form it submitted, the Kitikmeot Regional Wildlife Board indicated it "does not support" the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. The reasons for their response included that the information ECCC provided was not enough for KRWB and the HTOs to make an informed decision and that ECCC did not provide sufficient evidence that the proposed listing is relevant for all herds (e.g., some are declining while others increasing). Additionally, they stated that biological surveys reporting abundance estimates and trends are herd specific and that the reliability of trend data on each herd varies, with herds being managed individually. KRWB also stated that it is unclear how the proposed listing incorporates or considers Inuit traditional knowledge, Inuit *Quajimajatuqangit* and/or socioeconomic impacts in the Kitikmeot region, and that consultations with Inuit traditional knowledge holders and elders were inadequate (did not include all affected Kitikmeot communities). Finally, they also stated that it should be made clear how the proposed listing and *SARA* affects or at a minimum influences Inuit rights to hunting and relationships to caribou. In March 2021, ECCC attended the KRWB AGM to present on the proposed listing, collect feedback and communicate next steps and timelines for submission to the NWMB. Unfortunately, due to connection issues, the KRWB was not able to connect to Zoom and ECCC was not able to present virtually to the board. Instead, ECCC gave a brief update on the current status of consultations with HTOs in the Kitikmeot, which at the time were ongoing, and ECCC indicated its intent to make a June 2021 submission to NWMB for a

decision on the *SARA*-listing proposal. It was communicated by KRWB members attending the AGM that ECCC should continue to meet at the HTO level for consultations.

Kitikmeot Inuit Association

Kitikmeot Inuit Association has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC did not meet with KIA individually, but did invite them to attend meetings within the region. Kikitmeot Inuit Association attended the second meetings that ECCC had with Kugluktuk HTA, Ekaluktutiak HTA, Omingmaktok HTA, Burnside HTA, Spence Bay HTA and Qutairuruaq HTA.

Aqiggiag/Rankin Inlet/Kangiqtiniq

Aqiggiag HTO has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC met with the HTO on two occasions to discuss the proposed listing. During the first meeting, HTO members asked if IQ was included in the COSEWIC report and asked how the COSEWIC committees are formed. They would also appreciate a herd-by-herd assessment and they were not aware of any studies done in their region. The HTO expressed seeing an increase in predation, with more wolves and grizzlies being seen than before. Additionally, they want to be involved in drafting the recovery strategy and expressed that management plans already in place in some regions should be recognized. Some members also agreed to the listing of the Barren-ground Caribou. During the second meeting, we heard from the HTO members that they are very worried about potential harvest restrictions and that they are very apprehensive of losing control over the management plan of their own herd. They believe they have a good management plan in place and that it is enough for now. The HTO desired to have a third meeting with ECCC, however the meeting had to be cancelled and was unable to be rescheduled.

Arviat

Arviat HTO has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC met with the HTO on two occasions to discuss the proposed listing. At the first meeting, members expressed various reasons why they have observed less caribou than before including: sport hunting south of Arviat, migration routes changing, increased predation (wolves, grizzly bears, and wolverines), moose habitat range extending into their region and changing hunting practices. Due to scheduling challenges for the second meeting, Mitch Campbell (Government of Nunavut regional caribou biologist) presented ECCC’s presentation on ECCC’s behalf, and ECCC staff participated by phone. There were concerns about helicopters disturbing caribou, the lack of wolf hunting, the sport hunting of large bulls and a desire to protect calving areas and migration corridors.

Issatik/Whale Cove

In the response form it submitted, Issatik HTO indicated it “does not support” the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. The reason for their response is that the HTO disagrees with the COSEWIC assessment of Threatened, and believes it should be Special Concern. ECCC met with the HTO on two occasions to discuss the proposed listing. During the first meeting, they mentioned various reasons why they see less caribou than before: increased

predation (eagles, wolverines), more muskox, increased disease (Brucellosis), increased mining, and the natural cycle of caribou populations. During the second meeting, the HTO members expressed the need to coordinate Inuit responses to ECCC to coordinate input and information. The members also expressed that the wolves are learning to use the Meadowbank road to hunt caribou more intensively and the HTO would like collars to measure the effects of the road on caribou.

Aiviit/Coral Harbour

In the email ECCC received, Aiviit HTO indicated it “does not support” the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC met with the HTA on two occasions to discuss the proposed listing. During the first meeting, which was a joint public and HTA meeting, both community members and the HTA were concerned about mining activity and identified industry as one of the main threats to caribou. Community members also identified climate change as an on-going threat to caribou. Some community members believe caribou numbers increase and decrease, but will always come back. Community members also expressed interest in knowing current local caribou numbers, particularly on Coats Island. There was a concern expressed that the lag time between caribou surveys and results is too long. The community members and HTA would like to be informed of the health of the herds more quickly, so they can better manage their harvest. Community and HTA members expressed interest in knowing how caribou herds across Canada were doing, and how they were being managed. Additionally, HTA and community members expressed that they were taught how to manage and respect caribou. During the second meeting, which was only with the HTA, the members expressed that IQ says caribou populations naturally go up and down. They also expressed that sport hunts should be regulated more closely and that the Southampton herd is a great example of a good management plan.

Arviq/Naujaat

In the response form it submitted, Arviq HTO indicated it “does not support” the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. One community member filled in the questionnaire indicating that they “do not support” the proposed listing, because there is a good population with the Wager Bay herd, and that other populations are at risk. They also stated that this recommendation should be considered by populations that are at risk, not populations that are doing well. ECCC met with the HTO on two occasions to discuss the proposed listing. The first meeting was a joint public and HTO meeting. Community members wanted to see local management of the herd. They did not like having their caribou lumped in with other herds across Canada as part of the assessment of Barren-ground Caribou or in future recovery plans. Some people expressed that the population numbers and survey methodology are not trustworthy, and that the range maps may not be correct. Some people indicated that the caribou in the area are currently doing well and are not declining. People were also worried about their harvest rights and food security. The second meeting was only with the HTO and they expressed that they see changes in their herds (migration timing and routes) but that their herd is healthy.

Aqigiq/Chesterfield Inlet

Aqigiq HTO has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC met with the HTO on two occasions to discuss the proposed listing. During the first meeting, HTO members asked if IQ was included in the

COSEWIC report and asked how the COSEWIC committees are formed. They mentioned that caribou have other predators, like wolves, grizzlies and wolverines that are also responsible for their decrease. They expressed concern about their harvest rights and some have noticed the caribou have recently started to increase in the area. At the second meeting, the HTO expressed interest in seeing GN's 2018 survey data, and they indicated that they would need to discuss the issues further on their own before providing comments to ECCC.

Baker Lake

Baker Lake HTO verbally communicated that they do not support the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC met with the HTO on two occasions to discuss the proposed listing. During the first meeting, the HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou and the decision-making process. They would like to see an Inuit representative on the COSEWIC committee. They also expressed concerns about their harvest rights and food security. HTO members expressed not seeing the Qamanirjuaq herd for a long time, and mentioned potential causes of the caribou decline, including changing migration routes, natural cycle of the caribou population, forest fires, and increased predation. They want the recovery strategy to be developed cooperatively with all implicated jurisdictions, and expressed that there should be extra attention to protect migration routes. During the second meeting, the HTO members indicated that community members should be more involved through the use of training and capacity building. There were questions about the recovery planning process, and how coordination would occur between all co-management partners across the entire Barren-ground Caribou range. HTO members expressed appreciation for the time to reflect on and understand the issues prior to making a decision. There were also some concerns about the harvest restrictions. Past negative experiences with caribou harvest quotas and Polar Bear made HTO members very apprehensive of the impact that listing could have on their harvest rights.

Kivalliq Wildlife Board

Kivalliq Wildlife Board has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. In November 2019, ECCC presented at the KWB AGM with new material aimed at addressing outstanding concerns, to further clarify concerns about the proposed listing, and to seek guidance on the need for further consultations. Following the presentation, we had an open discussion during which board members and attendees asked questions, voiced opinions, and shared knowledge about caribou in their area. Following the discussions, we were told that additional meetings in the Kivalliq region would be needed. Kivalliq Wildlife Board attended the second meetings ECCC had with Aqiggiag HTO, Arviat HTO and Aiviit HTO.

Kivalliq Inuit Association

Kivalliq Inuit Association has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC met with the Kivalliq Inuit Association on February 7th 2020. Kivalliq Inuit Association has completed many consultations and analyses, as demonstrated by the comments they have collected. Their detailed reports are a good record of caribou management in the region. We heard from Kivalliq Inuit Association that many Inuit rely on caribou to eat, it is one of their main sources of food. We also heard that the use of traditional

knowledge is very important, rather than just using consultations and that ECCC needs to make sure to use it properly. It was noted that harvest pressure has increased in the Kivalliq due to meat sales to regions with harvest quotas. Kivalliq Inuit Association suggested that mobile protection measures are required for caribou and that density analyses could indicate where the herds are which would allow for temporary road closures so caribou can cross. Kivalliq Inuit Association also stated that hunting is not a major threat, because it is logistically challenging and requires capacity (skidoo, sled, fuel, etc.) that many Inuit can not afford and it means only one or two caribou can be carried back. They also expressed that the government needs to put more resources into investigating the causes of decline, especially on the impact of mines and other developments on caribou populations. In a follow up conversation in March 2021, Kivalliq Inuit Association noted that they cannot provide aposition on the proposed listing and that ECCC should contact Nunavut Tunngavik Incorporated.

Nunavut Tunngavik Incorporated

Nunavut Tunngavik Incorporated has not provided a position on the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. ECCC worked closely with NTI following the first round of consultations to modify the consultation approach and review presentation materials, in order to respond to questions and concerns that were raised during the first round. To help build capacity for Inuit engagement regarding the *SARA*-listing proposal, ECCC also developed a funding agreement with NTI to facilitate internal dialogue amongst Inuit communities and organizations on caribou management and conservation. ECCC invited NTI to attend meetings and they were able to attend the meetings with Iqaluit HTO and Aqiggiag HTO in the first round of meetings, and Kugluktuk HTA, Ekaluktutiak HTA, Omingmaktok HTA, Burnside HTA, Spence Bay HTA, Qutairuruaq HTA and Aqiggiag HTO in the second round.

Beverly and Qamanirjuaq Caribou Management Board

In the written response we received, BQCMB indicated it “supports” the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act.* BQCMB came to this decision as a result of discussions with ECCC and its decision is in part based upon the assurance that the listing would not infringe on Indigenous harvesting rights and that there would be a legal Duty to Consult if any infringement of harvest rights is contemplated in the future. Their expectation is that full and meaningful consultation would be undertaken prior to any impact to harvest rights. BQCMB expects the Recovery Strategy to incorporate Indigenous Knowledge and to focus on outlining measures required to reduce threats to Barren-ground Caribou and their habitat, identify critical habitat, develop stewardship and education objectives, and use existing caribou conservation plans and strategies. They also wish to be involved in the recovery planning process. ECCC held two in-person meetings with BQCMB in May 2018 and May 2019. BQCMB staff presented updates to the Board at its November 2018 and November 2019 meetings. BQCMB submitted questions to the Species at Risk Public Registry in January and October 2019, and submitted an update directly to ECCC staff in December 2019. ECCC provided a 19-page written response, addressing questions on the implications of listing on harvesting rights, consultation and recovery planning. BQCMB representatives were also in attendance at the Kivalliq Wildlife Board AGM on October 23, 2019, and Kivalliq HTO chairs also sit on the BQCMB. Representatives from the BQCMB were supportive of the approach and the material that was presented at the Kivalliq Wildlife Board AGM in October 2019.

Government of Nunavut

In the written response we received, the GN indicated it "does not support" the proposed listing of Barren-ground Caribou as Threatened under the *Species at Risk Act*. The reasons for their response included that caribou populations are cyclical, and many herds are known to be near or at the low point of their cycle, and being at the low point of their cycle does not mean they are at risk. Additionally, the potential threats to caribou populations include harvesting, habitat loss and climate change, however, the COSEWIC assessment does not present evidence that these potential threats are the cause of the decline in population size. Finally, the GN states that existing legal and other management tools and initiatives in Nunavut can adequately address the declines and recovery of the Barren-ground Caribou herds. ECCC did not have a consultation meeting specifically with only the GN; however, ECCC has worked closely with GN staff and has been in constant communication with them throughout the consultation process. ECCC worked closely with GN following the first round of consultations to modify the consultation approach and review presentation materials, in order to respond to questions and concerns that were raised during the first round. Although the GN was only able to attend the meetings with the Pond Inlet HTO, Igloolik HTO, Iqaluit HTO, Kugluktuk HTA, Spence Bay HTA, Arviat HTO, Arviq HTO, Aqigiq HTO and Baker Lake HTO in the first round, they were able to attend all meetings in the second round of consultations.

E. Accommodations

During its consultations in Nunavut on the proposed *SARA*-listing of Barren-ground Caribou (2018-2021), ECCC has endeavoured to accommodate the concerns, feedback, and requests raised by Inuit communities and organizations, in a number of ways that are highlighted below.

Additional Meetings

During the first round of consultations, a number of common questions and concerns about the proposed listing were raised by communities and HTOs, which indicated that further consultation meetings may be warranted. To accommodate these concerns and to ensure that questions were adequately addressed, it was decided that ECCC would conduct further consultations in Nunavut. Through discussions with NTI and GN, ECCC developed a plan to consult with the regional wildlife boards at their fall 2019 annual general meetings (AGM), in order to provide an update on consultations to date and seek guidance on the need for further consultations in each region. This led to ECCC presenting at the Qikiqtaaluk Wildlife Board and Kivalliq Wildlife Board AGMs in the fall of 2019, and an additional round of meetings within the Kivalliq (2020) and Kitikmeot (2021) regions, including a meeting with the Kitikmeot Regional Wildlife Board (2021). ECCC worked closely with GN and NTI to modify the consultation approach and review presentation materials, in order to respond to questions and concerns that were raised during the first round. Presentation materials were adapted to provide additional information and emphasis to address outstanding concerns and clarify common misconceptions and questions about the proposed *SARA*-listing. This meant additional, meaningful consultations, and the ability to answer any outstanding concerns and questions.

Providing Detailed Responses to Questions

Through the consultation process, three organizations (Qikiqtaaluk Wildlife Board, the Beverly and Qamanirjuaq Caribou Management Board and the Kitikmeot Regional Wildlife Board) posed detailed questions about the listing process and what would happen if Barren-ground Caribou were listed as Threatened under *SARA*. ECCC was able to provide detailed answers all of the questions posed. In the case of the BQCMB, there was a back-and-forth dialogue to clarify BQCMB's questions and to provide a clear response. This dialogue led to both parties becoming more informed, and led to the BQCMB being able to determine their position on the proposed listing. In addition, during each consultation meeting, ECCC staff had open, in-depth discussions during which board members and attendees asked questions, voiced opinions, and shared knowledge about caribou in their area.

Adapting Presentations

During the first round of consultations, it became clear that ECCC's presentation materials needed improvement to anticipate and address key questions and concerns raised by HTOs and communities (e.g. implications for Inuit harvest). Before our second round of meetings, ECCC worked closely with NTI and GN to create a more clear and understandable presentation. Presentation materials were adapted to provide additional information and emphasis to address outstanding concerns and clarify common misconceptions and questions about the proposed *SARA*-listing. Additional information and emphasis was included regarding summaries of previous consultation feedback; COSEWIC's assessment process and the *SARA*-listing processes; the role of IQ and Inuit involvement; Inuit harvest rights and wildlife management processes under the *Nunavut Agreement*; the potential benefits of listing Barren-ground Caribou under SARA; and local herd information. This meant a more focused and individualized presentation for each community and led to a more meaningful discussion of the *SARA*-listing proposal.

Inviting Experts

During the first round of consultations, HTOs and communities were interested in hearing specific, herd-related information beyond ECCC's mandate that ECCC staff were unable to answer. For subsequent consultations, GN regional biologists were invited to attend ECCC's meetings to provide information related to local herds, survey data and methodology specific to the area, and other topic areas related to GN's mandate, and to help to explain the respective management roles of GN and ECCC. This accommodated the requests for herd specific information that ECCC received and led to a more meaningful discussion in which HTO members could discuss a more complete picture of caribou management, beyond just ECCC's mandate for *SARA*.

Collaboration with Partners

Throughout the consultations, ECCC worked collaboratively with partner organizations in Nunavut, and staff from GN, NWMB, NTI, Regional Inuit Associations, RWOs, Parks Canada, ere invited to attend ECCC's consultation meetings, and attended when feasible. In addition, ECCC developed a funding agreement with NTI to facilitate internal dialogue amongst Inuit communities and organizations on caribou management and conservation in an effort to help build capacity for Inuit engagement regarding the *SARA*-listing proposal

Delayed Submission to NWMB

Due to the need for additional consultation meetings in Nunavut, the initial consultation period for the *SARA*-listing proposal, ending October 2018, was extended significantly. The extension of the consultation period allowed for more in-depth engagement with HTOs and other partners to occur. Similarly, ECCC delayed its submission to NWMB on this topic for a decision, to allow adequate time to address concerns and questions, and to allow partners sufficient time to develop their views and positions on the *SARA*-listing proposal. This allowed more time for HTOs and other organizations to engage and determine their position with their constituents.

Appendices

Appendix A. Consultation Materials

See attached.

Appendix B. Full Meeting Notes

See attached.

Baffin Region Full Meeting Notes

Pangnirtung

Qikiqtarjuak

Clyde River

Pond Inlet/Mittimatalik

Arctic Bay/Ikajutit

Cape Dorset/Aiviq

Hall Beach

Igloolik

Iqaluit

Kimmirut

Qikiqtaaluk Wildlife Board - DNE

Kitikmeot Region Full Meeting Notes

Round 1:

Kugluktuk

Ekaluktutiak/Cambridge Bay and Burnside/Bathurst Inlet and Omingmaktok/Bay Chimo

Spence Bay/Taloyoak

Qutairuruaq /Kugaaruk

Gjoa Haven/Usqsuqtuuq

Round 2:

Kugluktuk

Ekaluktutiak/Cambridge Bay and Burnside/Bathurst Inlet and Omingmaktok/Bay Chimo

Spence Bay/Taloyoak and Qutairuruaq /Kugaaruk

Kivalliq Region Full Meeting Notes

Aqiggiag/Rankin Inlet/Kangiqtiniq

Arviat

Issatik/Whale Cove

Aiviit/Coral Harbour

Arviq/Naujaat

Aqigiq/Chesterfield Inlet

Baker Lake

Kivalliq Inuit Association

Appendix C. HTO Response Forms and Letters Received

See attached for Questionnaires and Letters.

Clyde River – Indifferent

Aiviq – Indifferent

Amaruk (Iqaluit) – Do Not Support

Mayakalik – Do Not Support

Spence Bay (Taloyoak) – Do Not Support

Kurtairojuark – Do Not Support

Issatik (Whale Cove) – Do Not Support (Consider Special Concern, not Threatened)

Coral Harbour – Do Not Support

Arviq – Do Not Support

Appendix D. Public Response Forms and Letters Received

See attached for Public Response Forms and Letters Received.

Clyde River – 1 Indifferent

Aiviq – 8 Do Not Supports

Kimmirut – 1 Support

Naujaat – 1 Do Not Support

Appendix E. Organizations – Letters Received

See attached for Letters Received.

Beverly and Qamanirjuaq Caribou Management Board – Support

Government of Nunavut – Do Not Support

Kitikmeot Regional Wildlife Board – Do Not Support

Appendix F. Schedule of Consultations in Other Regions

See attached for Schedule of Consultations in Other Regions .

Appendix G. Raw Consultation Feedback

See attached for Raw Consultation Feedback.

Summary

Barren-ground Caribou was assessed as a Threatened species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2016 because of steep population declines. According to the COSEWIC criteria, Barren-ground Caribou could have been assessed as Endangered but were downgraded due to existing co-management efforts by governments, wildlife management boards and communities, and because Barren-ground Caribou do not appear to be facing imminent extinction at this time. Most Barren-ground Caribou herds have shown large declines since 1990. Across Canada, Barren-ground Caribou have declined from around 2 million individuals in the early 1990s to about 800,000 in 2016 - a 56.8% decline over three generations (between 1989 and 2016). Recent abundance surveys, since the COSEWIC assessment, have shown further declines in some populations, including the Bluenose-East, Bathurst, and Beverly herds. A Threatened species is likely to become Endangered unless threats are addressed. Potential threats to Barren-ground Caribou include: climate and weather changes affecting forage availability, predation, parasites and diseases; industrial exploration and development; fragmentation of habitat in their winter range from forest fires and increasing human presence; increased human population and an increased demand for caribou meat.

Under the *Species at Risk Act (SARA),* the federal Minister of the Environment must consult relevant provinces, territories and wildlife management boards before making a recommendation to the Governor in Council on whether to accept COSEWIC's assessment and add Barren-ground Caribou to *SARA* as a Threatened species. It is important to note that no decision regarding the *SARA*-listing proposal has been made to date. To inform the federal Minister's recommendation regarding the *SARA*-listing proposal, Environment and Climate Change Canada (ECCC) consulted Hunter and Trapper Organizations, Regional Wildlife Organizations, communities, and other organizations (i.e. Nunavut Tunngavik Incorporated, Regional Inuit Associations, Beverly and Qamanirjuaq Caribou Management Board) in Nunavut from 2018 to 2021. The purpose of the consultations was: 1) to explain the COSEWIC assessment, the *SARA*-listing process, and the implications of listing Barren-ground Caribou as a Threatened species under *SARA*; 2) to gather comments, other information, and formal positions from implicated parties regarding the *SARA*-listing proposal, to inform the federal Minister's recommendation to the Governor in Council; and 3) to address questions and concerns raised.

Under the *Nunavut Agreement*, ECCC consults Hunter and Trapper Organizations (HTOs), Regional Wildlife Organizations (RWOs), Nunavut communities, and other organizations before seeking a decision from the Nunavut Wildlife Management Board (NWMB). Prior to initiating consultations, ECCC presented its consultation plan to NWMB and sought feedback from NWMB on the proposed consultation approach (December 2017). Information updates were presented periodically to NWMB during the consultation process (March 2019 and March 2020), and ECCC worked closely with the Government of Nunavut (GN) and Nunavut Tunngaviik Incorporated (NTI) to improve the consultation approach following the first round of consultations. Throughout the consultations, ECCC worked collaboratively with partner organizations in Nunavut, and staff from partner organizations (NWMB, NTI, Regional Inuit Associations, RWOs, etc.) were invited to attend ECCC's consultation meetings, and attended when able. To help build capacity for Inuit engagement regarding the *SARA*-listing proposal,

ECCC also developed a funding agreement with NTI to facilitate internal dialogue amongst Inuit communities and organizations on caribou management and conservation.

Consultation

On January 25, 2018, written consultation materials were distributed to communities and partners outlined in the consultation plan. ECCC held the first round of consultation meetings from February 2018 to February 2019 in the Qikiqtaaluk, Kivalliq and Kitikmeot regions. As HTOs are the local authority for wildlife management in each community, ECCC consulted the HTO for each Nunavut community within the Barren-ground Caribou range. ECCC's consultation meetings with HTOs were held with the HTO members and if requested, a public meeting was also held during the first round of consultations. At each meeting, ECCC presented information to explain the COSEWIC assessment, the *SARA*-listing process, and the implications of listing Barren-ground Caribou as a Threatened species under *SARA*.

Following the first round of consultations, ECCC worked closely with GN and NTI to modify the consultation approach and review presentation materials, in order to respond to questions and concerns that were raised during the first round. Presentation materials were adapted to provide additional information and emphasis put into addressing outstanding concerns and clarify common misconceptions and questions about the proposed *SARA*-listing. Additional information was included and emphasis put on the summaries of previous consultation feedback; COSEWIC's assessment process and the *SARA*-listing processes; the role of IQ and Inuit involvement; Inuit harvest rights and wildlife management processes under the *Nunavut Agreement*; the potential benefits of listing Barren-ground Caribou under *SARA*; and local herd information. Through discussions with NTI and the GN, ECCC developed a plan to consult with the regional wildlife boards at their fall 2019 annual general meetings (AGM), in order to provide an update on consultations to date and seek guidance on the need for further consultations in each region. ECCC attended the Kivalliq and Qikiqtaaluk Wildlife Board AGMs in the fall of 2019, but was unable to attend the Kitikmeot Regional Wildlife Board AGM in 2019 due to the federal election. At the Kivalliq Wildlife Board AGM, it was suggested that additional meetings in the Kivalliq region were required, and a second round of in-person meetings was held with HTOs in the Kivalliq region in February 2020. Through discussions with KRWB's Regional Coordinator, it was suggested that additional meetings in the Kitikmeot region were also required. Due to Covid-19 restrictions, only virtual meetings were conducted with all but one of the Kitikmeot region HTOs from January 2021 to June 2021. ECCC also attended the Kitikmeot Regional Wildlife Board AGM in March 2021 to provide a brief update on the current status of consultations in the Kitikmeot, which were ongoing at the time. There was no request for additional meetings from the Qikiqtaaluk Wildlife Board. Consultation meetings with additional organizations (i.e. NTI, Regional Inuit Associations, Beverly and Qamanirjuaq Caribou Management Board) were also held between 2018 and 2021.

Over the course of the consultations, ECCC adjusted its approach and provided a number of accommodations in order to better address the concerns, feedback, and requests raised by Inuit communities and organizations. These accommodations included having additional meetings, providing detailed responses to all questions received, altering and adapting presentations based on feedback received, inviting experts to meetings, collaboration with partners, and delaying the timing of the submission to NWMB for decision.

Results

During each consultation meeting, ECCC staff had open discussions during which board members and attendees asked questions, voiced opinions, and shared knowledge about caribou in their area. Attendees were invited to provide comments, other information or a formal position on the *SARA*-listing proposal. After each meeting, ECCC prepared meeting summaries, and HTOs were provided an opportunity to review and validate the summaries before they were finalized. A range of common comments and concerns were received during the consultations. Core concerns shared by at least 50% of the communities across all regions included that caribou distribution is always changing; that predation is the main threat or cause of decline; the need for Inuit involvement in all stages of the *SARA* process and the importance of including IQ in all stages of the *SARA* process; that caribou populations undergo natural fluctuations; the need for herd-level assessments; that caribou are not declining; potential prohibitions on harvesting rights; and a limited understanding of the *SARA* process. Additional input that was shared by less than 50% of the communities and usually not by all regions, included disagreeing with the survey methodology; disagreeing with the current regulations, restrictions or quotas; the need for more information to support decisions (both western science and IQ); observed increases and decreases in local herds; concerns about scientists disturbing caribou; and that Inuit harvest is done properly.

Results can be seen below, with more detailed tables available in Section 4 Summary of Feedback. Those parties who have not submitted a response are not included below but can be seen in Section 4.

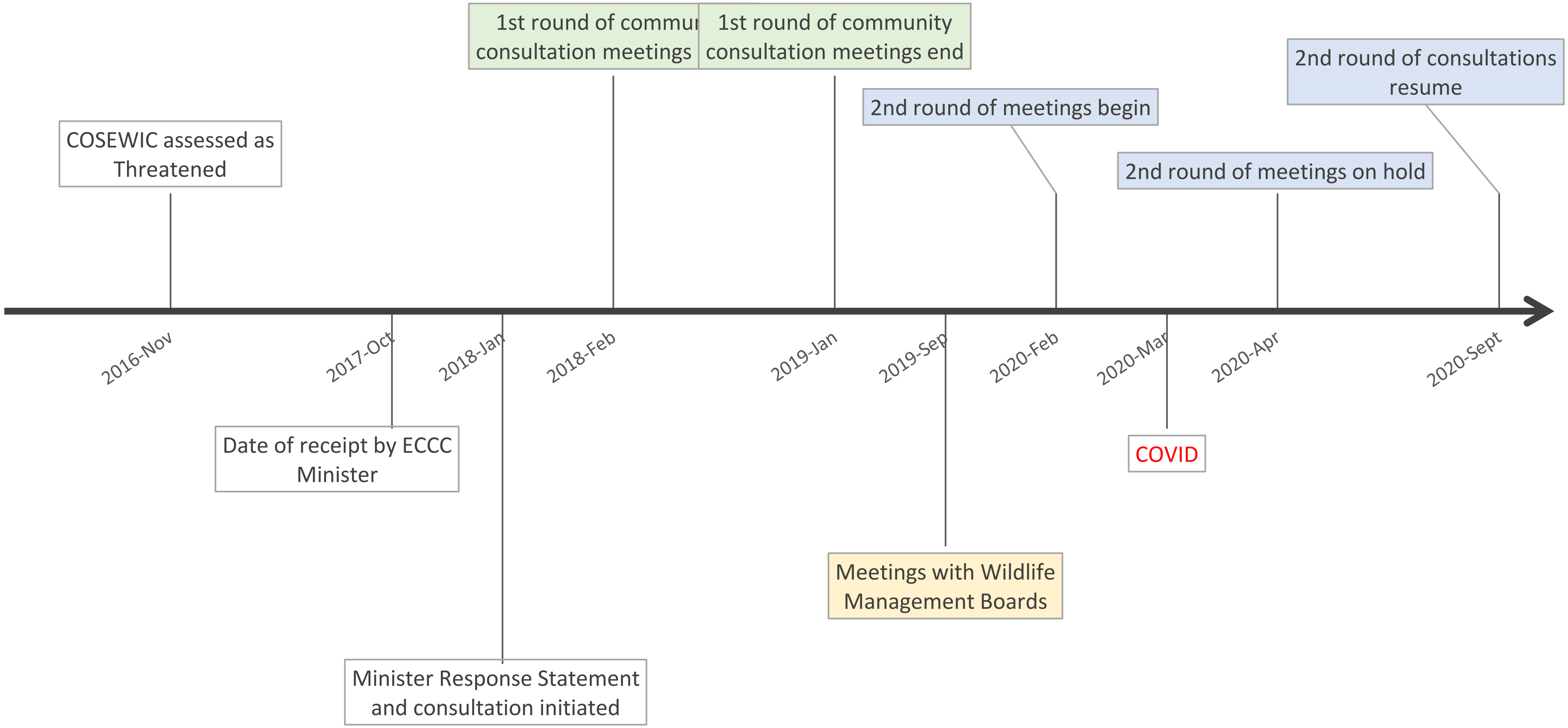
	Response Type		
	Do Not Support	**Support**	**Indifferent**
Wildlife Boards	Kitikmeot Regional Wildlife Board	-	-
BQCMB	-	X	-
Government of Nunavut	X	-	-
Hunters and Trappers Organizations	Iqaluit, Kimmirut, Spence Bay, Kurairojuark, Issatik, Aiviit, Arviq, Baker Lake	-	Clyde River, Cape Dorset
Community Responses	Aiviq (Cape Dorset) (8). Naujaat (Arviq) (1)	Kimmirut (1)	Clyde River (1)

Although not all organizations and HTO’s submitted a formal position, ECCC still received extensive comments, questions and feedback during consultation meetings, which provide insight into Inuit views regarding the *SARA*-listing proposal. Inuit organizations engaged in open, thoughtful dialogue with ECCC to express their ideas and views on the proposal.

The following report and appendices summarize the results of the Nunavut consultations. This document is being submitted to NWMB for its decision on the proposed listing of Barren-ground Caribou as Threatened under the federal *Species at Risk Act* (*SARA*) as per the *Nunavut Agreement* s.5.2.34 (f) and 5.3.16-5.3.23.

Should Barren-ground Caribou be added to the Species at Risk Act?

Timeline of Events



QUESTIONS/COMMENTS

Outline

1. SARA
2. Herd health
3. Threats to recovery
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Photo by A. Gunn

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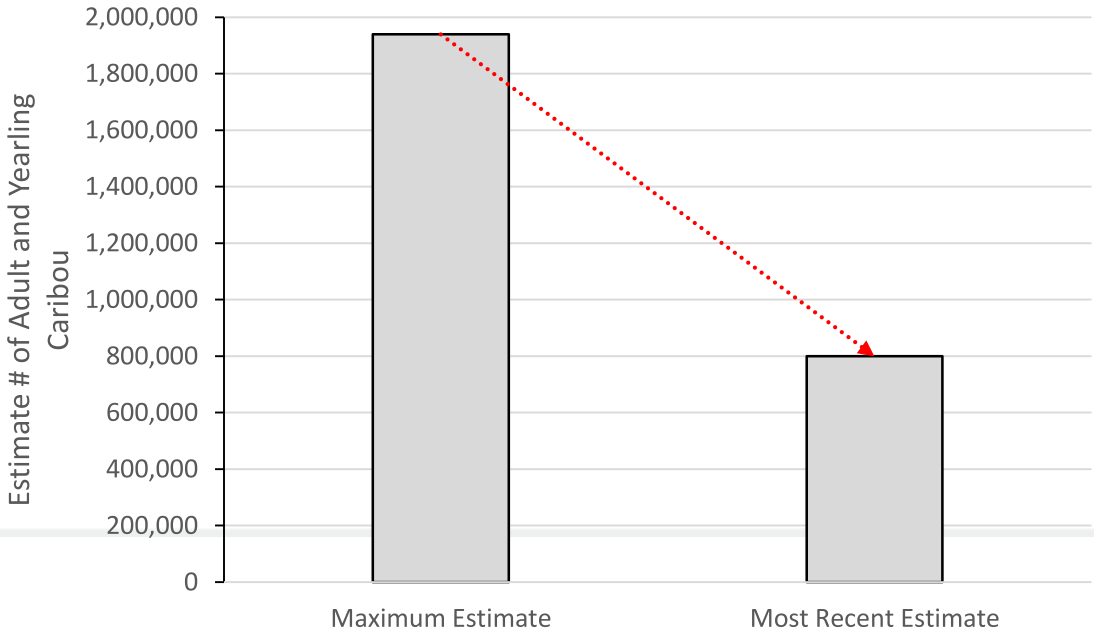

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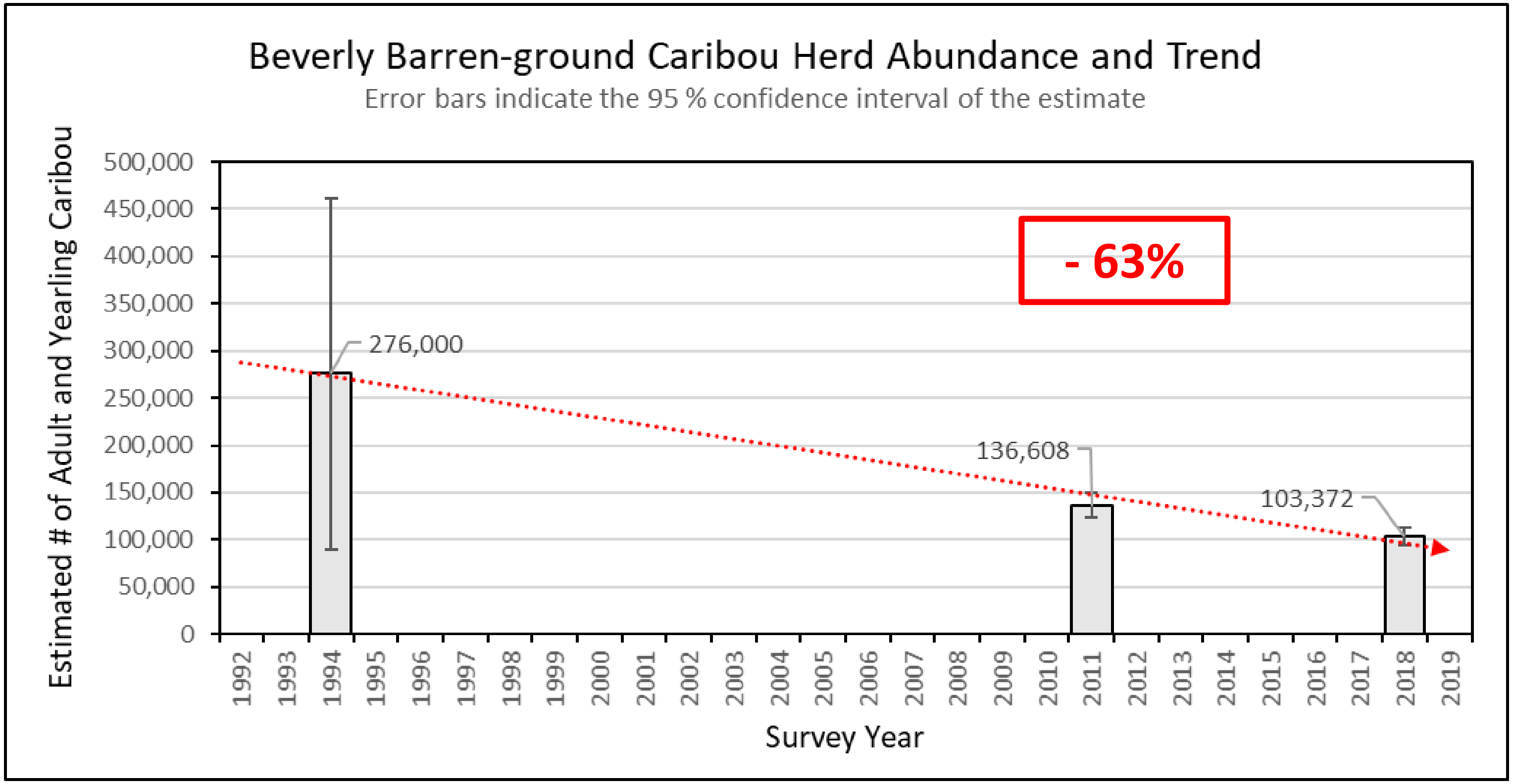

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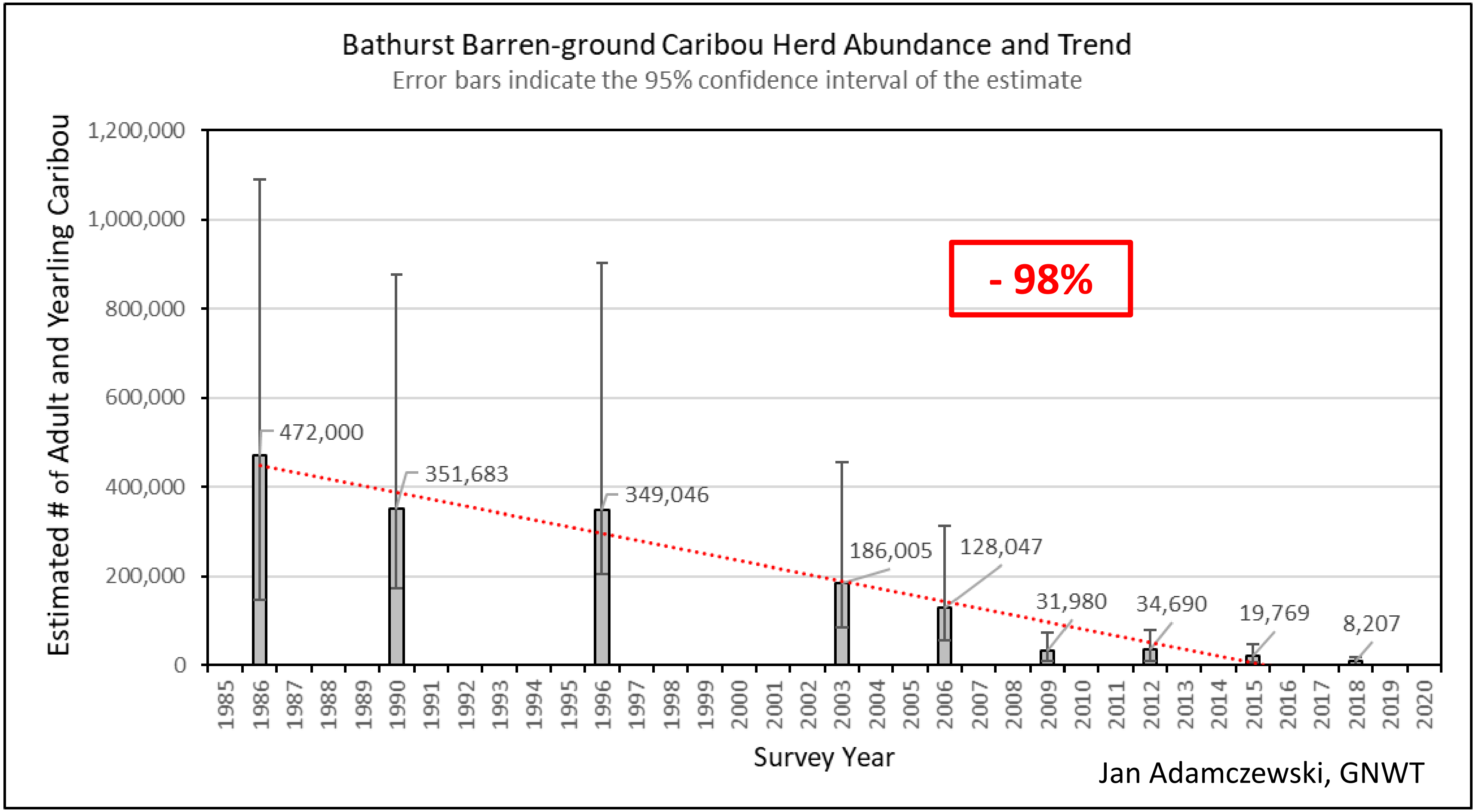

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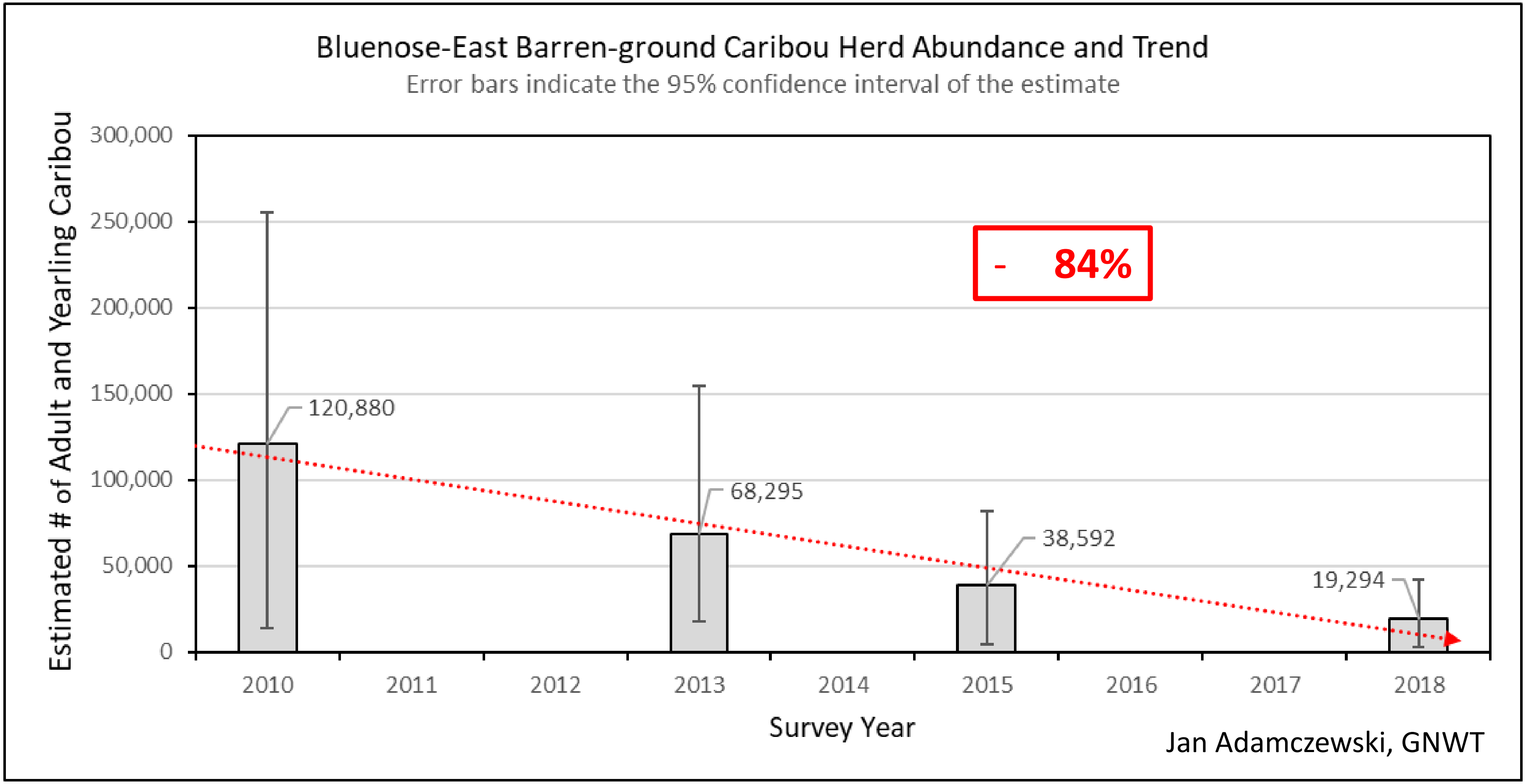

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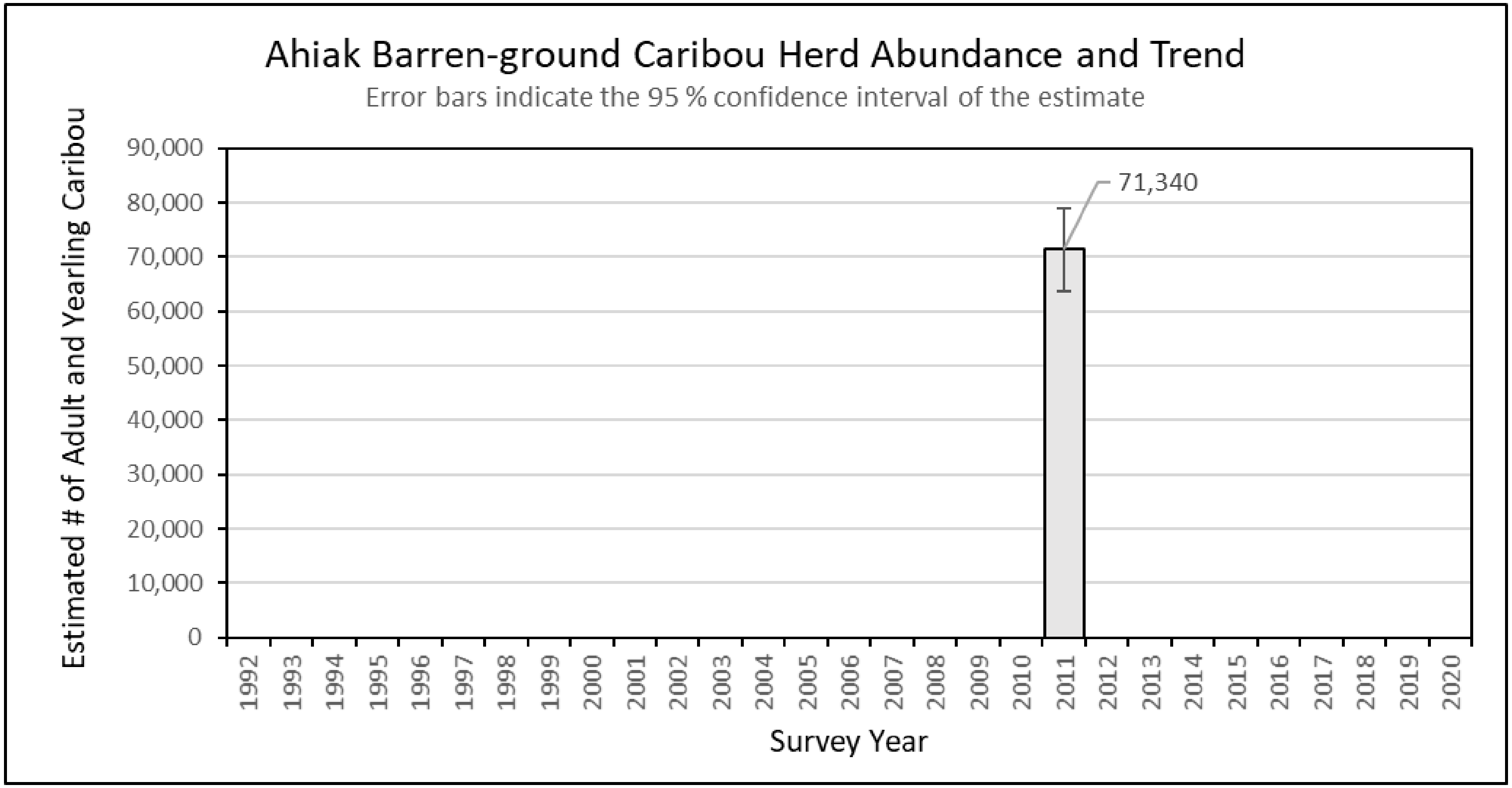

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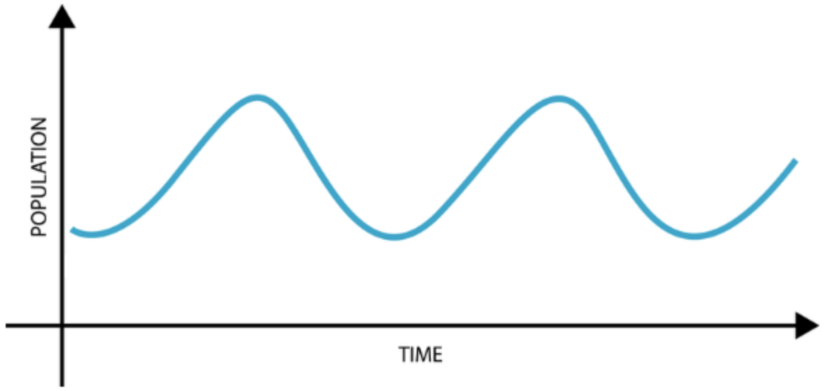

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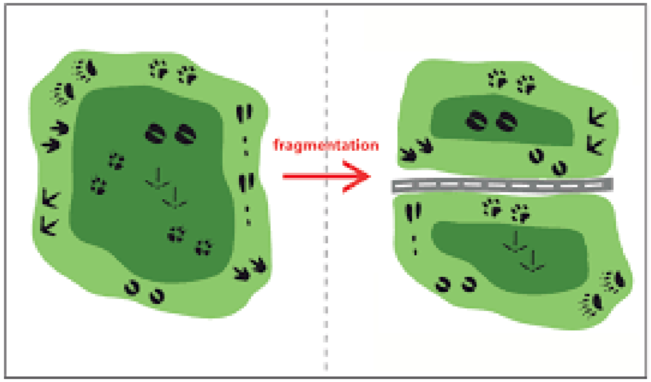

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Next steps

Kananginak Pootoogook, 2007

Ongoing

- Continue to solicit input from communities including Inuit Qaujimatuqangit and socio-economic impacts of listing

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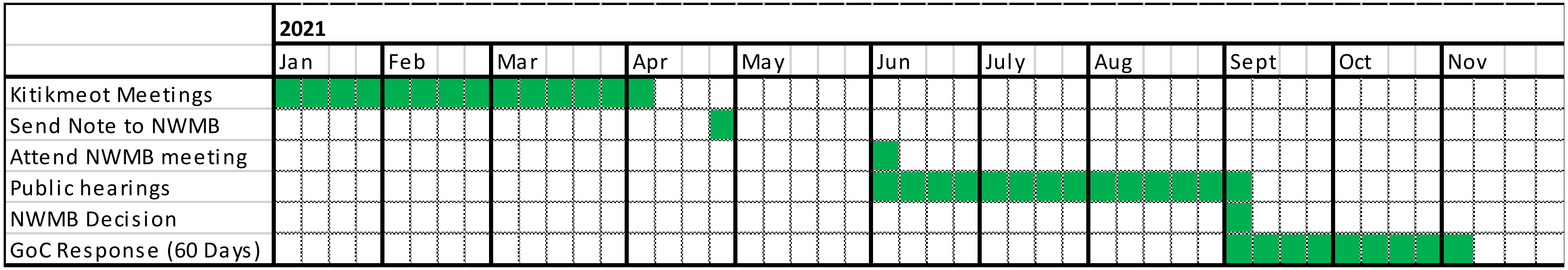

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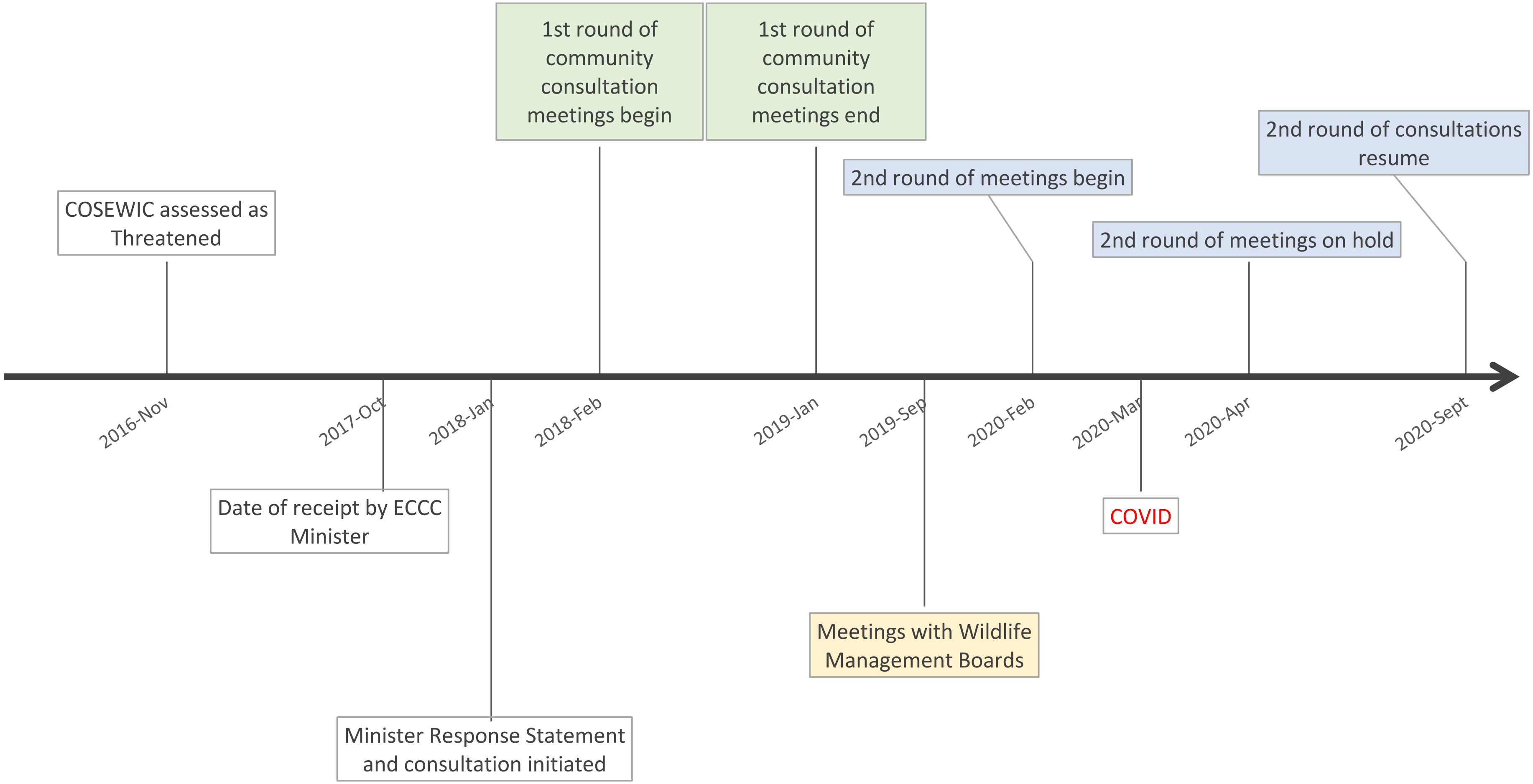
Environment and Climate Change Canada
Environnement et Changement climatique Canada

Should Barren-ground Caribou be added to the Species at Risk Act?

Canada

Timeline of Events



Last Meeting – March 1 2018

We heard:

1. HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground Caribou and the decision-making process.
2. You are worried about the caribou declining, the species is critical for their way of life and food security. They are interested in collaborating to help the species recover.
3. You would like to improve youth education regarding hunting practices.
4. You mentioned various reasons why you see less caribou than before:
   - Increased predation (wolves, wolverines and grizzlies)
   - You are seeing a lot more muskox than before
   - Climate Change: caribou are vulnerable to migration on thin ice.

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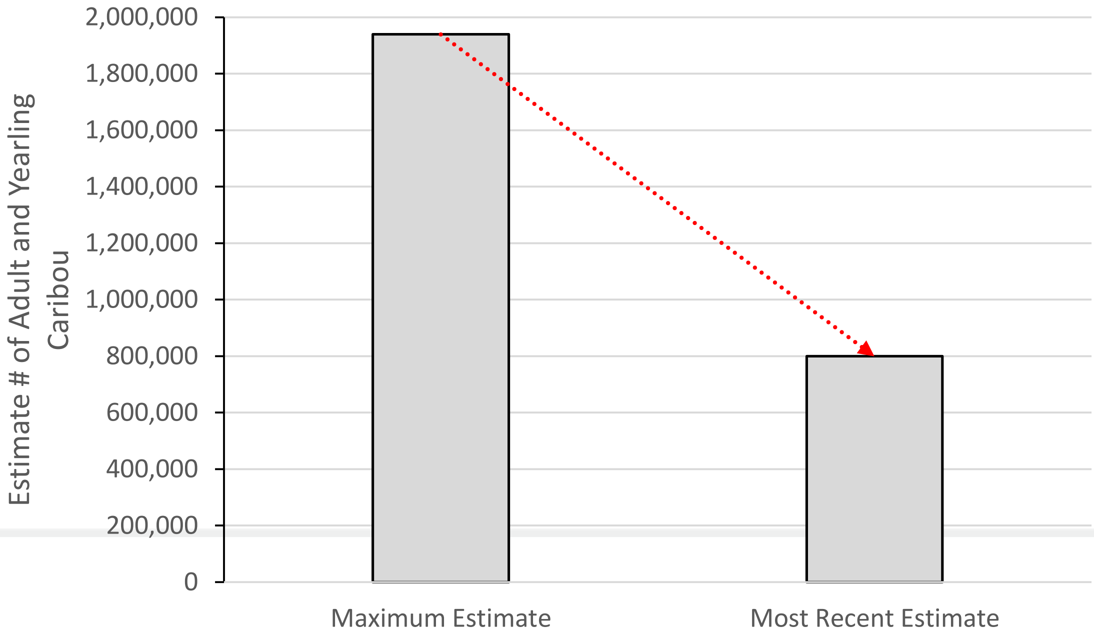

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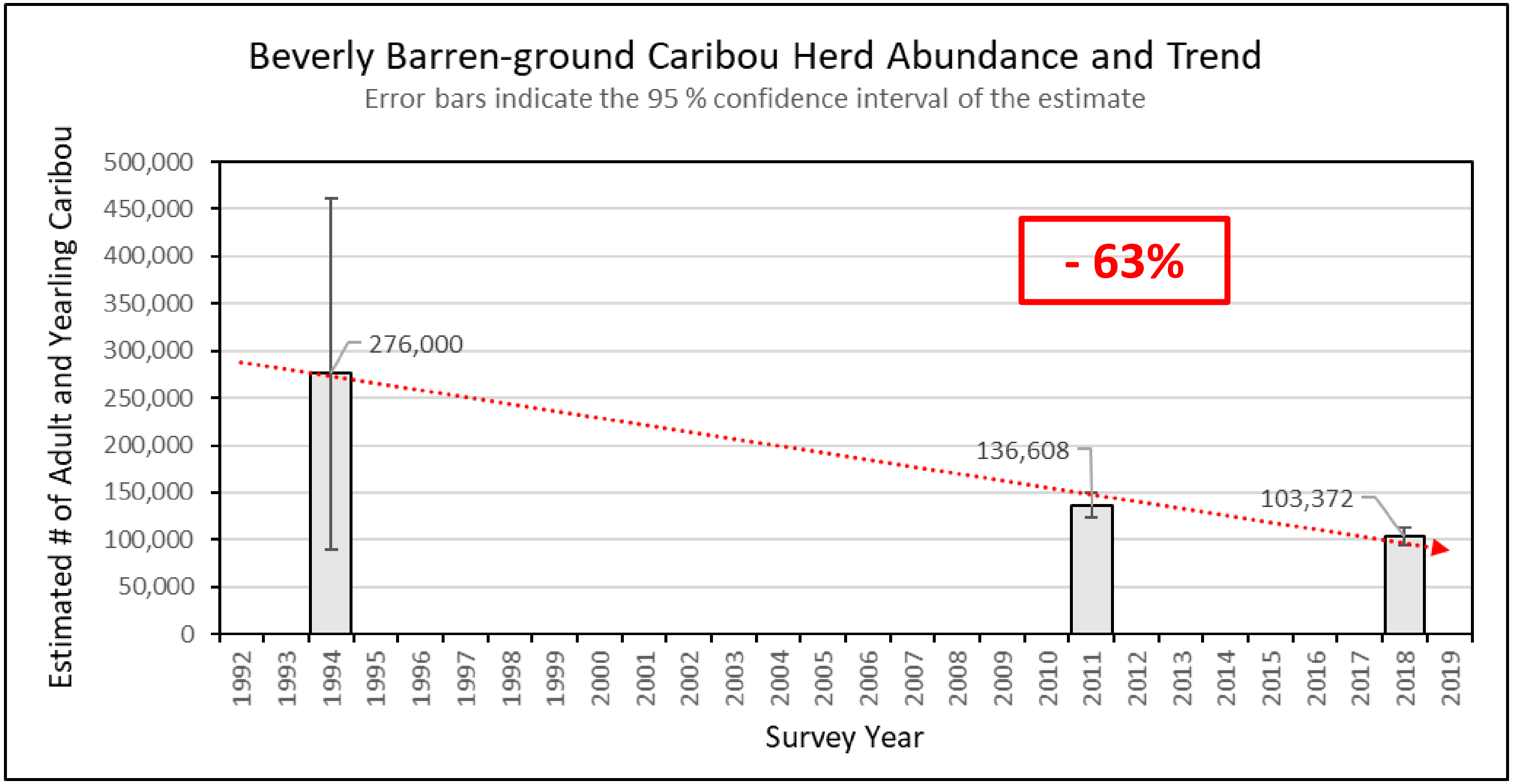

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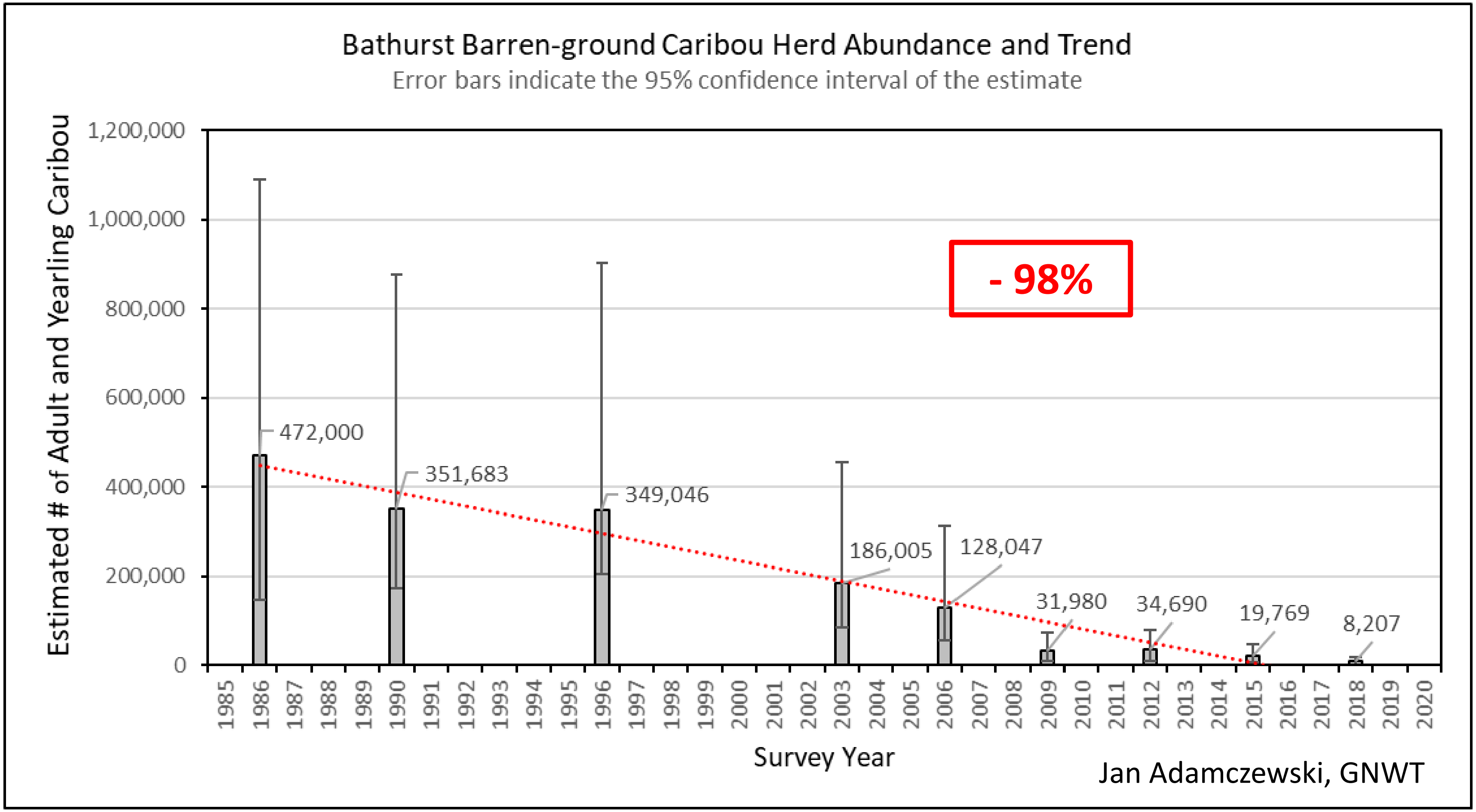

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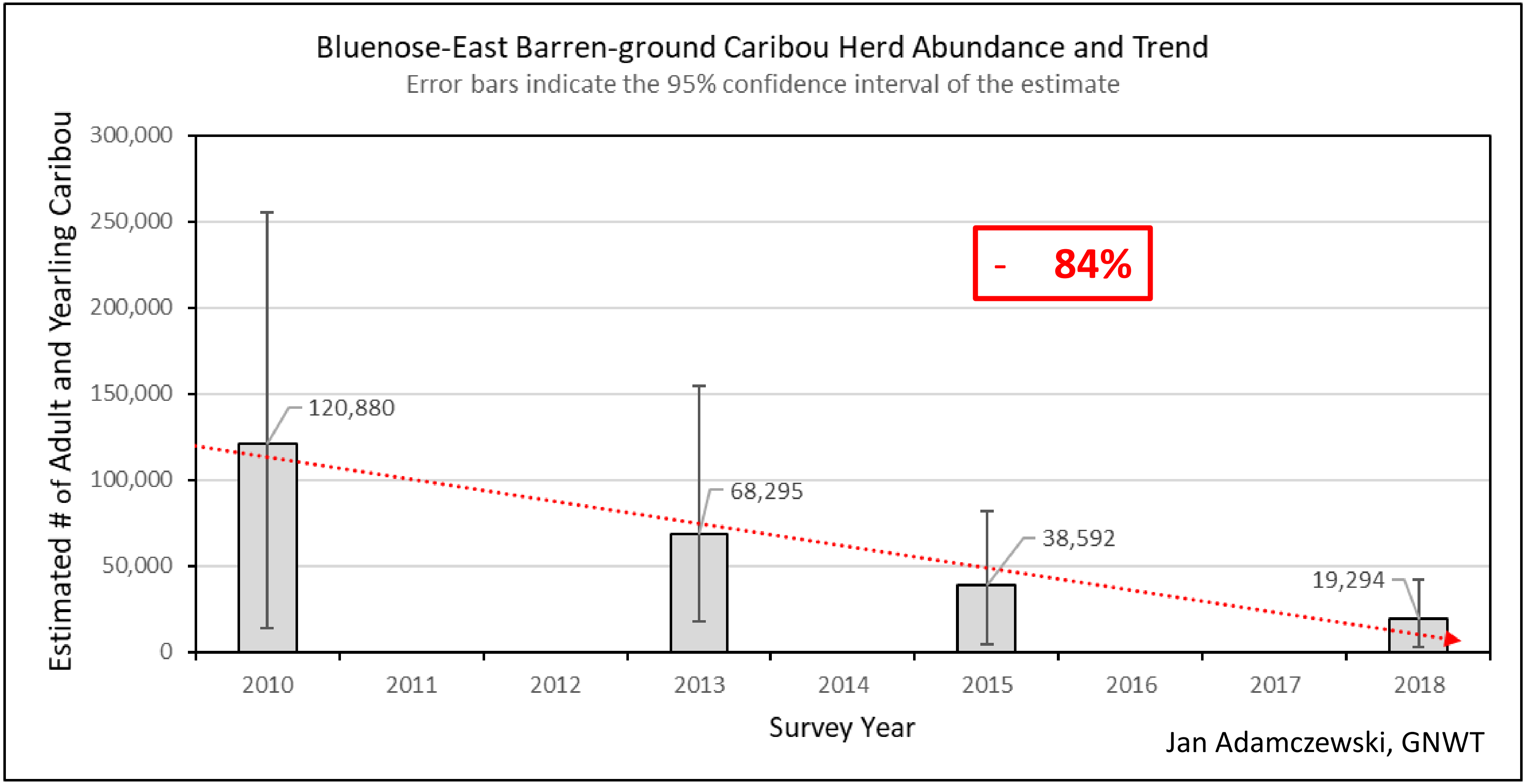

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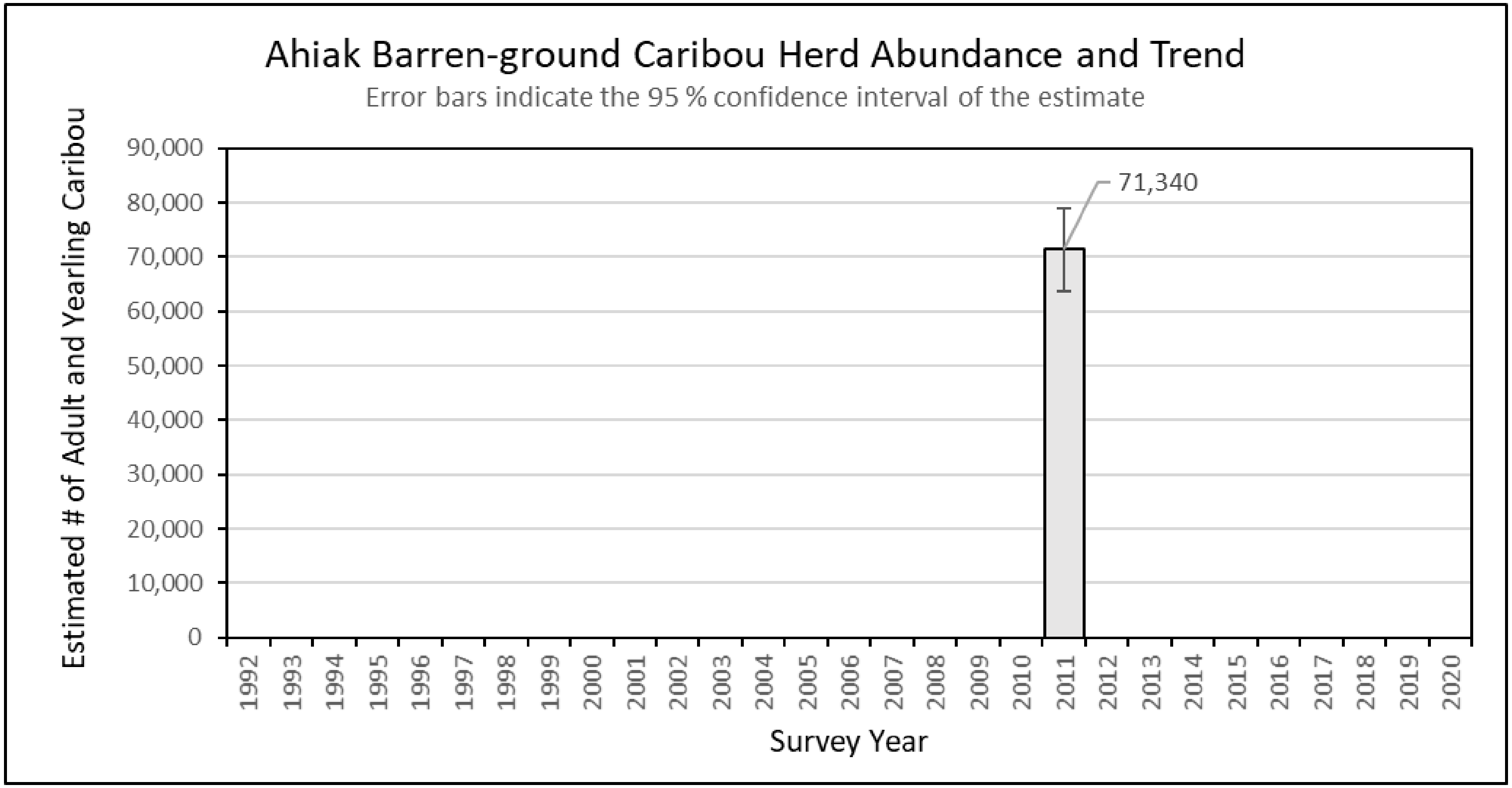

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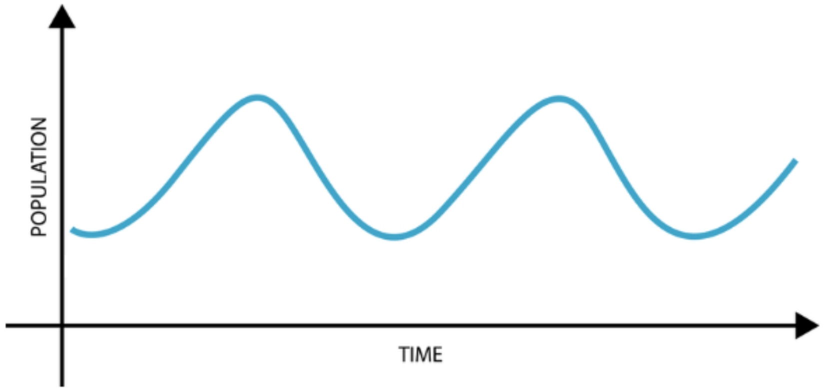

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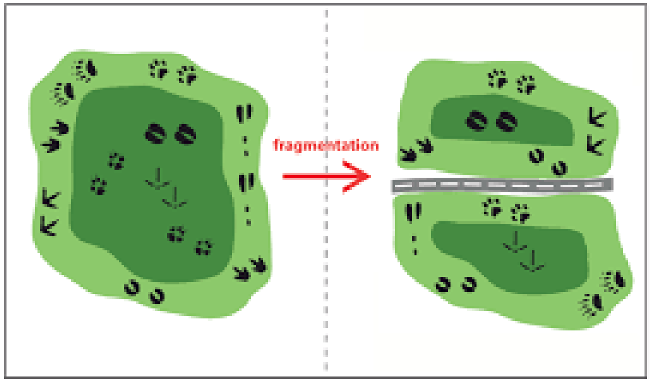

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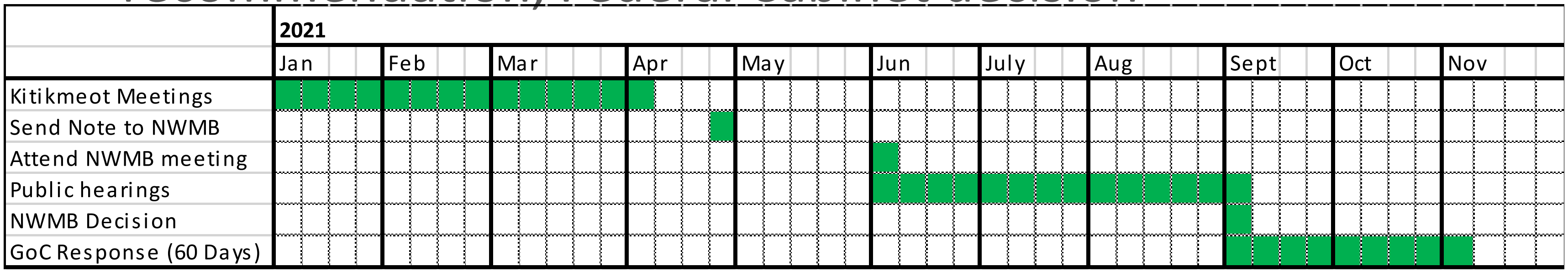

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PRE-INTRO

- Need GN and the community

INTRODUCTION

a) Hello, my name is Hayley Roberts, I'm a Species at Risk Biologist working for Environment and Climate Change Canada based in Iqaluit, NU. First I'd like to start off by saying welcome to everyone and thank you for attending the meeting to discuss the proposed listing of Barren-ground Caribou under the federal Species at Risk Act.

b) Before we begin I will remind everyone to keep themselves on mute if you are not speaking so that we don't have any interruptions. If you have called in, it's *6 to unmute your line. Also if you have a camera and feel comfortable doing so, please turn it on so that we can see your face. It'll help to make this feel a little bit more like an in person meeting. For those on the computer familiarize yourself with the raise hand function, it can be accessed from the bottom of the screen. Please use it if you a question and I will do my best to monitor it or you can put a question in the chat as I'll also be monitoring that as well. For those in the room, I'll ask Amanda (or whoever is manning the computer) to watch for questions and let us know when there is one. A 10 min break in an hour (7PM?).

c) **If it gets to this point** We'll open the meeting with a prayer, Amanda is there someone who can lead us

d) Thank you ?.

e) I'll ask now if anyone is opposed to this meeting being recorded? Please speak up if you are. This recording will be used to ensure all feedback and information is captured. And that we have accurate meeting notes. And if you are interested in a copy of the recording we can provide that, so please let us know.

INTRODUCTION

f) As mentioned previously this meeting is to discuss the proposed listing of Barren-ground Caribou under the federal Species at Risk Act and to collect feedback from everyone on the line. We are also interested to know if your organization supports or does not support the proposed listing. A decision on the listing does not have to be made today but it is important that your decision is included in the package that we submit to the Minister for consideration. We have provided questionnaires in the email invitation that was sent around and those can be filled out after the meeting and sent to myself, or Rhiannon, or Lenny or Shannon, after the meeting. The contact information is in this presentation and in the meeting invite.

g) Let's start with introductions so that everyone knows who is in the room and on the line/computer. I will pass it over to those in the room.

h) Next we'll go through those on the phone/computer (non ECCC). I've already mentioned a bit about myself, so I will go down the participant list.

i) Thanks everyone. Well move on to the presentation next and I do want to mention that there will be lots of time throughout the upcoming presentation to ask questions. We will be pausing throughout the presentation to allow for clarification and discussion. Following the presentation there will be time for further discussion. I'll pause here to ask if there are any general questions before we begin.

j) Ok, then lets get started.

Should Barren-ground Caribou be added to the Species at Risk Act?

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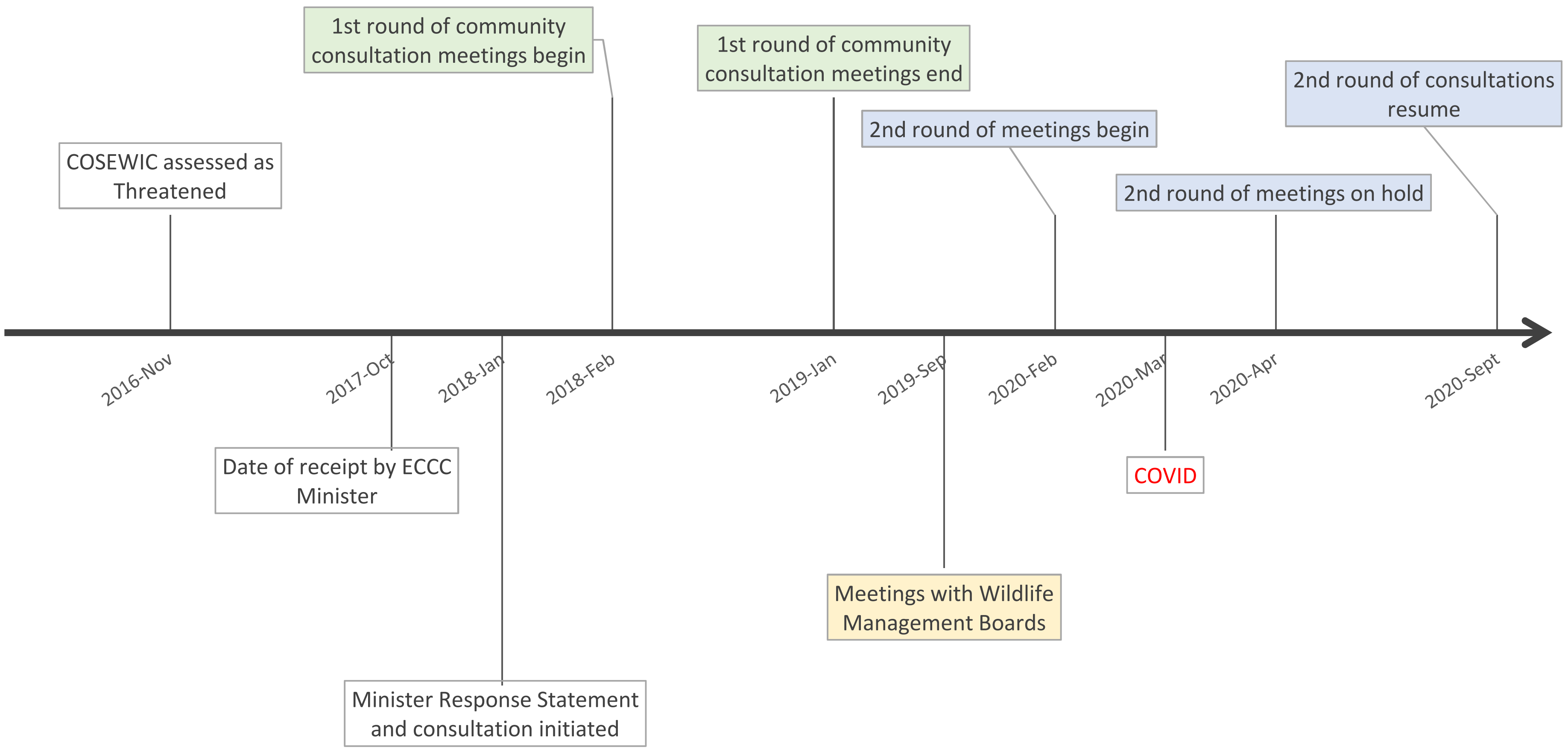

Last Meeting – February 27, 2018

We heard:

1. HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process.
2. They would appreciate a herd-by-herd assessment, and worry about the flexibility in prohibitions and how it will be applied to local management.
3. They noticed an increase in wolf and wolverine populations.

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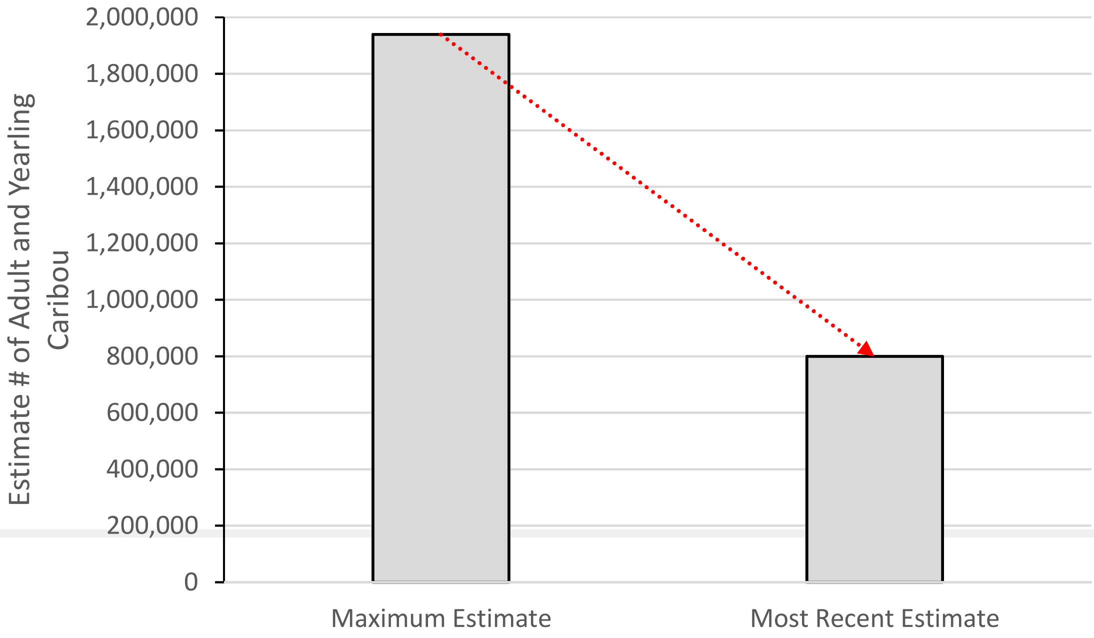

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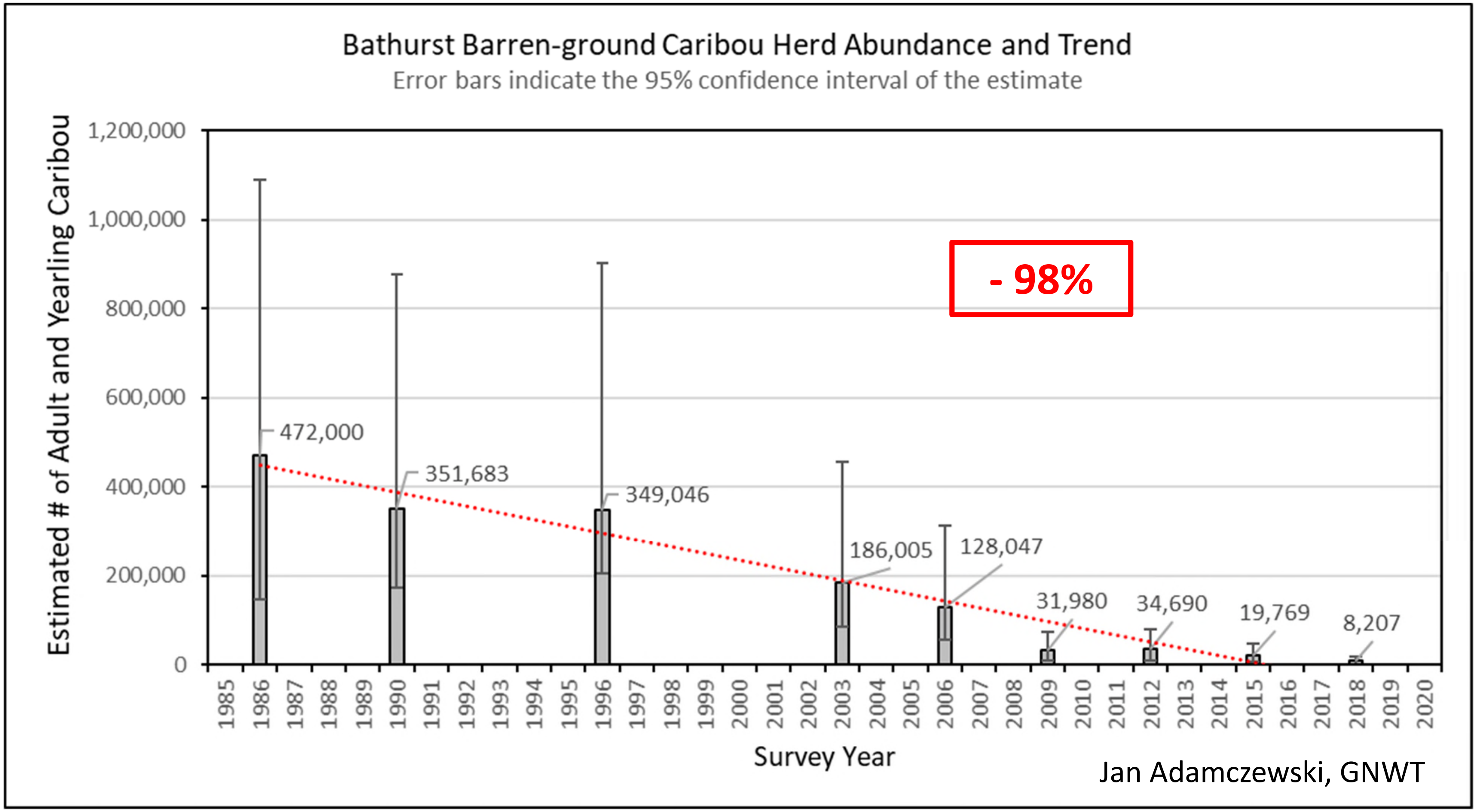

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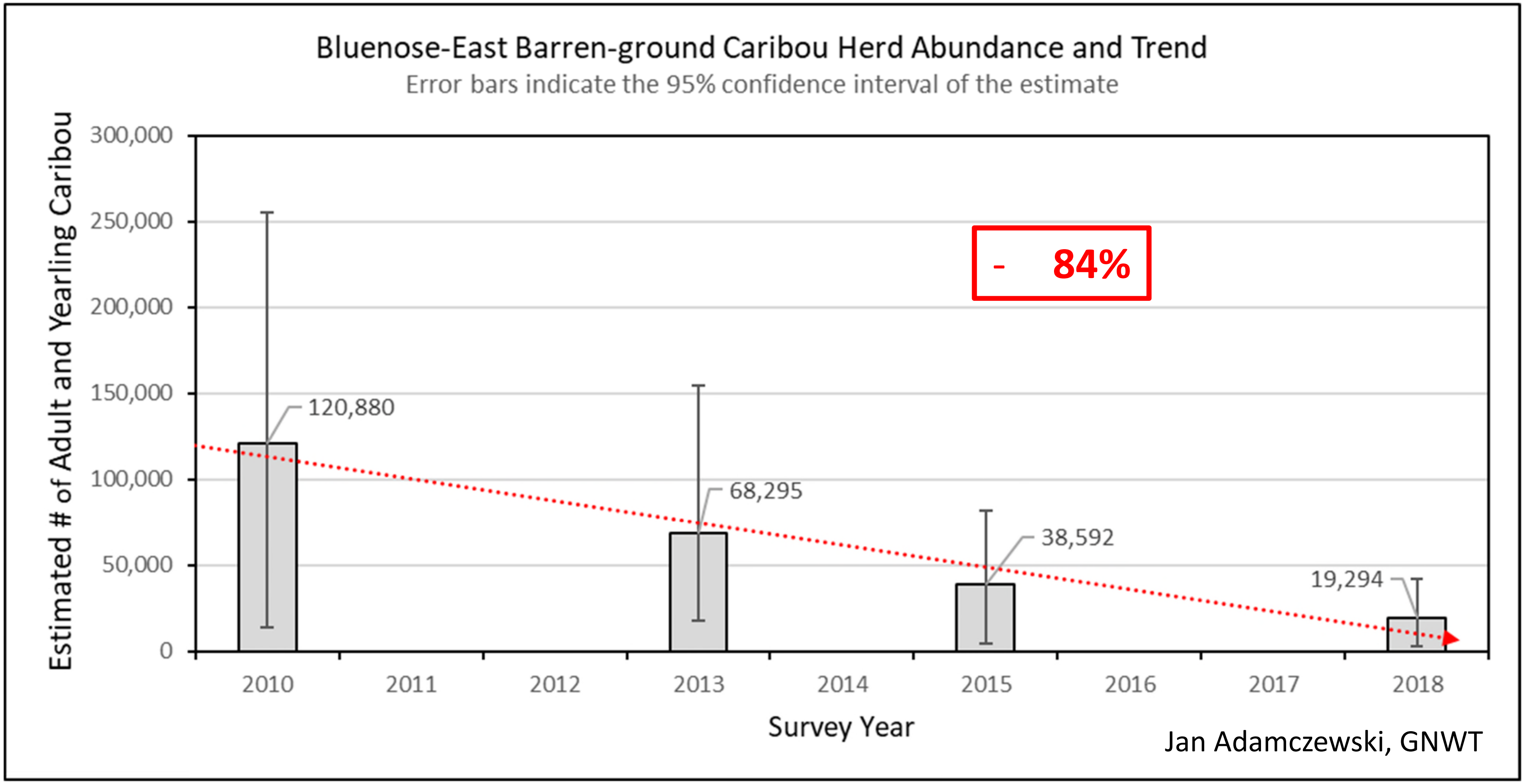

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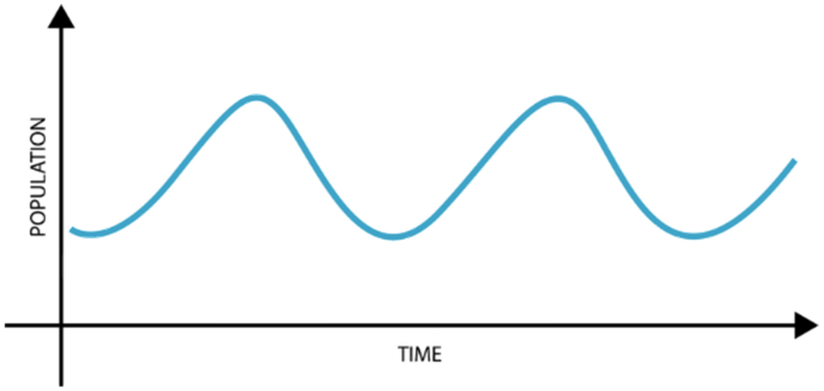

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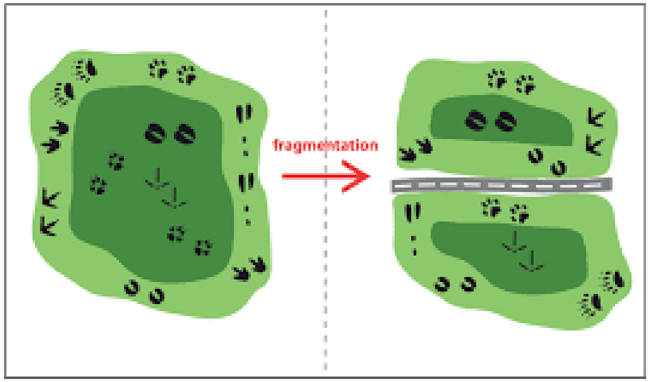

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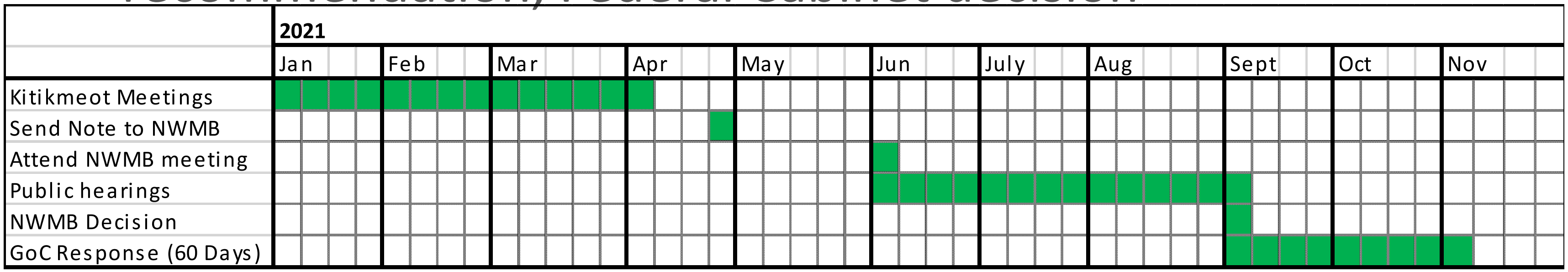

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- We will be seeking a decision on the proposed listing
- Decision does not need to be made today
- Will be included in submission to NWMB and the Federal Minister

We need to know:

- **Yes, the board/organization supports the listing**
- **No, the board/organization does not support the listing**
- **No opinion**

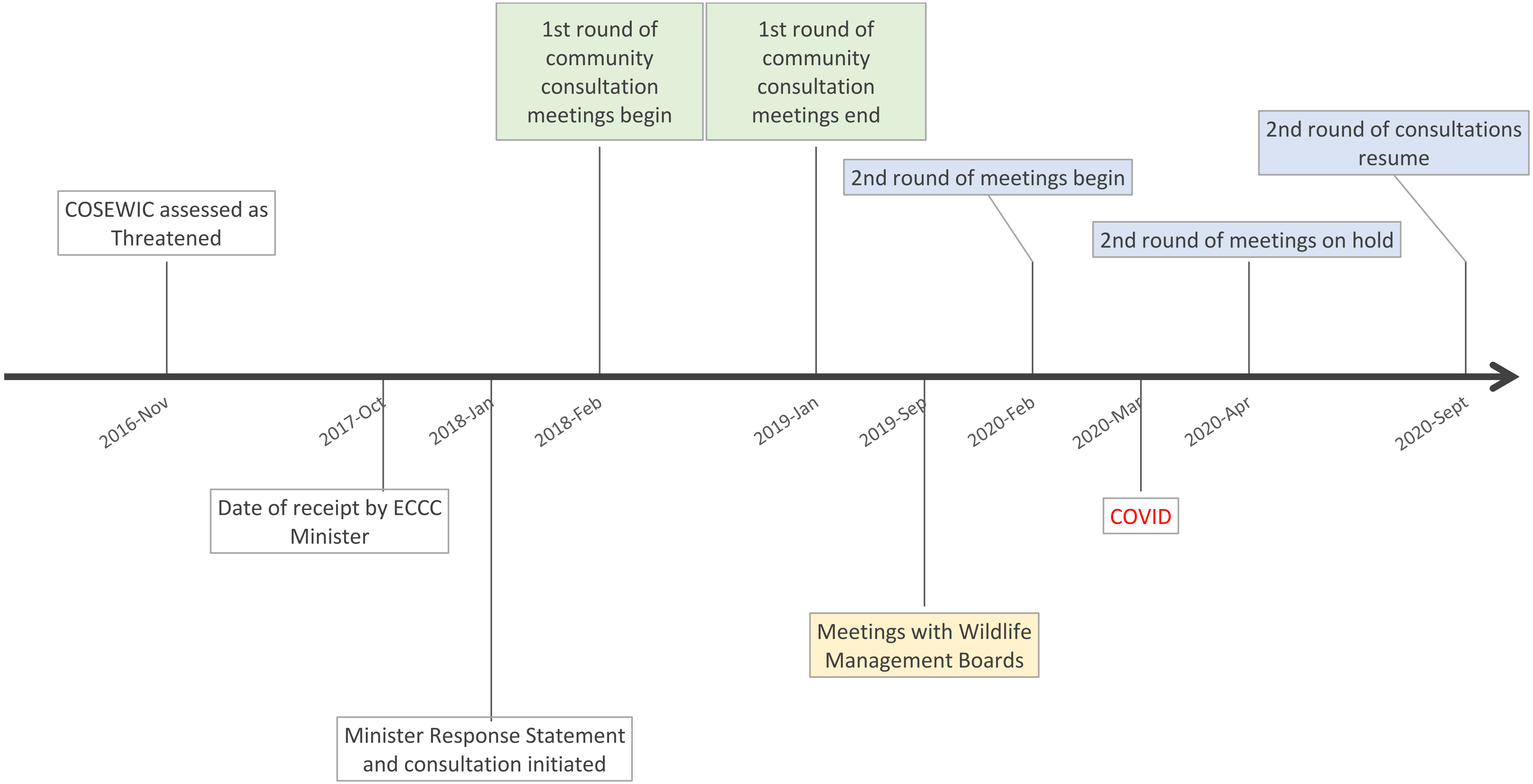
Should Barren-ground Caribou be added to the Species at Risk Act?

Last Meeting – February 26 2019

We heard:

1. **You did not agree with the delineation of the herds because interbreeding has caused the Boothia Peninsula herd to move south and all caribou in the area are one herd.**
2. **You identified wolves and muskox as threats to the herd.**
3. **You expressed an interest in establishing an incentive for wolf harvest.**
4. **You were interested in knowing more about threats and their impact on caribou herds.**
5. **You want more concrete survey data on populations in your area prior to making a decision on the listing.**
6. **You know that growing populations are putting increased pressure on caribou herds unlike before.**

Timeline of Events



QUESTIONS/COMMENTS

Outline

1. SARA
2. Herd health
3. Threats to recovery
4. What will listing caribou on SARA do
5. Next steps
6. Discussion

Photo by A. Gunn

What is SARA?

Federal legislation that aims to prevent wildlife from disappearing from Canada

Tim Pitsiulak, 2017

SPECIAL CONCERN	THREATENED	ENDANGERED	EXTIRPATED	EXTINCT
Likely to become **Endangered** or **Threatened** unless threats are mitigated.	Likely to become **Endangered** unless threats are addressed.	Facing imminent disappearance from Canada.	No longer exists in the wild in Canada, but exists elsewhere.	No longer exists anywhere in the world.

The Species at Risk Act (SARA)

SARA could be used as a tool to help conserve

Barren-ground Caribou

-

SARA does not affect Inuit harvesting rights

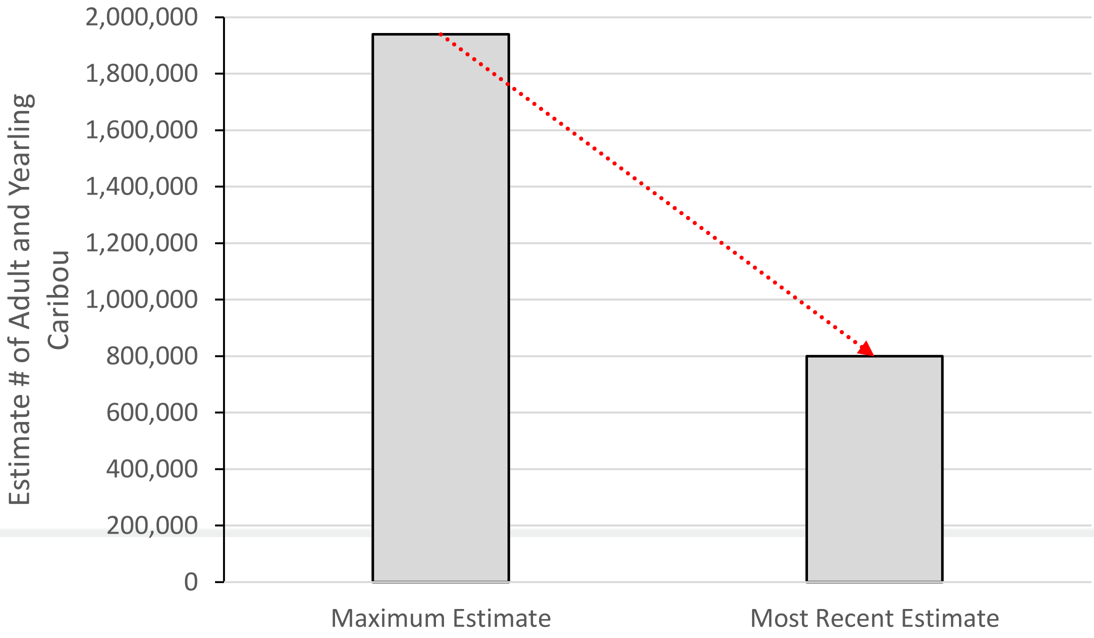
QUESTIONS/COMMENTS

Barren-ground Caribou

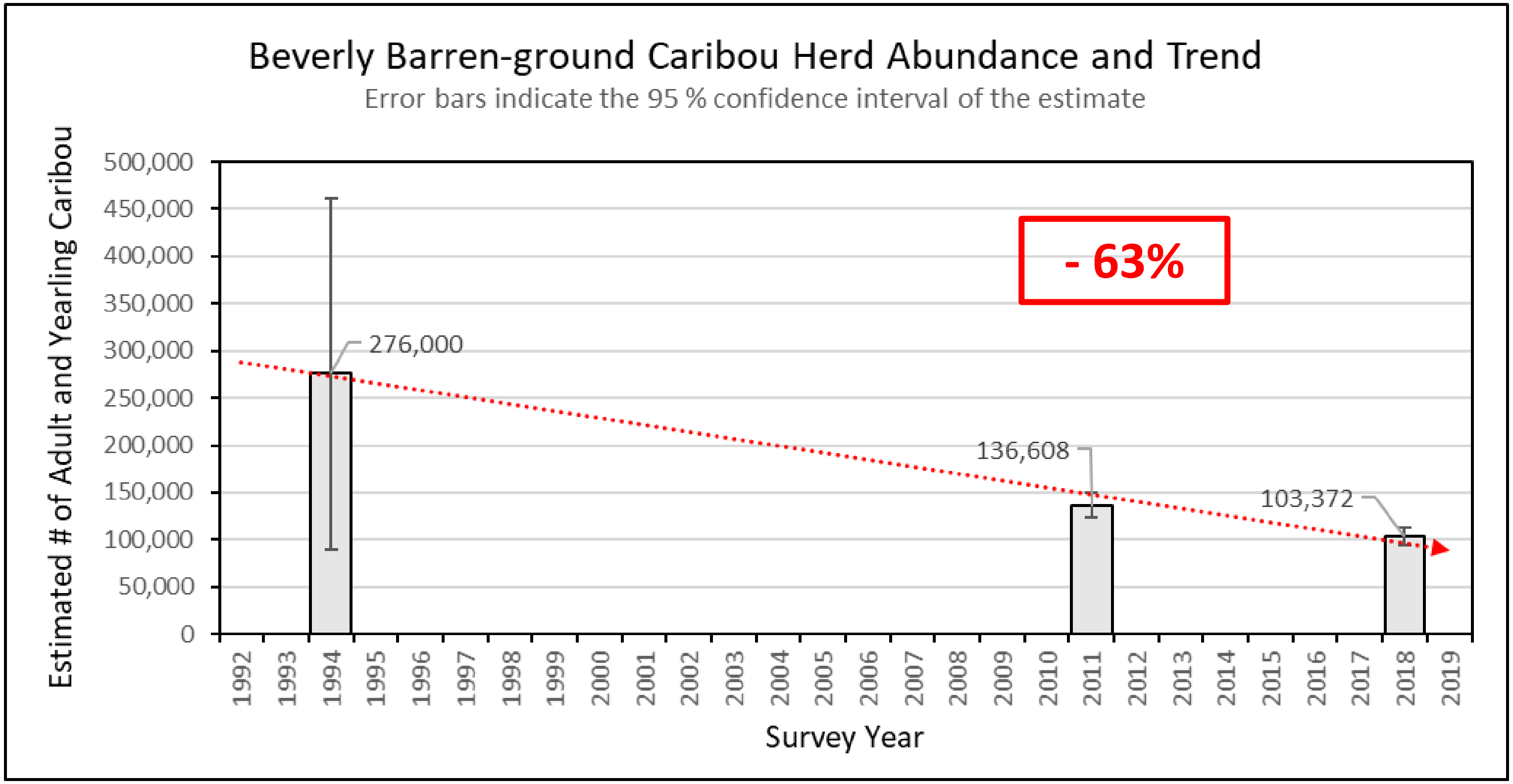
COSEWIC Assessment

- Average decline was 56.8% over the last 24 years
- Should be designated Endangered as >50% decline
- Determined Threatened
  - because of existing co-management
  - not facing imminent extinction

Barren-ground Caribou declined from approx. 2 million individuals to approx. 800,000 individuals

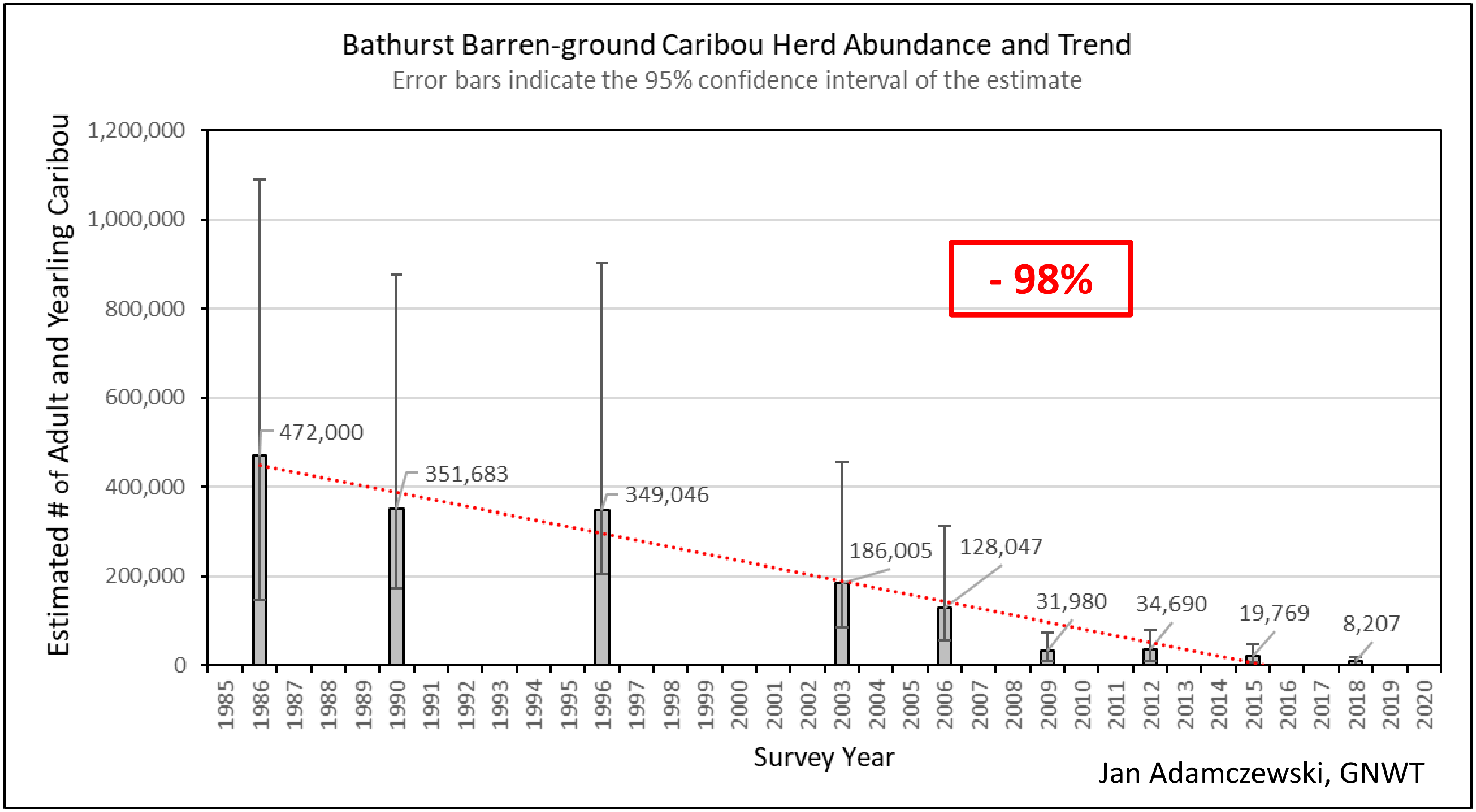


Herd health - Beverly

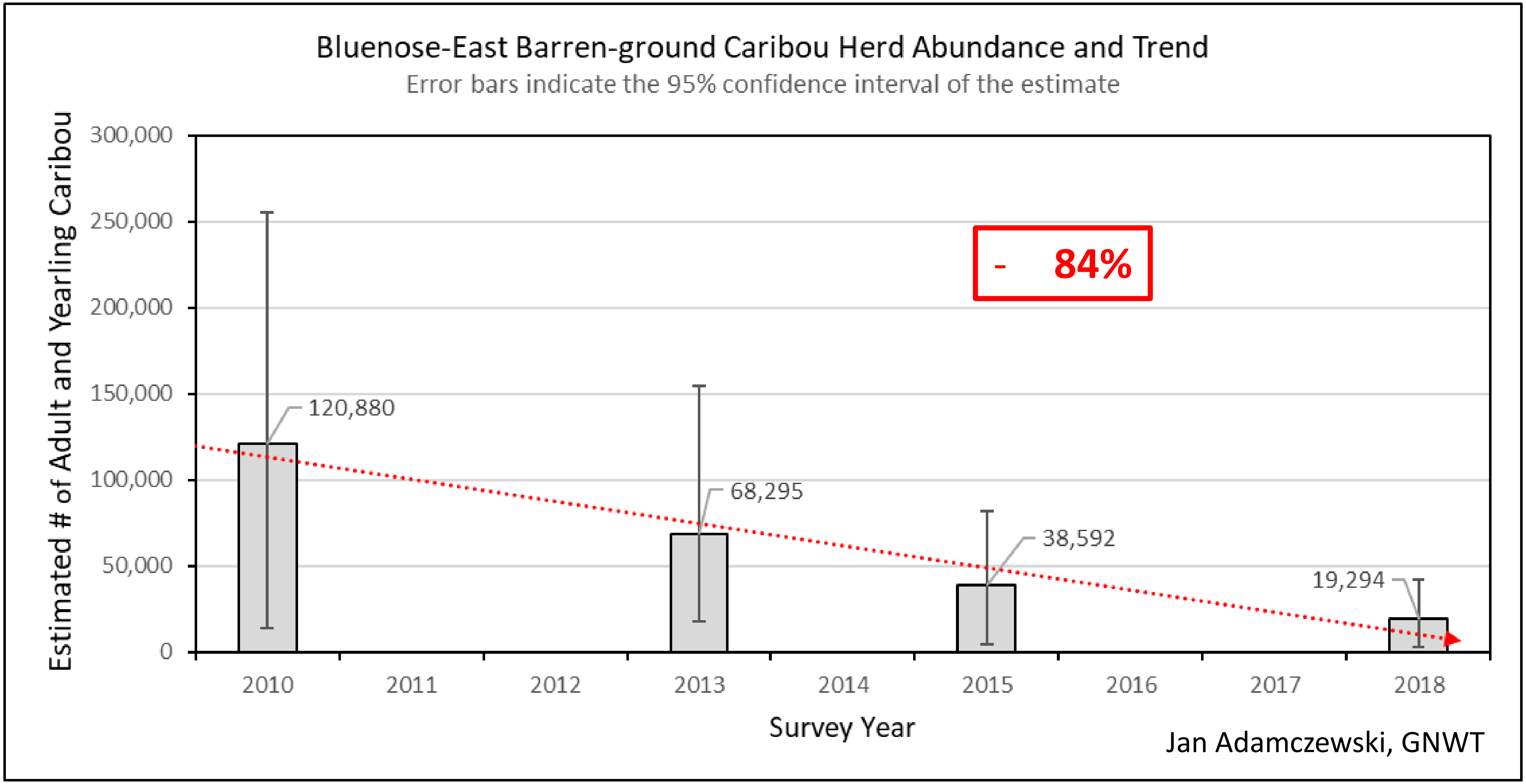


Mitch Campbell, GN

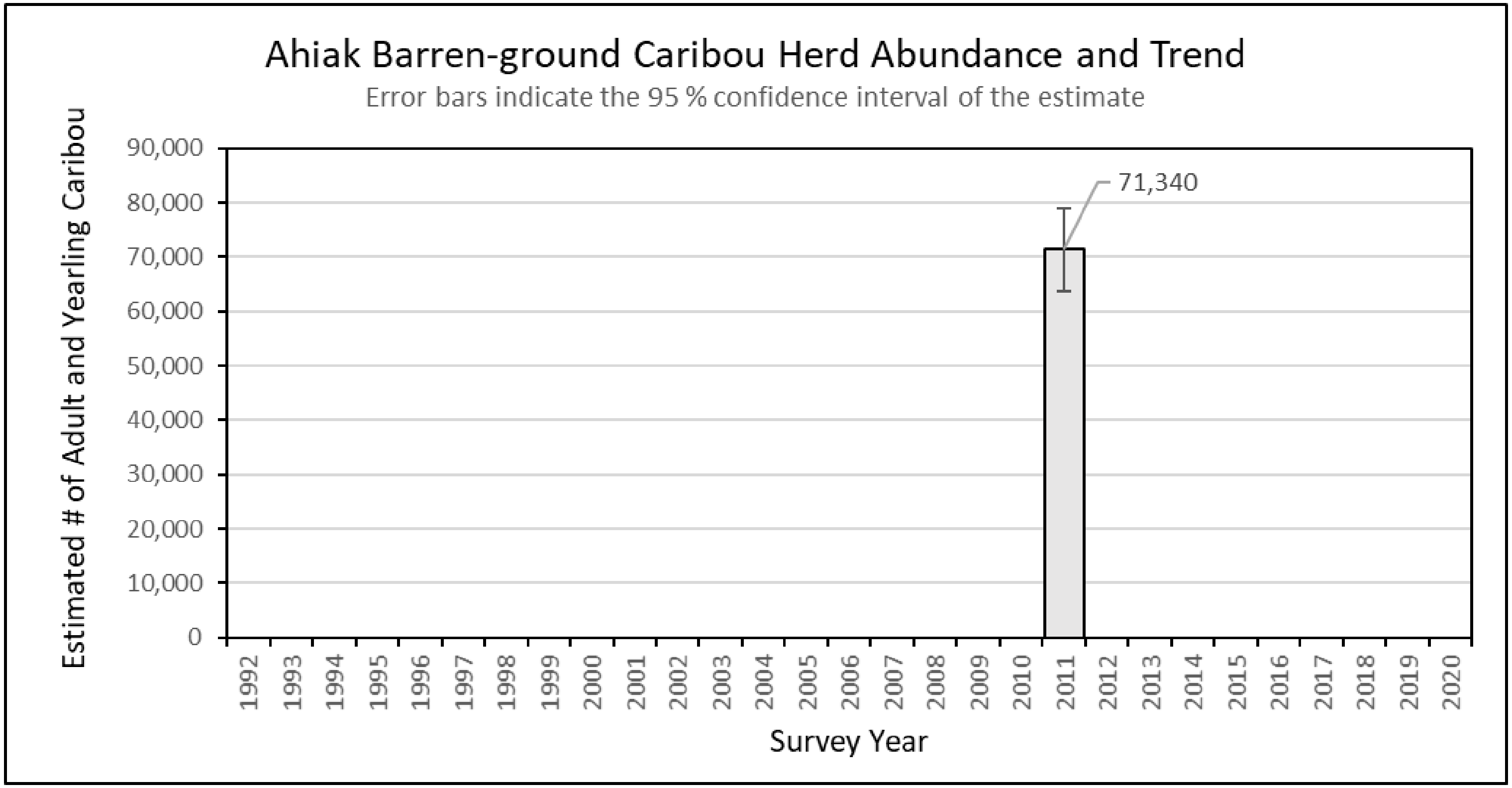
Herd health -Bathurst



Herd health – Bluenose East



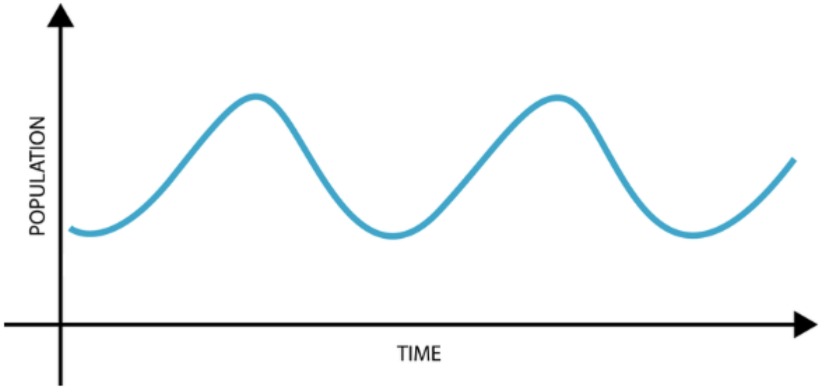
Herd health - Ahiak



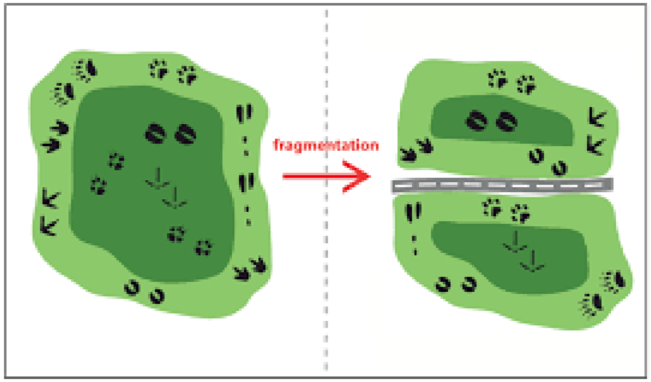
Mitch Campbell, GN

Herd health

- Many herds are at a low point in their natural population cycles
- Herd vulnerability is highest at low points
  - more sensitive to disturbance, predation, climate change, etc.
- Due to new factors (e.g. development, climate change) caribou populations may not cycle back to regular levels



Threats to recovery



Development

-Habitat loss, fragmentation

-Herds can't recover if there is no space for them to do so

Increased human population

- Increased demand for caribou

Climate change

- e.g. Increase in rain on snow events

QUESTIONS/COMMENTS

What will listing caribou on SARA do?

1. **The existing wildlife management system does not change**.

Harvest decisions still follow Nunavut Agreement's decision-making process (Article 5).

Listing on SARA does not affect Inuit harvesting rights.

What will listing caribou on SARA do?

2. **Your voice becomes louder**.

There will be more attention on community concerns about caribou

You will have a say in how to keep the herds healthy and make sure they're available for future generations.

What will listing caribou on SARA do?

3. **More resources will be available to support caribou conservation**.

SARA-listing would raise the importance of caribou, making it easier for HTOs to access resources (e.g. funding for monitoring or the development of herd-specific management plans).

What will listing caribou on SARA do?

4. **Protect space for caribou**.

SARA will ensure important caribou habitat (e.g. calving grounds) is identified and protected in some form (e.g protected from disturbance such as development).

QUESTIONS/COMMENTS

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QUESTIONS/COMMENTS

Important to remember

- No decision has been made yet
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- Existing wildlife management bodies & processes do not change
- SARA is a tool to help with caribou conservation
- SARA does not affect Inuit harvesting rights

Next steps

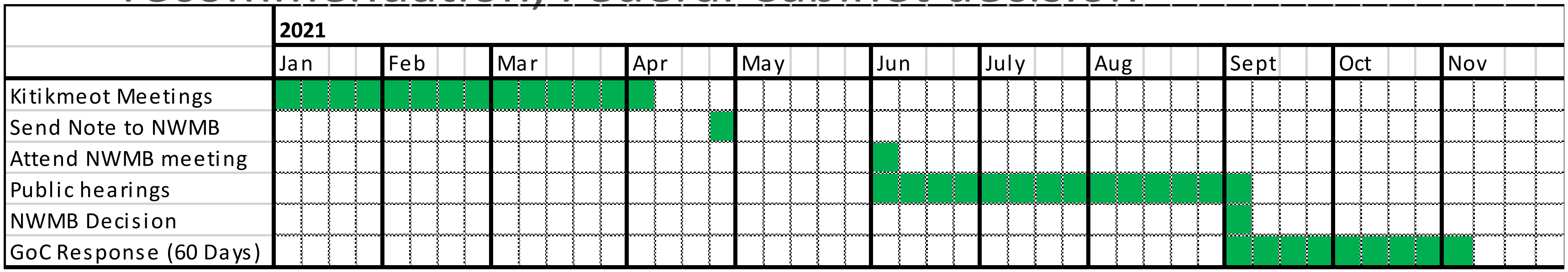
Kananginak Pootoogook, 2007

Ongoing

- Continue to solicit input from communities including Inuit Qaujimatuqangit and socio-economic impacts of listing

Mid-2021 or later

- NWMB decision, Environment Minister recommendation, Federal Cabinet decision



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What is needed to support your caribou herds?

Do you agree/disagree/have concerns with the listing proposal?

Any other questions, concerns, or comments?

How to contact us

Shannon Stotyn
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867-333-9891
Whitehorse, YK

Hayley Roberts
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Iqaluit, NU

Lenny Emiktaut
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Photo by A. Gunn

WELCOME

Should Barren-ground Caribou be added to the Species at Risk Act?

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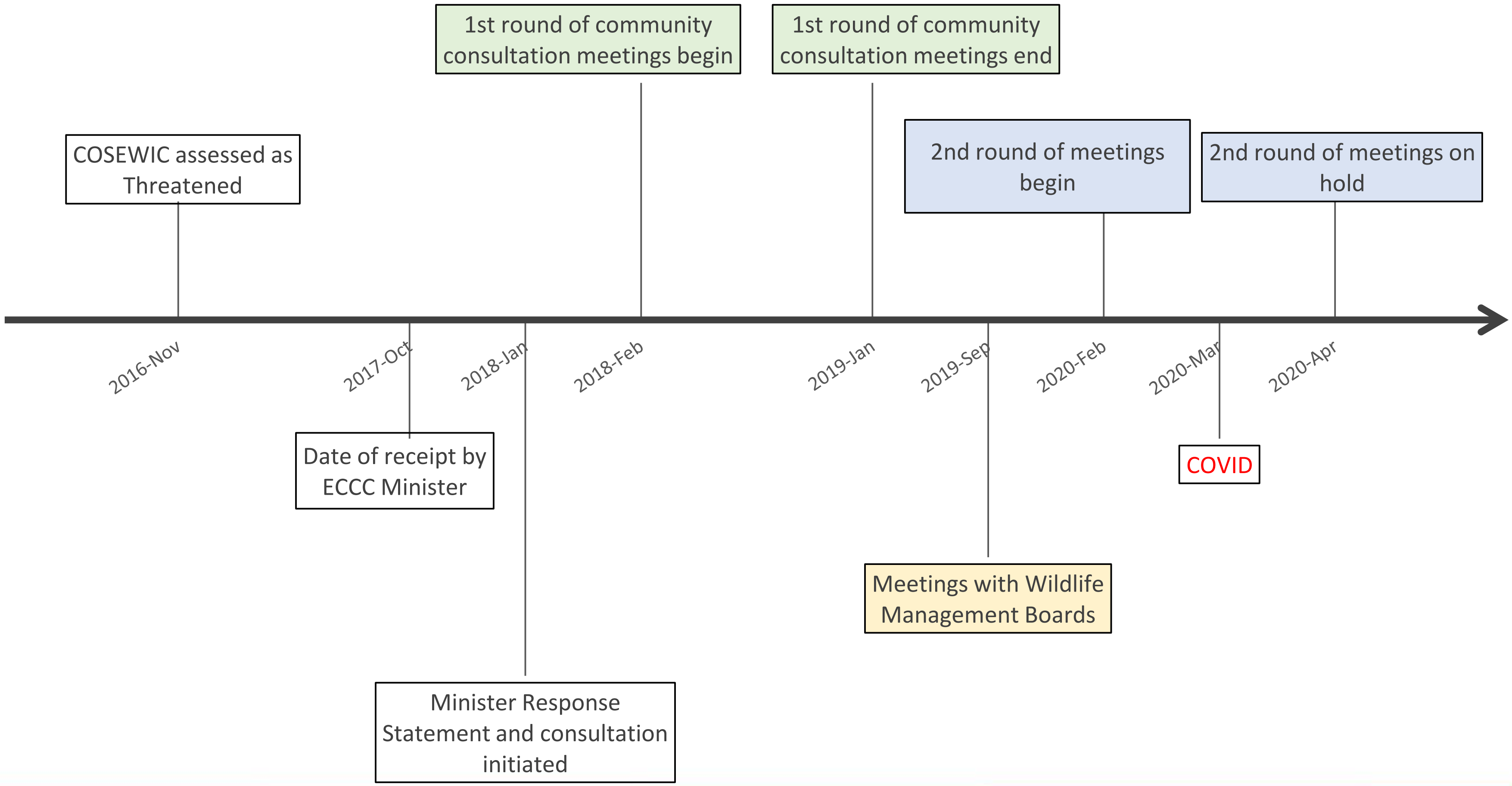

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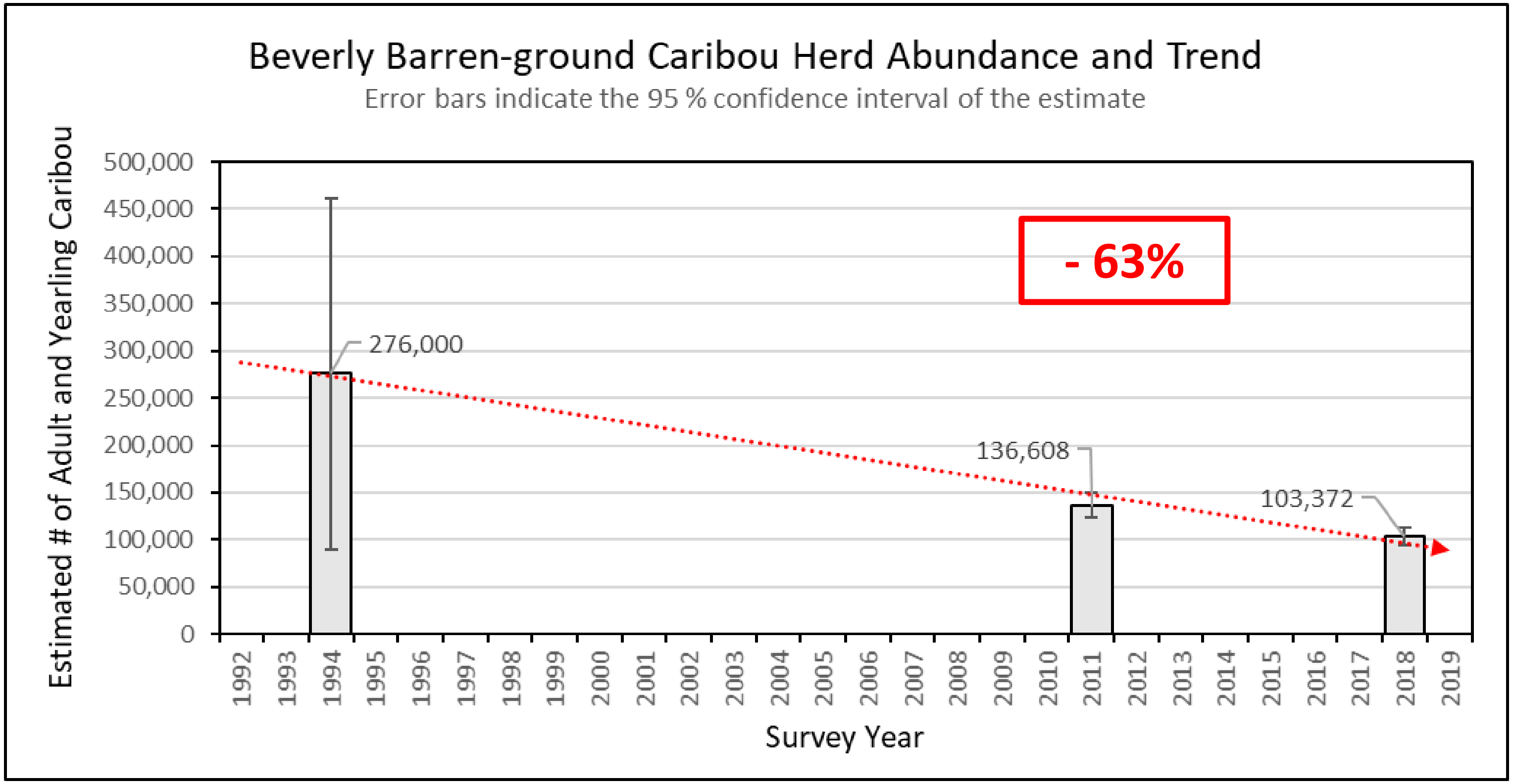
Herd health - Beverly



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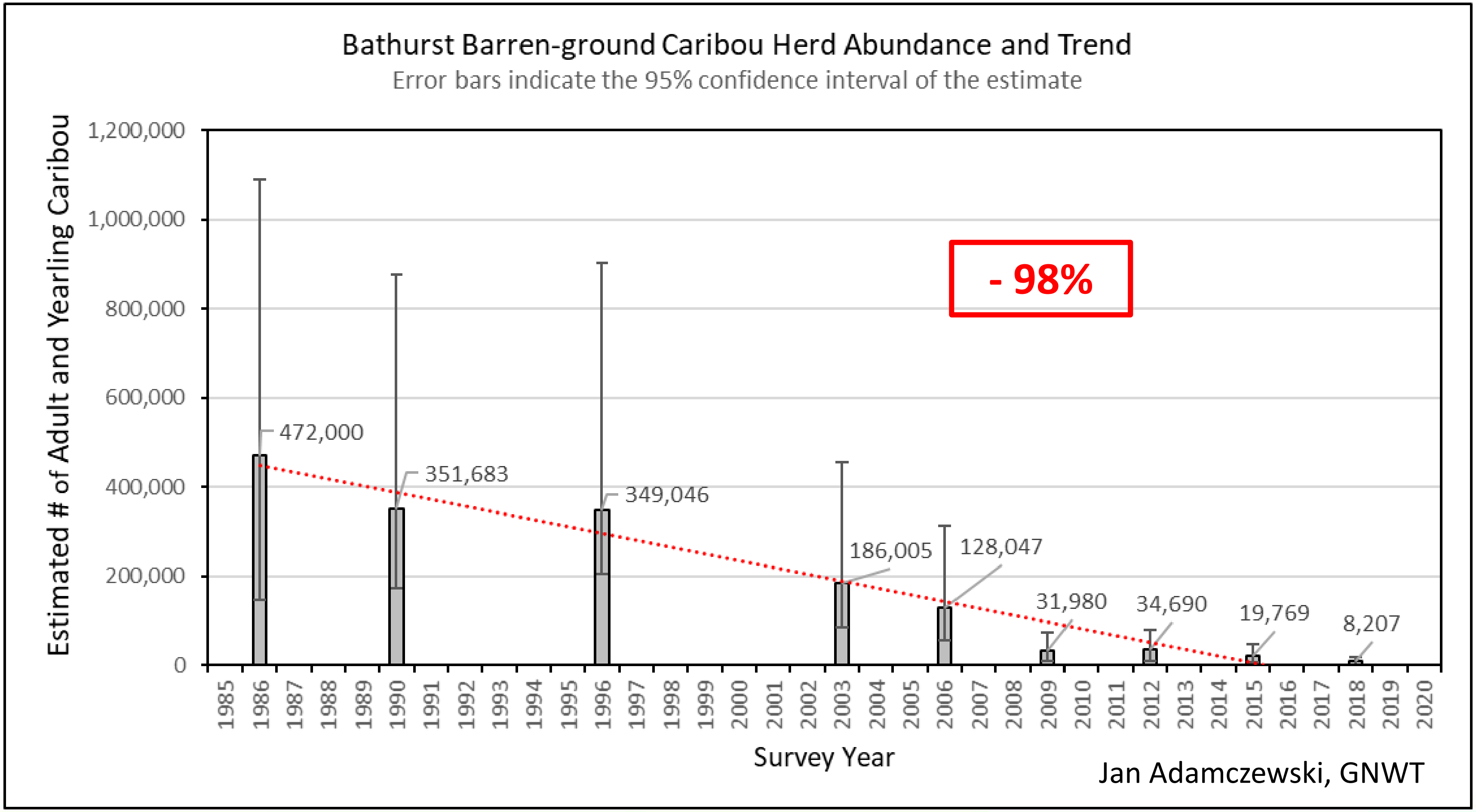

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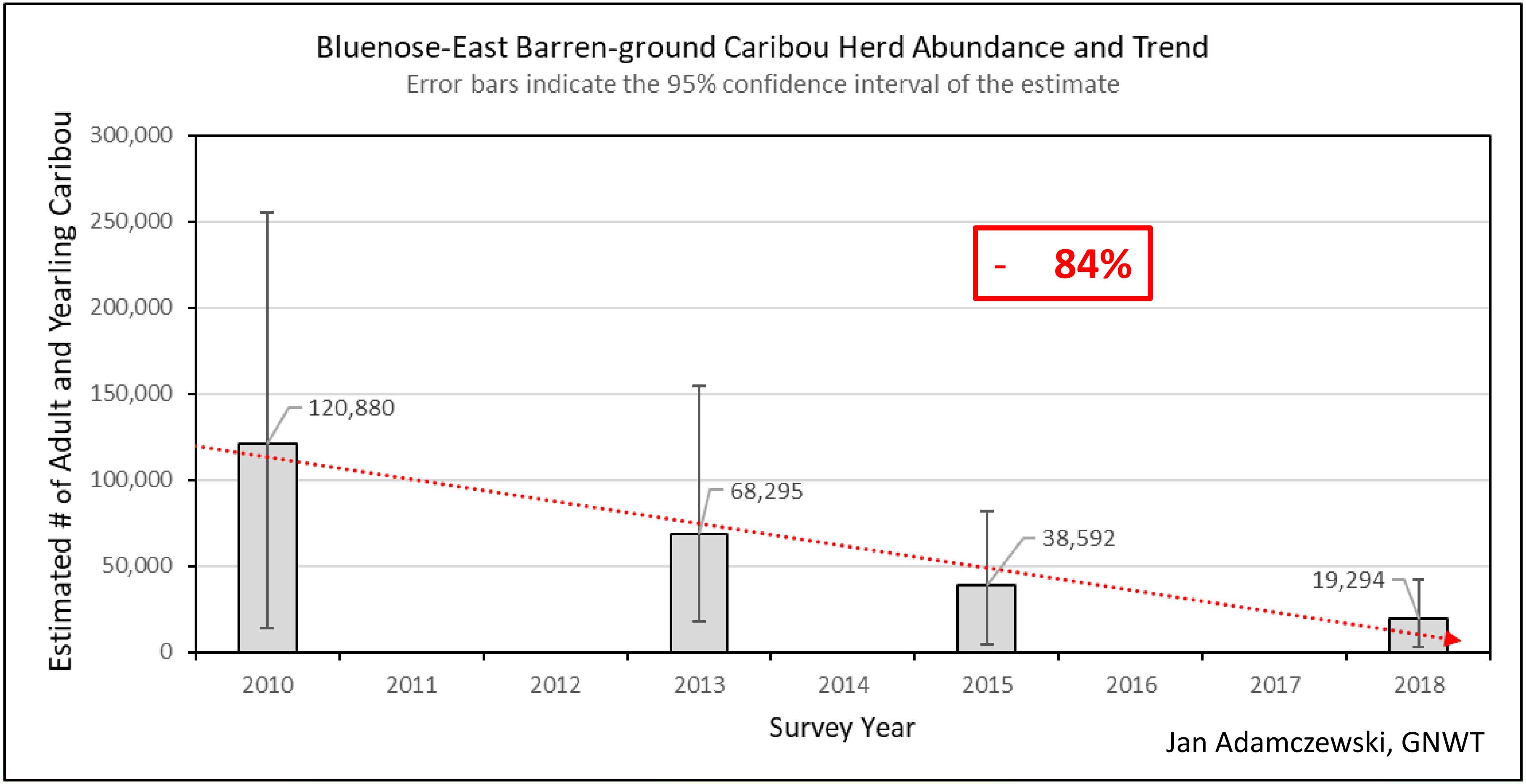

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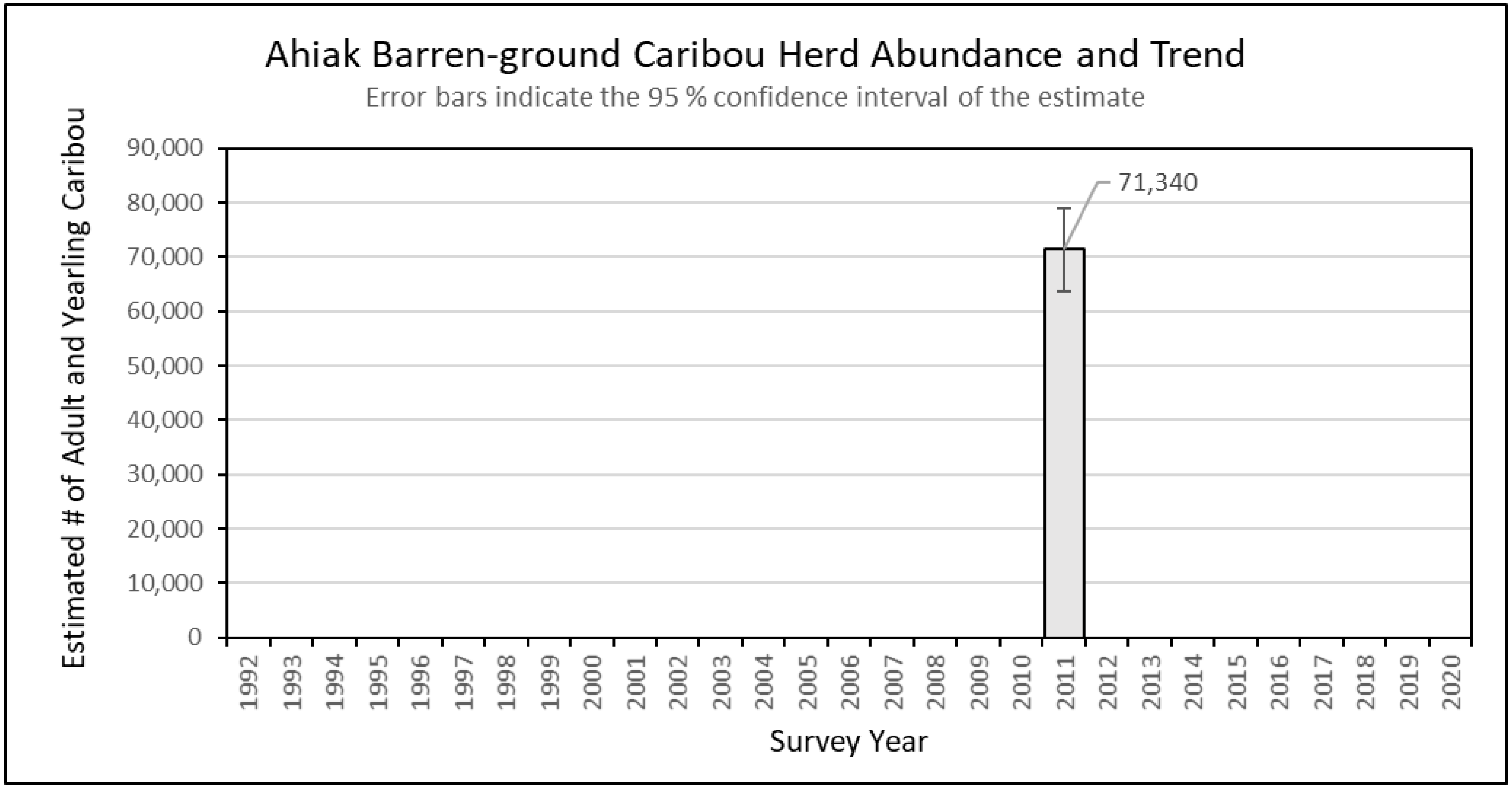

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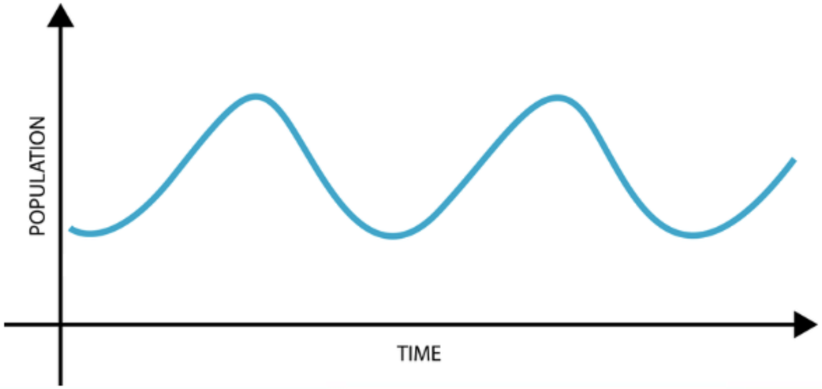
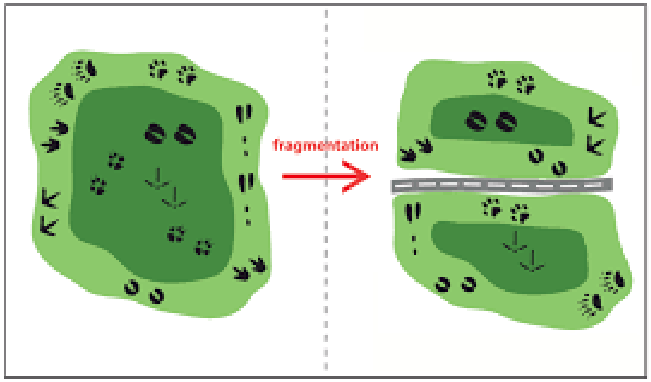


Threats to recovery



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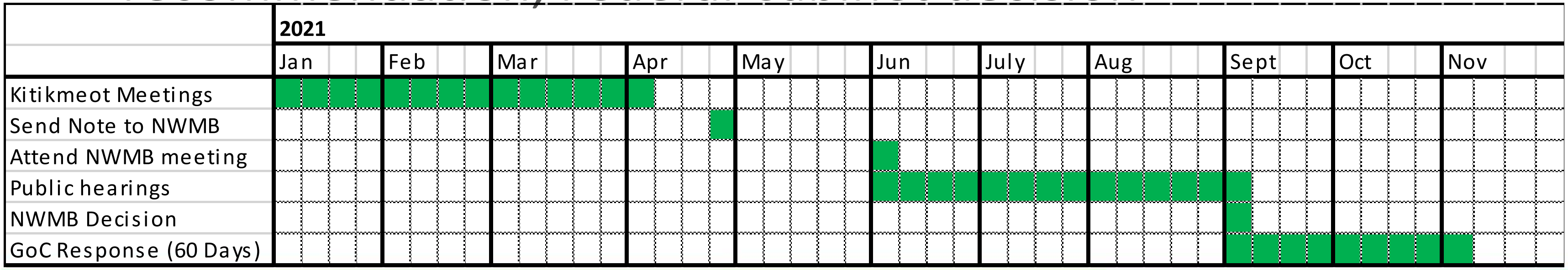

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FAQs about the Species at Risk Act in Nunavut

<u>How does SARA affect Inuit harvesting rights in Nunavut?</u>

The Nunavut Agreement's (NA) principles on wildlife recognize that "the exercise of Inuit harvesting rights are governed by and subject to the principles of conservation" while "Government retains the ultimate responsibility for wildlife management" (NA 5.1.2).

While the mission of the Species at Risk Act (SARA) is to protect wildlife species at risk in Canada, it reaffirms that existing Indigenous rights, as recognized and affirmed in the Canadian Constitution, are also protected (SARA s.3).

Decisions by the Government of Canada in relation to SARA must follow a decision-making process set out in the Nunavut Agreement and abide by the Government of Canada's duty to consult. This includes the "plans for management and protection of particular wildlife habitats" and the "designation of rare, threatened and endangered species" (NA 5.2.34).

Under the terms of the Nunavut Agreement, the Nunavut Wildlife Management Board (NWMB) has "the sole authority to establish, modify or remove… levels of total allowable harvest…" (NA 5.6.16).

Furthermore, NA 5.7.16 states that "Inuit shall have free and unrestricted right of access for the purpose of harvesting … to all Crown lands, including, for greater certainty, Parks and Conservation Areas…" although that right of access is subject to "any restrictions established by the NWMB for the purpose of conservation" (NA 5.7.18).

Put simply, <u>listing a species under SARA does not directly affect Inuit harvesting rights anywhere in Nunavut. Only NWMB can restrict harvesting rights.</u>

Extreme circumstances

The NWMB has the authority to "restrict or limit Inuit harvesting only to the extent necessary… to effect a valid conservation purpose" (NA 5.3.3). If there is a significant conservation concern, the competent federal Minister may ask the NWMB to make a decision to restrict Inuit harvesting. In "urgent and unusual circumstances" a Minister may implement an interim decision for an "immediate modification" in harvesting activities (NA 5.3.24). This interim decision would require thorough and extensive consultation with affected communities and is subject to a full review by the NWMB, at which point the decision-making processes defined in the Nunavut Agreement (NA 5.3) are followed.

How does SARA affect non-Inuit in Nunavut?

When a species is listed under SARA, general prohibitions are automatically applied to non-Inuit on federal lands in Nunavut under the authority of Environment and Climate Change Canada or the Parks Canada Agency. In these areas, non-Inuit are not allowed to:

- Kill, harm, harass, capture or take an individual
- Possess, collect, buy, sell or trade an individual or its parts or derivatives
- Damage or destroy its residence (SARA s.32-33)

These prohibitions only apply when a listed species or its residence occurs on federal lands such as National Parks, National Wildlife Areas, and Migratory Bird Sanctuaries. The Government of Nunavut is responsible for protecting listed species on lands outside of federal areas. If the GN fails to sufficiently protect a listed species on non-federal land, the Governor in Council can issue an order enforcing the prohibitions (SARA s.35), however this would be an extreme circumstance.

What is critical habitat?

Critical habitat is the land, or water (for aquatic species), identified in a recovery strategy or action plan as being needed for survival or recovery of an Endangered, Threatened or Extirpated species. This could include areas such as calving or spawning areas or migration routes. Critical habitat is legally protected on **federal** lands within 180 days of being identified. Protection on **non-federal** lands can be achieved through either “a conservation agreement with any government in Canada, organization or person to benefit a species at risk or enhance its survival in the wild” (SARA s.11) or an order that provides protection if “the laws of the … territory do not effectively protect the critical habitat” (SARA s.61).

Who decides what is critical habitat and how?

The development of the Recovery Strategy and the identification of critical habitat happens through consultation and cooperation with affected communities and relies on community and Inuit Qaujimatuqangit. Once drafted, the Recovery Strategy and the identification of critical habitat have to be approved by the NWMB.

Where can I learn more?

SARA Public Registry: www.sararegistry.gc.ca
Includes COSEWIC assessments, recovery strategies, action plans, regulations and orders.

Environment and Climate Change Canada, Canadian Wildlife Service:
Saleem Dar Saleem.dar@canada.ca (867-939-7676) Whitehorse, YK
Teresa Tufts Teresa.tufts@canada.ca (867-979-7058) Iqaluit, NU

Environment and Climate Change Canada / Environnement et Changement climatique Canada

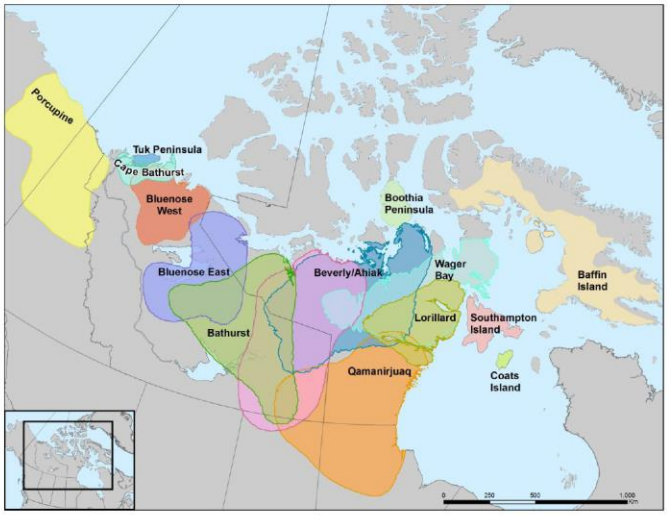
Canada

Submission to the Nunavut Wildlife Management Board

For

Information: X Decision:

Issue: Update on the consultations in Nunavut on the proposed listing of Barren-ground Caribou as Threatened under the federal *Species at Risk Act* (SARA)



Background:

Distribution

- The range of Barren-ground caribou in Canada extends from the Yukon to Baffin Island, and south into Saskatchewan and Manitoba.
- In Nunavut, the range includes the Bluenose-East, Bathurst, Beverly, Ahiak, Qamanirjuaq, Lorillard, Boothia Peninsula, Wager Bay, Southampton Island, Coats Island, and Baffin Island herds.

Assessment and Threats

- The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed Barren-ground Caribou as Threatened in November 2016. A threatened species is likely to become endangered unless threats are addressed.
- Most Barren-ground Caribou herds have shown large declines since 1990. Across Canada, Barren-ground Caribou have declined from around 2 million individuals in the early 1990s to about 800,000 in 2016. The decline is estimated at 56% over three generations (between 1989 and 2016). Abundance surveys that have occurred since the

COSEWIC assessment have shown further declines in some populations, including the Bluenose-East, Bathurst, and Beverly herds.

- Herds are more vulnerable and sensitive to threats when their populations are low.
- Inuit knowledge says that caribou cycle through population highs and lows. New threats, such as development and climate change, may make it more difficult for populations to cycle back to peak levels and there are no indications that populations are making rapid recoveries at this time.
- Potential threats include:
  - Climate and weather changes affecting forage availability, predation, parasites and diseases.
  - Industrial exploration and development.
  - Fragmentation of habitat in their winter range from forest fires and increasing human presence.
  - Increased human population and an increased demand for caribou meat.

Implications of the proposed listing

- If Barren-ground Caribou is listed on SARA, a national recovery strategy will be written. This will include a plan detailing how to keep the herds healthy and available for future generations.
- Important caribou habitat will be identified and CWS will work with partners in Nunavut to identify the best ways of protecting it from activities that would harm it. For example, important habitat such as calving grounds and migrations routes could be protected.
- Upon listing, general prohibitions would apply to non-Inuit; they would be prohibited from harvesting caribou in National Parks, National Wildlife Areas, and Migratory Bird Sanctuaries.
- Harvest decisions for Inuit-harvest will continue to follow the Nunavut Agreement decision-making process, thus, a SARA listing does not directly affect Inuit-harvest.
- The profile of caribou would be raised and communities would have more resources available to them to support caribou conservation (e.g. funding for monitoring and the development of herd-specific management plans).

Consultations on the proposed listing

- In December 2017, CWS presented a consultation plan to the NWMB, outlining our intentions for consultations in Nunavut. Although the initial plan was lacking details, we ultimately did conduct face-to-face meetings in each of the communities within the Barren-ground Caribou range.
- Consultation packages were sent by email and mail to 22 Nunavut communities within the range of the species in January 2018. The packages included a letter, a factsheet, a PowerPoint presentation, and a questionnaire in English and Inuktitut. Follow-up phone calls were made to Hunter & Trapper Organizations between January and April 2018.
- In-person consultations were conducted between February 2018 and February 2019 in all 22 communities within the Barren-ground Caribou range.

- Throughout the consultations, it became clear that many communities had similar concerns about the proposed listing (see Appendix A for a summary of the feedback received).
- To accommodate the concerns shared by several communities and to ensure their questions were addressed, we decided to conduct further consultations in Nunavut.
- CWS worked closely with the GN and NTI to develop a plan to consult with the regional wildlife boards at their fall 2019 annual general meetings (AGM). The overlap of the Kitikmeot Regional Wildlife Board (KRWB) AGM with the 2019 federal election meant our plans were put on hold and we were not able to meet with the KRWB.
- Since then, CWS has been working with GN biologists in each region to determine the best strategy for additional consultations.
- In October and November 2019, respectively, we presented at the Kivalliq Wildlife Board (KWB) and Qikiqtaaluk Wildlife Board (QWB) AGMs with new material aimed at addressing outstanding concerns and clarifying common misconceptions about the proposed listing. Following each presentation, we had open discussions during which board members and attendees asked questions, voiced opinions, and shared knowledge about caribou in their area. A summary of the feedback received at these meetings is included in Appendix A.
- Upon advice from the GN's Kivalliq biologist, and the fact that the Kivalliq represents a substantial portion of the Barren-ground Caribou range (7 of the total 11 herds in Nunavut), we decided that further in-person consultations in this region might be warranted. The GN gave us the opportunity to coordinate with their annual regional tour which would streamline and support our efforts and reduce the consultation burden to HTOs and communities. We presented this idea at the KWB AGM and received no objections from board members or attendees.
- As the Baffin herd is shared by 10 communities, the most efficient and effective way to address concerns for this region was to consult at the regional level at the QWB AGM. Following the presentation and subsequent discussion, we asked members if they required any follow-up consultations in their communities. We did not receive any such requests or indications of interest. As a result, we consider consultations with the Baffin region to be complete at this time.
- As we were not able to attend the KRWB AGM in the fall, we will be looking for other ways to engage with the Kitikmeot community HTOs.
- We have made multiple efforts to consult with the Regional Inuit Associations, starting in January 2018 when they were sent the initial consultation package. In December 2019, we received confirmation that the Qikiqtani Inuit Association (QIA) had received and reviewed the information. They noted that they had limited capacity to address the proposed listing and did not request any further engagement from us.
- Discussions have occurred with the Kivalliq Inuit Association (KIA) and an in-person meeting will take place in February 2020.
- We are still waiting to hear back from Kitikmeot Inuit Association (KitIA) on whether they require further engagement.

Upcoming consultations

- In February 2020, in conjunction with the GN regional biologist's community tour, we plan to travel to each of the seven Kivalliq communities to conduct further in-person consultations on the proposed listing. Representatives from the GN and NTI will be in attendance of each of these meetings.
- We will have an in-person meeting with the KIA in Rankin Inlet in February 2020.
- In April 2020, we will meet with the Beverly and Qamanirjuaq Caribou Management Board (a board made up of members from the Kivalliq, NWT, Saskatchewan and Manitoba, as well as NWMB) for further consultations.
- Spring 2020 (TBD) consultations in the Kitikmeot region, as required.

Next Steps:

- Complete further consultations in the Kivalliq (February 2020) and Kitikmeot (spring 2020, TBD), as required.
- Request decision from the NWMB on the proposed listing (TBD, possibly June 2020).

Prepared by:
Canadian Wildlife Service, Iqaluit January 2020

Should Barren-ground Caribou be added to the Species at Risk Act?

Canada

Outline

Photo by A. Gunn

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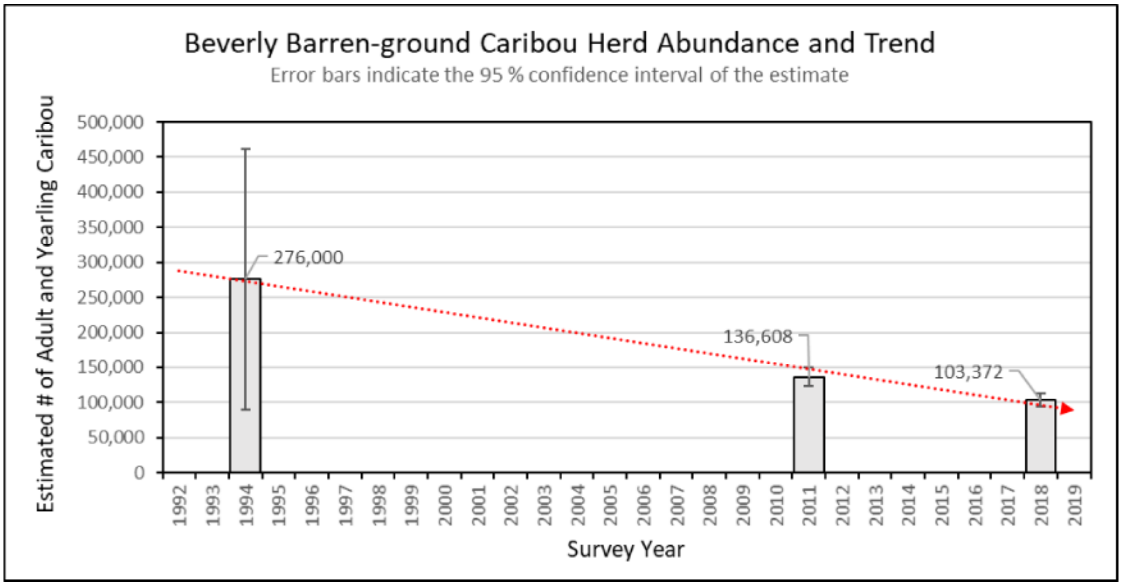

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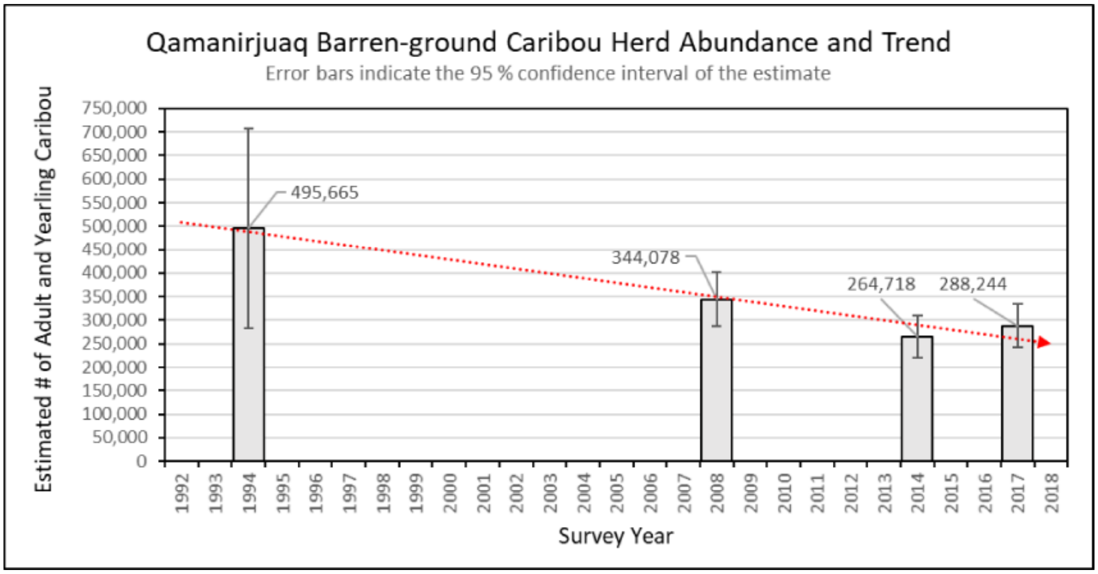

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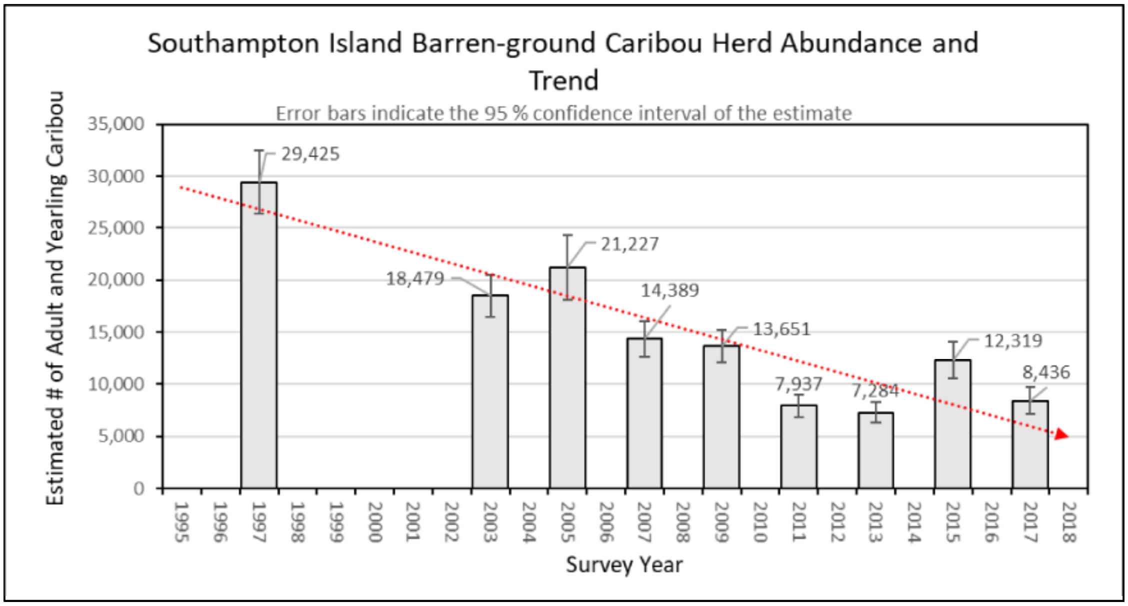
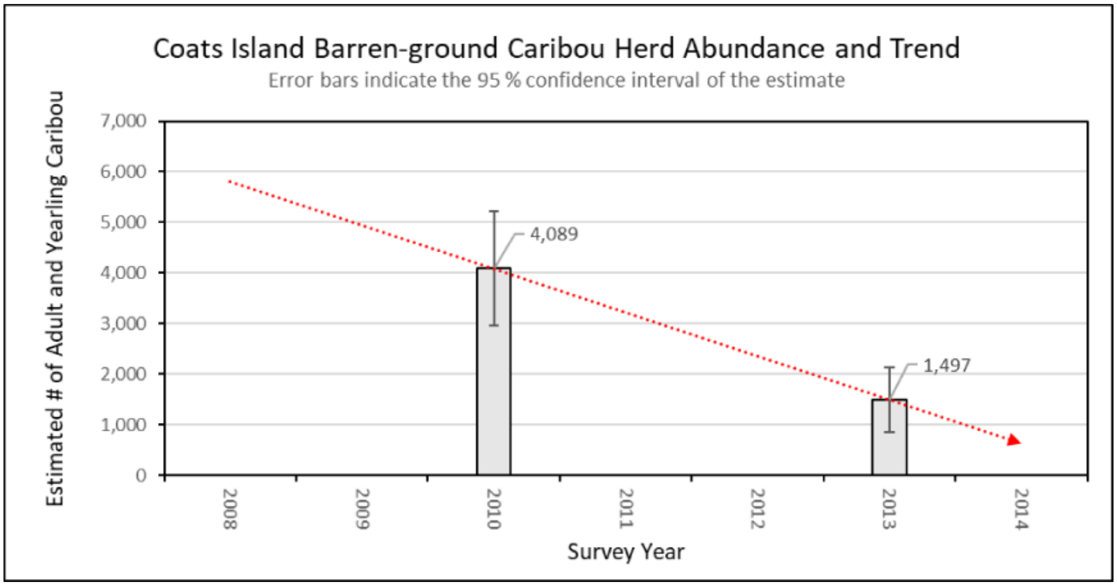
Herd health – Southampton Island



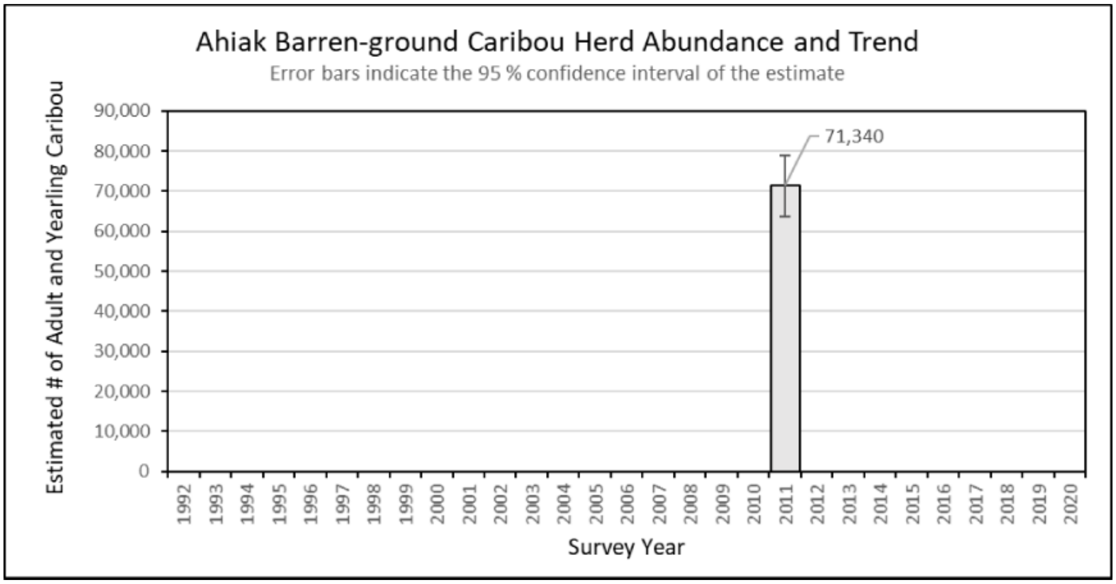
Mitch Campbell, GN

Herd health – Coats Island



Mitch Campbell, GN

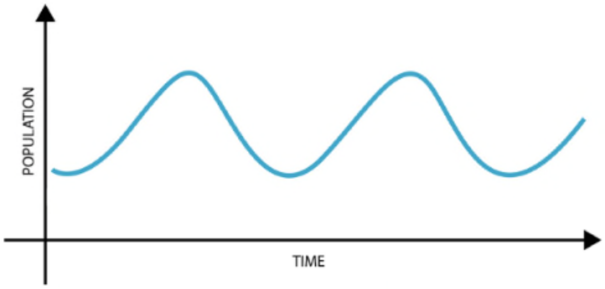
Herd health - Ahiak



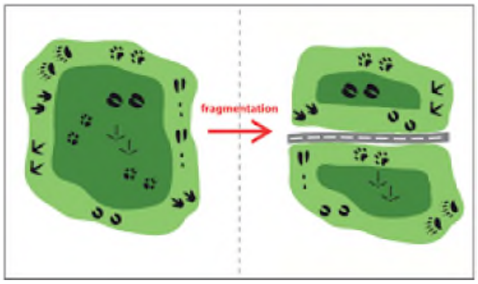
Mitch Campbell, GN

Herd health

- Many herds are at a low point in their natural population cycles
- Herd vulnerability is highest at low points
  - more sensitive to disturbance, predation, climate change, etc.
- Due to new factors (e.g. development, climate change) caribou populations may not cycle back to regular levels



Threats to recovery



Development

-Habitat loss, fragmentation

-Herds can't recover if there is no space for them to do so

Increased human population

- Increased demand for caribou

Climate change

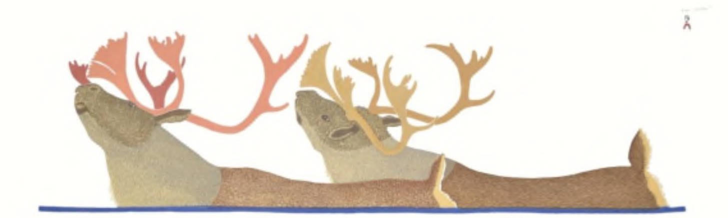
- e.g. Increase in rain on snow events

Environment and Climate Change Canada Environnement et Changement climatique Canada

Canada

What is SARA?

Federal legislation that aims to prevent wildlife from disappearing from Canada



Tim Pitsiulak, 2017

SPECIAL CONCERN	THREATENED	ENDANGERED	EXTIRPATED	EXTINCT
Likely to become **Endangered** or **Threatened** unless threats are mitigated.	Likely to become **Endangered** unless threats are addressed.	Facing imminent disappearance from Canada.	No longer exists in the wild in Canada, but exists elsewhere.	No longer exists anywhere in the world.

What will listing caribou on SARA do?

1. **The existing wildlife management system does not change**.

Harvest decisions still follow Nunavut Agreement's decision-making process (Article 5).

Listing on SARA does not affect Inuit harvesting rights.

What will listing caribou on SARA do?

2. **Your voice becomes louder**.

There will be more attention on community concerns about caribou

You will have a say in how to keep the herds healthy and make sure they're available for future generations.

What will listing caribou on SARA do?

3. **More resources will be available to support caribou conservation**.

SARA-listing would raise the importance of caribou, making it easier for HTOs to access resources (e.g. funding for monitoring or the development of herd-specific management plans).

What will listing caribou on SARA do?

4. **Protect space for caribou**.

SARA will ensure important caribou habitat (e.g. calving grounds) is identified and protected in some form (e.g protected from disturbance such as development).

Environment and Climate Change Canada Environnement et Changement climatique Canada

Canada

If caribou is listed:

1. Make a plan
   - Goal: keep the herds healthy and available for future generations
   - Management partners, including HTOs, will work together to identify what needs to be done to keep the herds healthy

2. Identify and protect important caribou habitat

3. General prohibitions
   - Inuit harvest: **not affected**
   - Non-Inuit harvest: prohibited from harvesting caribou on Environment Canada or Parks Canada lands (e.g. National Parks, National Wildlife Areas, Migratory Bird Sanctuaries)

Environment and Climate Change Canada Environnement et Changement climatique Canada

Canada

Important to remember

- No decision has been made yet
- Nunavummiut input is required at all stages in SARA; before any decision is made we need your input
- Existing wildlife management bodies & processes do not change
- SARA is a tool to help with caribou conservation
- SARA does not affect Inuit harvesting rights

Environment and Climate Change Canada Environnement et Changement climatique Canada

Canada

Next steps

Ongoing

- Continue to solicit input from communities
  including Inuit Qaujimatuqangit and socio-economic impacts of listing

Kananginak Pootoogook, 2007

Mid-2020 or later, TBD

- NWMB decision, Environment Minister recommendation, Federal Cabinet decision

Environment and Climate Change Canada Environnement et Changement climatique Canada

Canada

Discussion

What is needed to support your caribou herds?

Do you agree/disagree/have concerns with the listing proposal?

Do you want to share any Inuit Qaujimajatuqangit about your herds?

Environment and Climate Change Canada Environnement et Changement climatique Canada

Canada

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Canada

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Environnement et Changement climatique Canada

Should Barren-ground Caribou be added to the Species at Risk Act?

Canada

Outline

1. SARA
2. Herd health
3. Threats to recovery
4. What will listing caribou on SARA do
5. Next steps
6. Discussion

Photo by A. Gunn

The Species at Risk Act (SARA)

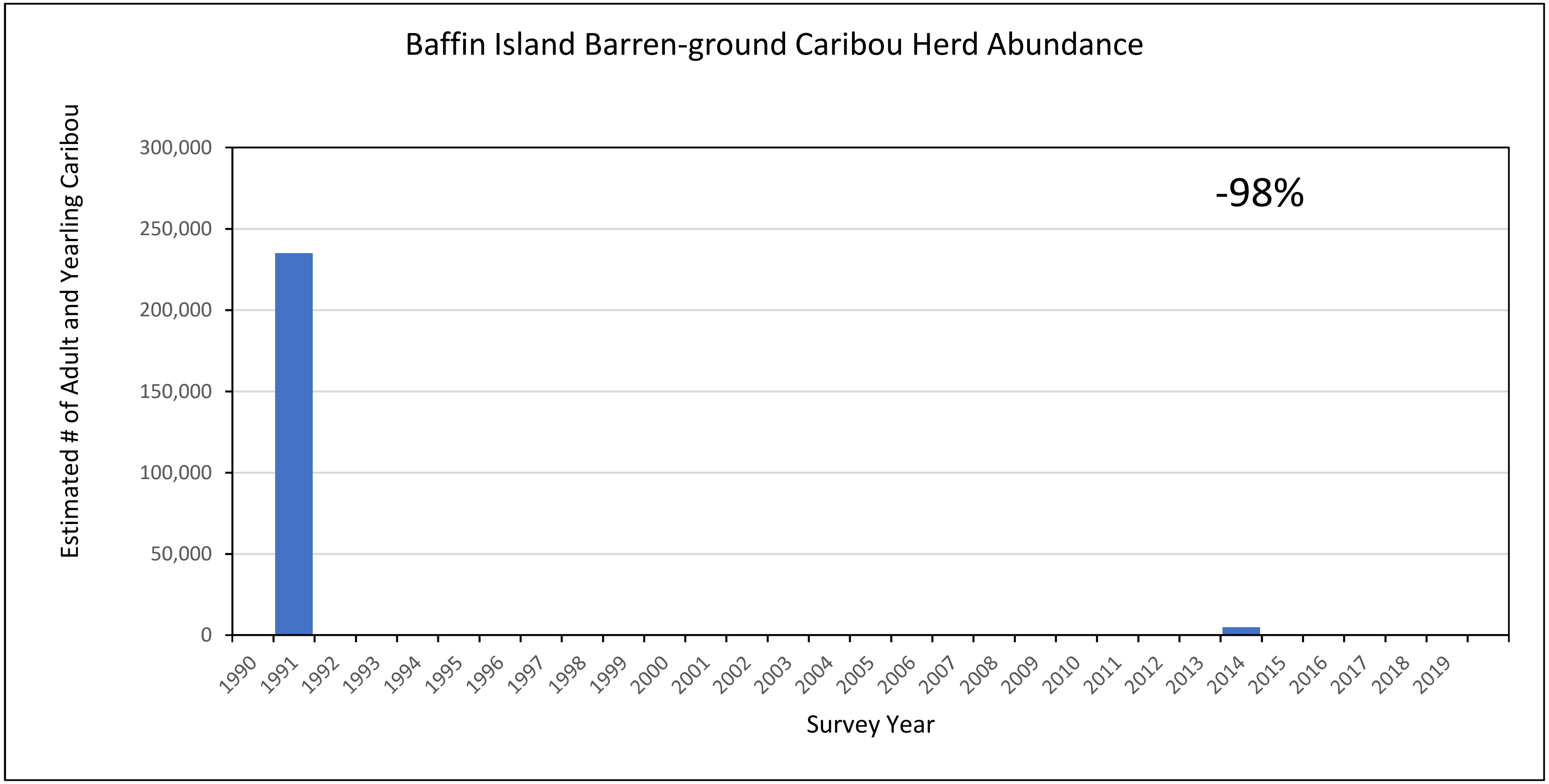
SARA could be used as a tool to help conserve

Barren-ground Caribou

-

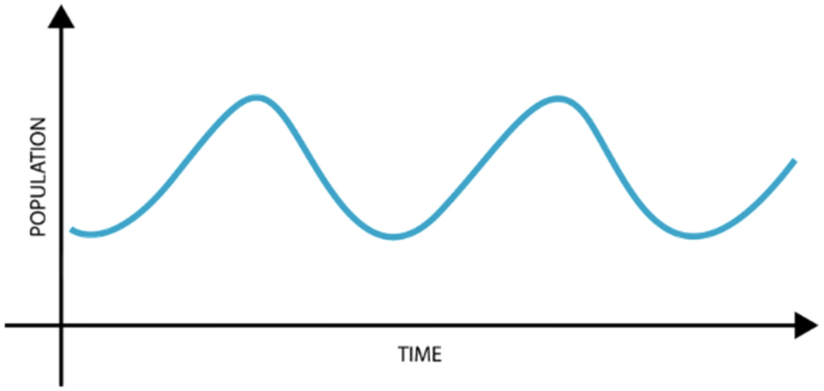
SARA does not affect Inuit harvesting rights

Herd health


Baffin Island Barren-ground Caribou Herd Abundance
Estimated # of Adult and Yearling Caribou
300,000
250,000
200,000
150,000
100,000
50,000
0
-98%
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Survey Year

Herd health

- The Baffin herd is at a low point in its natural population cycle
- Herd vulnerability is highest at low points
  - more sensitive to disturbance, predation, climate change, etc.
- Due to new factors (e.g. development, climate change) caribou populations may not cycle back to regular levels

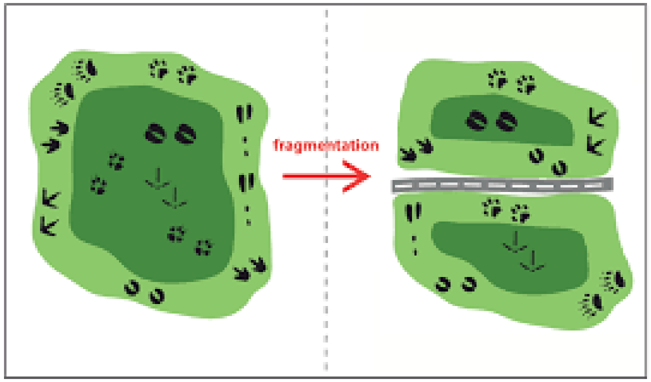


Threats to recovery

Development

-Habitat loss, fragmentation

-Herds can't recover if there is no space for them to do so



Increased human population

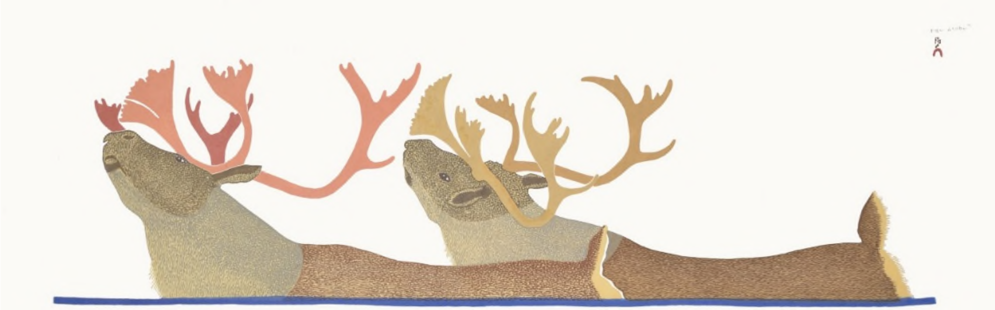
- Increased demand for caribou

Climate change

- e.g. Increase in rain on snow events

What is SARA?

Federal legislation that aims to prevent wildlife from disappearing from Canada



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What will listing caribou on SARA do?

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What will listing caribou on SARA do?

2. **Your voice becomes louder**.

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You will have a say in how to keep the herds healthy and make sure they're available for future generations.

What will listing caribou on SARA do?

3. **More resources will be available to support caribou conservation**.

SARA-listing would raise the importance of caribou, making it easier for HTOs to access resources to conduct monitoring and develop management plans.

What will listing caribou on SARA do?

4. **Protect space for caribou**.

SARA can legally protect important caribou habitat (e.g. calving grounds) from disturbance such as development.

If caribou are listed:

1. Make a plan
   - Goal: keep the herds healthy and available for future generations
   - Management partners, including HTOs, will decide what needs to be done to keep the herds healthy

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2. Identify and protect important caribou habitat

3. General prohibitions
   - Inuit harvest: **not affected**
   - Non-Inuit harvest: Not allowed to harvest caribou on Environment Canada or Parks Canada lands (e.g. National Parks, National Wildlife Areas, Migratory Bird Sanctuaries)

Important to remember

- No decision has been made yet
- Nunavummiut input is required at all stages in SARA; before any decision is made we need your input
- Existing wildlife management bodies & processes do not change
- SARA is a tool to help with caribou conservation
- SARA does not affect Inuit harvesting rights

Next steps

Ongoing

- Continue to solicit input from communities

  including Inuit Qaujimatuqangit and socio-economic impacts of listing

Kananginak Pootoogook, 2007

March 2021 or later, TBD

- NWMB decision, Environment Minister recommendation, Federal Cabinet decision

Discussion

We want to hear from you:

What is needed to support the Baffin herd?

Do you agree/disagree/have concerns with the listing proposal?

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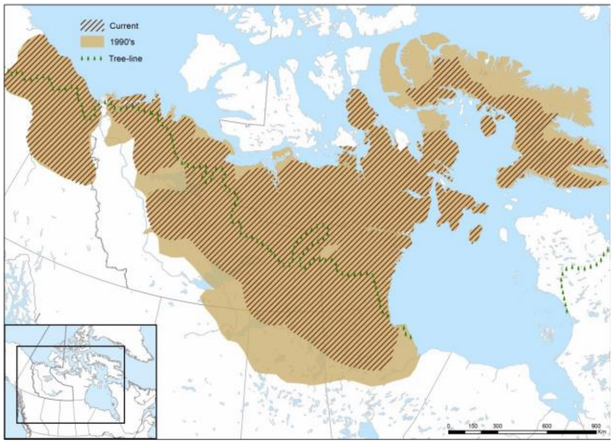
Environment Canada · Environnement Canada

SUBMISSION TO THE NUNAVUT WILDLIFE MANAGEMENT BOARD
FOR

Information: **Decision: X**

Issue: Request for decision on the proposed listing of **Barren-Ground Caribou** as a threatened species under the federal *Species at Risk Act*

Barren-Ground Caribou



Current and historical range of Barren-Ground Caribou

Background

Designatable Unit

- COSEWIC divides caribou in Canada into 12 types or "Designatable Units" based on distribution, genetics, appearance, movements, and behavior and life history strategies.
- The range of Barren-ground caribou in Canada extends from the Yukon to Baffin Island, and south into Saskatchewan and Manitoba.
- Barren-ground caribou includes 14-15 populations or herds including the following herds found in Nunavut: Bluenose-East, Bathurst, Beverly, Qamanirjuaq, Lorillard, Ahiak, Boothia Peninsula, Wager Bay, Southampton Island, and Baffin Island herds.

Assessment & Threats:

- The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed Barren-Ground Caribou as a threatened species in November 2016.

Canada

- A threatened species is likely to become endangered if limiting factors are not reversed.
- Most Barren-Ground Caribou herds have shown large declines since 1990, only 2 herds are increasing. Across Canada, Barren-ground caribou have declined from around 2 million individuals in the early 1990s to about 800,000 in 2016. The decline is estimated at 56% over three generations (between 1989 and 2016).
- Evidence from both local Indigenous people and scientific studies suggests that most herds have undergone natural fluctuations in numbers in the past; however, available data does not indicate any sign of rapid recovery at this time.
- Barren-ground caribou meets criteria for *Endangered* status because of a reduction in numbers of ≥50%, but the lower risk category of *Threatened* was recommended because, overall, this population does not appear to be facing imminent extinction at this time.
- Potential threats include:
    - Climate and weather changes affecting forage availability, predation, parasites and diseases.
    - Industrial exploration and development.
    - Fragmentation of habitat in winter range from forest fires and increasing human presence.
    - Contaminants
    - Subsistence and sport harvest can be significant causes of mortality.

<u>Herds of the Nunavut Territory:</u>

Herds	**Bluenose-East**	**Bathurst**	**Beverly/ Ahiak**[1]	**Qamanirjuaq**	**Lorillard /Wager Bay**	**Boothia Penins.**	**Southampton Island**[2]	**Baffin Island**[3]
Increase/ Decrease rate:	- 89%	-96%	Decline	-4%	NA	NA	+113%	-98%
Last Survey reported in COSEWIC report	38,592 (2015)	19,769 (2015)	195,529 (2011)	264,661 (2014)	41,000 (2002)	6,658 (1995)	12,297 (2015)	4,856 (2014)
Maximum observed in surveys	114,472 (2010)	472,000 (1986)	Bev (1995): 276,000 Ahiak (1996): 200,000	495,000 (1994)	41,000 (2002)	6,658 (1995)	30,381 (1997)	235,000 (1991)

1. Beverly and Ahiak herds were merged into one in 2011.
2. One of the only two herds that are increasing across Canada.
3. There is considerable uncertainty in the population estimates and resulting trend.

Implications of proposed listing:

- If Barren-Ground Caribou are listed under the federal *Species at Risk Act* a national recovery strategy will be written. The needs of each herd could be considered separately within the national recovery strategy.
- Critical habitat will be identified to the extent possible and CWS will work with partners to find the best method to protect it from activities that would destroy it. Critical habitat could be used to protect calving areas, migration routes or other important habitat for caribou.
- Prohibitions against killing or harming Barren-Ground caribou will automatically come into force in National Parks, Wildlife Bird Sanctuaries and Wildlife Management Areas. These prohibitions do not apply to Inuit harvest under the Nunavut agreement.
- Federal funding programs such as the Aboriginal Fund for Species at Risk (AFSAR) are available to provide support for projects that can help species that are listed under the federal *Species at Risk Act*.

Consultations on the proposed listing:

- Consultation packages were sent by email and mail to 22 Nunavut communities within the range of the species in January 2018. The packages included: a letter, a factsheet, a PowerPoint presentation, and a questionnaire in English and Inuktitut.
- Follow-up phone calls were made to Hunter & Trapper Organizations between January and April 2018.
- In person consultations on the proposed listing were conducted starting in February 2018.

Meeting Location	Public Meeting	Separate HTO Board Meeting	Meeting Group	Staff from other organizations in attendance			Meeting Date
				NWMB	GN	Others	
Cambridge Bay	Y	Y	Ekaluktutiak HTO, Omingmaktok HTO, Burnside HTO	N	N	KRWB	February 26, 2018
Kugluktuk	N	Y	Kugluktuk HTO	N	Y	KRWB	Feb 27, 2018
Gjoa Haven	N	Y	Gjoa Haven HTO	N	N		March 1, 2018
Kugaaruk	N	Y	Kurairojuark HTO	N	N		March 2, 2018
Rankin Inlet	N	Y	Kangiqliniq HTO	N	N	NTI	March 5, 2018
Arviat	N	Y	Arviat HTO	N	Y		March 7, 2018
Whale Cove	N	Y	Issatik HTO	N	N		March 6, 2018
Taloyoak			Spence Bay HTO				TBC
Baker Lake	N	Y	Baker Lake HTO	N	Y		March 8, 2018
Chesterfield Inlet	N	Y	Aqigiq HTO	N	Y		March 9, 2018
Qikiqtarjuaq	Y	Y	Nattivak HTO	Y	N		Oct. 23-24, 2018
Pangnirtung	Y	Y	Pangirtung HTO	N	N		Dec 3, 2018
Iqaluit	N	Y	Amaruq HTO	Y	N		Oct 22, 2018
Igloolik	Y	N	Igloolik HTO	N	Y		Sept 25, 2018
Hall Beach	Y	Y	Hall Beach HTO	N	N		Sept 26, 2018
Repulse Bay	Y	N	Arviq HTO	N	Y		Sept 27, 2018
Coral Harbour	Y	Y	Aiviit HTO	Y	N		Jan 22, 2019
Cape Dorset	Y	Y	Aiviq HTO	Y	N		Jan 23, 2019
Kimmirut	Y	Y	Mayukalik HTO	Y	N		Jan 24, 2019
Arctic Bay	Y	N	Arctic Bay HTO	Y	N		Oct 16, 2018
Pond Inlet	Y	N	Mattimatalik HTO	Y	Y		Oct 17, 2018
Clyde River	Y	Y	Nangmautaq HTO	Y	N		Oct 18, 2018

Highlights from meetings:

Many communities and HTOs expressed concerns about the lack of Inuit Qaujimajatuqangit in the status assessment, and they want more involvement in the COSEWIC assessment stage of the process. CWS has asked COSEWIC to include HTOs in reviews of draft status assessments, so that IQ and local knowledge can be included in the assessment instead of waiting for the listing stage of the process.

People are extremely worried about the possible impact that listing could have on harvest and food security. If Barren-ground caribou are listed it would not require any change to how harvest is regulated

for Inuit hunters in Nunavut. Harvest would continue to be regulated through the co-management process which already takes conservation into account. The only automatic prohibitions would be for non-indigenous people in National Parks, National Wildlife Areas and Migratory Bird Sanctuaries. It is possible that in the future a protection order could be put in place that could impact Inuit harvest, this is known as the "federal safety net". Any such order would require a separate consultation process.

People would have preferred that the Barren-ground caribou herds were not combined together in one assessment. Nevertheless, they would like to see locally developed assessments and plans for each herd. The Barren-ground caribou were grouped together in COSEWIC's assessment because all these herds are similar in terms of their appearance, behaviour, and genetics. ECCC presents the original COSEWIC assessment during the consultations, however the different herds can be treated separately in the recovery strategy later on in the recovery planning process.

Some questioned whether the decline was a real cause for concern, suggesting that the caribou population will naturally cycle back up or that the caribou have moved to another area and will come back in the future. The COSEWIC assessment recognized the cyclical nature of the caribou populations, and it is possible that the caribou populations will recover naturally. However, caribou are facing many new threats so COSEWIC was uncertain that what happened in the past will happen again.

Most communities also mentioned the wolf population increasing as one of the important causes of the Caribou decline. Information on threats such as wolf predation can be used in the recovery strategy.

Detailed notes from community meetings can be found in the appendix. The following is a brief summary of the feedback received in each community.

Cambridge Bay [Bathurst and Beverly herds]:

- HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process. They also want to be involved in the drafting of the recovery strategy.
- They would appreciate a herd-by-herd assessment as they are in the opinion that their herd is doing fine.
- Increased predation: would like to see an incentive for hunters to harvest wolves.
- They are worried about their income (subsistence and income hunting).

Kugluktuk [Bluenose-East and Bathurst herds]:

- HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process.

- They would appreciate a herd-by-herd assessment, and worry about the flexibility in prohibitions and how it will be applied to local management.
- They noticed an increase in wolf and wolverine populations.

Gjoa Haven [Ahiak, Beverly and Boothia Peninsula Herd]:

- HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process.
- They are worried about the Caribou declining, the species is critical for their way of life and food security. They are interested in collaborating to help the species recover.
- They mentioned various reasons why they see less Caribou than before :
    - Increased predation (wolves, wolverines and grizzlies)
    - They are seeing a lot more Muskox than before
    - Climate Change: Caribou are vulnerable to migration on thin ice.
- They would like to improve youth education regarding hunting practices.

Kugaaruk [Ahiak, Boothia Peninsula, and Wager Bay herds]:

- HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process.
- They would appreciate a herd-by-herd assessment, they never heard of any studies done in their region.
- They are worried about harvest restrictions and food security.
- They mentioned various reasons why they see less Caribou than before :
    - Increased predation (wolves)
    - They are seeing a lot more Muskox than before
    - Mining (chemicals, plane/helicopters flying low)
    - Climate Change : They noticed a lot of rain on snow event making the foraging harder for the species.
    - Natural cycle of caribou population
    - Diseases

Rankin Inlet [Qamanirjuaq and Lorillard herds]:

- HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process. They would like to see an Inuit representative on COSEWIC committee.
- They would appreciate a herd-by-herd assessment, they never heard of any studies done in their region.
- Increased predation: They are seeing more wolves and grizzlies than before.
- They want to be involved in drafting the recovery strategy. Management plans already in place in some regions should be recognized.

- Some agreed to the listing of the barren-ground caribou.

Whale Cove [Qamanirjuaq and Lorillard herds]:

- HTO members expressed some worries about their harvest rights.
- They mentioned various reasons why they see less Caribou than before :
  - Increased predation (eagles, wolverines)
  - They are seeing a lot more Muskox than before
  - Natural cycle of caribou population
  - Diseases: They noticed swollen hooves (brucellosis)
  - Mining

Arviat [Qamanirjuaq herd]:

- HTO members would like to see a herd-by-herd assessment as they think their herd is stable.
- They mentioned various reasons why they see less Caribou than before :
  - Sport hunting happening south of Aviat
  - Migration routes have changed
  - Increased predation (wolves, grizzlies, wolverines)
  - Moose habitat range has recently extended to their region
  - Hunting ways have changed (bullet type, transportation)

Baker Lake [Ahiak, Lorillard, and Qamanirjuaq herds]:

- HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process. They would like to see an Inuit representative on COSEWIC committee.
- They are worried about their harvest rights and food security.
- They haven't seen the Qamanirjuaq herd for a long time, and mentioned potential causes of the caribou decline, i.e. changing migration routes, natural cycle of the caribou population, forest fires, and increased predation.
- They want to see the recovery strategy being elaborated cooperatively with all territories and provinces sharing the herds. Attention to the migration routes and its protection should be emphasized.

Chesterfield Inlet [Qamanirjuaq and Lorillard herds]:

- HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process.
- The caribou have other predators, like wolves, grizzlies and wolverines that are also responsible for their decrease.
- They are worried about their harvest rights.
- Some noticed the caribou have recently started to increase in the area.

Igloolik [Wager Bay and Baffin Island herds]:

- Community and HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process.
- They are worried about their harvest rights and food security; they see this proposed listing as an additional hardship done to their community and traditional way of life.
- Most of them believed the caribou population is going through a natural cycle and will eventually come back on its own. Some people mentioned the population numbers were not trustworthy.
- They want more responsibility in regards to managing their own herd, instead of having outsiders getting involved. They also didn't appreciate all the herds being merged together for the listing assessment.

Hall Beach [Wager Bay and Baffin Island herds]:

- Community and HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process.
- Most of them believed the caribou population is going through a natural cycle and will eventually come back on its own.
- The caribou have other predators, like wolves that are also responsible for their decrease.
- They are worried about their harvest rights and food security. Some of them thought animals should not be surveyed and didn't like outsiders coming to interfere with their wildlife management.

Naujaat [Wager Bay and Lorillard herds]:

- Community members wanted to see local management of the herd. They didn't like having their caribou lumped in with other herds across Canada as part of the assessment of Barren-ground caribou or in future recovery plans. Some of them mentioned the survey methodology was not trustworthy.
- Most of them believed the caribou population is going through a natural cycle and will eventually come back on its own.
- They are worried about their harvest rights being affected after the listing.

Arctic Bay [Baffin Island herd]:

- There were strong concerns about the lack of Inuit participation in the assessment of the caribou and decision-making regarding the wildlife management. They would like to see more traditional knowledge involved throughout the process.

- Community members mentioned the cause of decline is most likely due to wolf predation and natural cycle of the caribou population. They strongly believe the caribou will come back on their own.
- Community members were also worried about their harvest right and food security.

Pond Inlet [Baffin Island herd]:

- Community and HTO members expressed strong concerns about the lack of Inuit participation in the assessment of Barren-ground caribou and decision-making. They would like to see more local management and are concerned about their harvest rights.
- There were some doubts regarding the numbers of caribou and the survey methodology.
- Most of them believed the caribou population is going through a natural cycle and will eventually come back on its own.
- One person asked for a further investigation on the actual causes of decline of the Baffin herd.

Clyde River [Baffin Island herd]:

- Community and HTO members expressed strong concerns about the lack of Inuit participation in the assessment of Barren-ground caribou and decision-making. They would like to see more local management and are concerned about their harvest rights.
- One member mentioned there was a generational conflict where the younger hunters want to try new wildlife management methods, but the elders disagree. The Inuit's profound respect for elders makes the younger generation hesitant to talk about it.
- Community members also mentioned potential causes of the caribou decline, i.e. the natural cycle of the caribou population, the predation by wolves, female-male ratio allowed for hunting, and the new technology (snowmobiles scare caribou away).

Iqaluit [Baffin Island herd]:

- Community and HTO members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process.
- They would also like to be involved in the scientific research. The survey methodology is not clear to them, and they believe a herd-by-herd assessment would be much more relevant.
- They believe the caribou populations are going through natural cycle and will eventually come back up on their own.
- Many were worried about their harvest rights and would like to see investigation on other threats like predation, industry and impact of research.

Qikiqtarjuaq [Baffin Island herd]:

- HTO board members expressed their concerns about the harvest restrictions and mentioned they want to collaborate to see the caribou population increase again.
- HTO and community members mentioned the helicopters from mining companies were an important threat to the caribou (scaring them away).
- The wolf population is also an important threat to consider.
- Some of them strongly believed the caribou will come back on their own. They migrate long distance and undergo natural cycles of population density.

Coral Harbour:

- Community members were concerned about the mining activity and identified industry as one of the main threats to caribou.
- Community members identified climate change as an on-going threat to caribou.
- Several community members believe caribou undergo natural cycles of population density. When populations are too abundant the numbers drop, but increase again when vegetation grows back.
- Community members expressed interest in knowing current local caribou numbers, particularly on Coats Island.
- The lag time between caribou surveys and results is too long. The community members would like to be informed of the health of the herds more quickly, so they can better manage their harvest.
- Community members expressed interest in knowing how caribou herds across Canada were doing, and how they were being managed.

Cape Dorset:

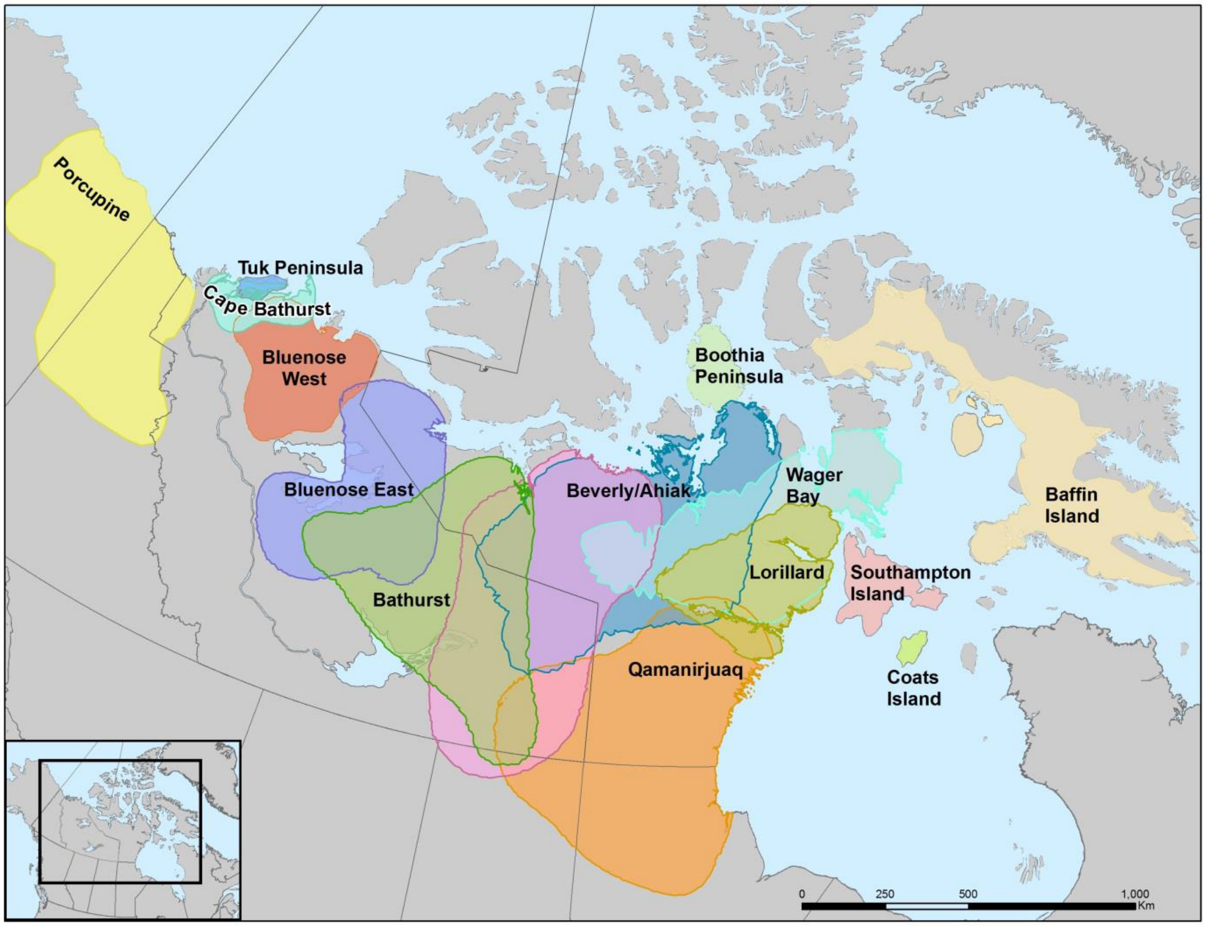
- Community members questioned the accuracy of the range of Barren-ground caribou herds shown on the maps
- Community members weren’t sure that caribou populations will cycle up and down as they have in the past because of all the things that have changes
- Community members were concerned about the affect of the mines on caribou and want to find ways to protect the caribou from mining. Critical habitat is one way to protect habitat for caribou.
- Community members were concerned about predation from wolves, and suggested wolf control
- Community members were concerned about harassment of caribou by helicopters and airplanes
- Some community members though that caribou are not threatened, and have just moved to another area
- Community members were concerned that caribou are not surveyed often enough
- Community members spoke about the importance of using Inuit Qaujimajungit
- Community members were concerned about the possible impact that listing caribou might have on harvesting

Kimmirut:

- HTO members expressed strong concern regarding the listing of all Barren-ground caribou herds as one. They believe South Baffin and North Baffin populations should be considered separately.
- Several HTO and community members do not believe the South Baffin population is in decline.
- Several HTO and community members believe caribou undergo natural cycles of population density. When populations are too abundant the numbers drop, but increase again when vegetation grows back.
- Some community members do believe caribou populations on South Baffin Island are in decline, support the listing, and believe more survey efforts are required.
- Community members expressed concern related to methods used to survey caribou (e.g. helicopter use), and suggest using less intrusive methods.
- Community members identified parasites and wolves as threats, and expressed an interest in better understanding how parasites (e.g. ticks) have arrived and how they impact the caribou.
- HTO and community members expressed concern about their harvest rights and the lack of Inuit participation in the listing process.

Request of the NWMB:

- That NWMB considers whether or not they support the listing of Barren-Ground Caribou as *Threatened* under the federal Species at Risk Act.
- That NWMB provides comments on the potential impacts and benefits of listing Barren-ground caribou under the federal *Species at Risk Act*.

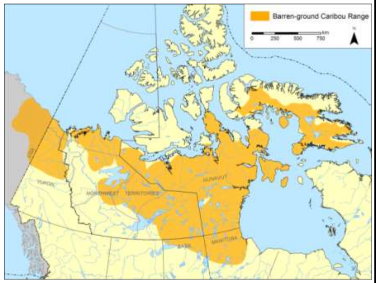


This map shows the different herds that make up the Barren-ground caribou.

Environment and Climate Change Canada | Environnement et Changement climatique Canada | Canada

Barren-ground Caribou: Should it be added to the Species at Risk Act?

Photo by A. Gunn



***SARA*'s Purpose:**
- Prevent plants & animals from disappearing from Canada
- Help species that aren't doing well

Canadian Wildlife Service, 2018

- ➢ Nunavut Agreement takes priority over SARA
- ➢ Inuit subsistence harvest rights are not affected

Environment and Climate Change Canada | Environnement et Changement climatique Canada | Page 2 | Canada

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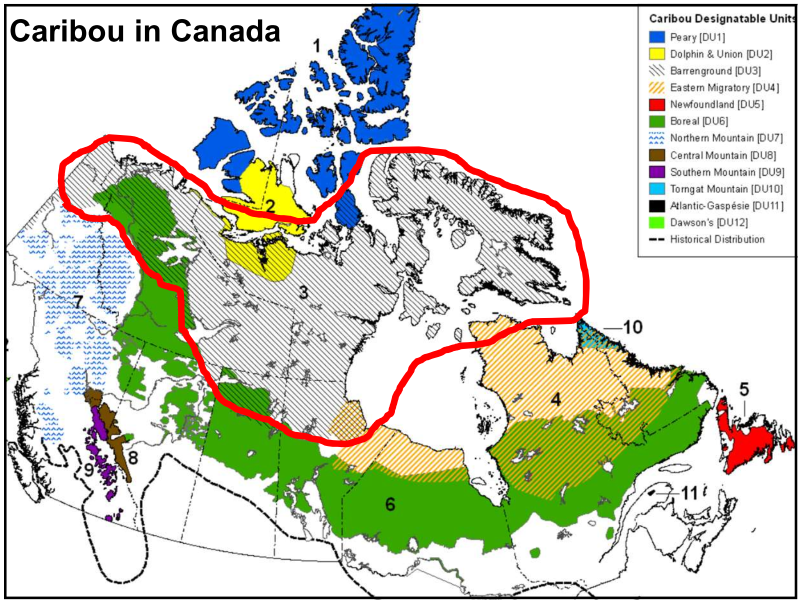
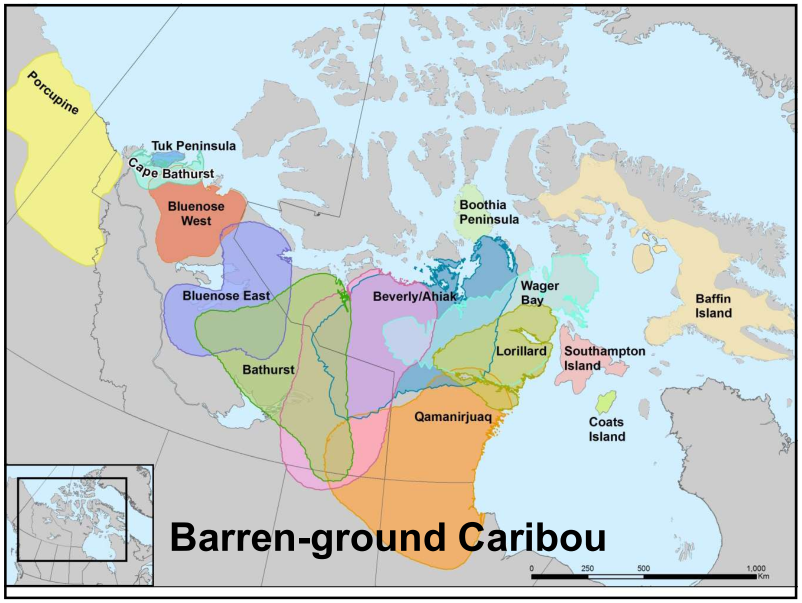
Caribou in Canada





Barren-ground Caribou

Should Caribou be added to the *Species at Risk Act*?

Re-assessed

Assessment
Independent, non-government committee (COSEWIC)
Assessed Caribou as **Threatened** (2016)

Add to SARA List?
Nunavut Wildlife Management Board decides
Environment Minister recommends
Federal Cabinet decides

Recovery Planning
SARA applies:
- Recovery Strategy & Action Plan
- Critical Habitat

Implementation
Undertake conservation measures described in the plans
- Protect Critical Habitat

Inuit input required at all stages

****Separate Processes****

Where do Caribou fit on the SARA scale?

high

Endangered

Threatened

Special Concern

Not at Risk

low

Why did COSEWIC say "Threatened"?

Dramatic declines

- 56% decline over last 3 generations
  - -Baffin Island herd suffered worse decline than average
  - -Two herds are increasing (Porcupine & Southampton Island)
- Current population ~800,000 (compared to over 2 million in 1990s)
- Despite natural population cycles (highs & lows), COSEWIC could not see signs of recovery for most herds. Caribou facing new threats

Threats include (*not applicable to all herds):

- Climate change → forage availability, predation, parasites & diseases
- Industrial development & Habitat fragmentation (forest fires; humans)
- Pollution
- Over-harvest

What would change if Caribou were added to SARA?

high

Threatened

low

<u>New prohibitions on killing, harming & harassing</u>

- These only apply to non-Inuit people
- Apply only in National Parks, National Wildlife Areas & Migratory Bird Sanctuaries
- Do not apply anywhere else unless Cabinet makes an "order"

What would change if Caribou were added to SARA?

high

Threatened

low

Nunavut Agreement takes priority over *SARA*

- Inuit subsistence harvest rights are not affected
- Any harvest limits would need to follow Nunavut Agreement's decision-making process (Article 5)
- Existing wildlife management bodies & processes remain in place (*SARA* does not change this)
  - NWMB, HTOs, Regional Wildlife Organizations, Nunavut government

What would change if Caribou were added to SARA?

high

Threatened

low

National Recovery Strategy will be required

- Coordinated approach across Canada
  - Needs of each herd can be treated separately
- Developed cooperatively with all key partners
  - Inuit communities, organizations and governments
  - HTOs, WMBs, etc.
  - Territorial governments
- **Critical Habitat** will need to be identified & protected
- Federal funding for species at risk

Consultation on adding Barren-ground Caribou to *SARA*

Who? WMBs, HTOs, Inuit & Indigenous communities, organizations and governments, territorial governments, general public

When? Until March 2019

What? Should it be listed in SARA?
What are the impacts?
What are the benefits?
Any other information / concerns / comments?

Why? Provide input to the Environment Minister, Cabinet & NWMB

Next steps? HTO comments provided to NWMB
Environment Minister's recommendation to Cabinet
Cabinet can Accept, Reject or refer back to COSEWIC (2020?)

Summary

Should Barren-ground Caribou be added to the Species at Risk Act?

- ✓ Currently assessed as **Threatened**
- ✓ A recovery strategy and action plan(s) will be developed
- ✓ Nunavut Agreement takes priority over SARA
- ✓ Inuit subsistence harvest rights are **not** affected

High Risk

Endangered

Threatened

Special Concern

Not at Risk

Low Risk

Questions? Comments?
Please send feedback to:
Dawn Andrews
Canadian Wildlife Service
5019 52nd Street
PO Box 2310
Yellowknife, NT X1A 2P7
(867) 669-4767
ec.sarnt-lepnt.ec@canada.ca
Lisa Pirie-Dominix

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Pangnirtung Public Meeting:

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Monday, December 3rd, 2018

Community Hall

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

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Photo by A. Gunn

Public Meeting

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Monday February 26th 2018

Luke Novoligak Community Hall, begins at 7 pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened in January 2018. Environment and Climate Change Canada is holding a public meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed

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Canada

Cape Dorset Meeting for public and HTO

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Thursday November 8th, 2018

Community Hall

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Coral Harbour Meeting for Public and HTO

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Wednesday November 7th, 2018

Community Hall

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Arctic Bay HTO and Public Meeting:

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Tuesday October 16th, 2018

Westside Community Hall

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Clyde River HTO and Public Meeting:

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Thursday October 18th, 2018

Tuqqajaaq Community Hall

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Iqaluit Public Meeting:

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Monday October 22th, 2018

HTO Board room

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Pond Inlet HTO and Public Meeting:

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Wednesday October 17th, 2018

Atakaalik Community Hall

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Qikiqtarjuaq Public Meeting:

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Tuesday October 23rd, 2018

Community Hall

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Hall Beach Public Meeting:

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Wednesday September 26th, 2018

Community Hall

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Igloolik Public Meeting:

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Tuesday September 25th, 2018

Community Hall

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Naujaat Public Meeting:

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Thursday September 27th, 2018

Community Hall

5:30pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened in January 2018. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Canada

Public Meeting

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Tuesday February 26th, 2019

E.W. Lyall Complex Community Hall

7:00 pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened in January 2018. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Kimmirut Meeting for public and HTO

Photo by A. Gunn

Barren-ground Caribou

Proposed Listing as Threatened under the *Species at Risk Act*

Thursday, January 24rd 2019

Community Hall – Akavak Center

6:00pm

Barren-ground Caribou are proposed to be listed under the federal *Species at Risk Act* as Threatened. Environment and Climate Change Canada is holding a meeting to talk about the possible listing of Barren-ground Caribou.

Come and learn about the process, share your ideas and concerns, and find out what it would mean to have the species listed.

SARA GLOSSARY
ᐆᒪᔪᑦ ᐃᓅᓴᓪᓚᓗᐊᕐᑯᓇᒋᑦ (ᐃᓄᐃᓴᓪᓚᓗᐊᕐᑯᓇᒋᑦ) ᐱᕐᑯᔾᔨᓐᓂᑦ ᑐᑭᓯᓇᕐᓯᒋᐊᕈᑎᑦ

Species at Risk Act (SARA)	**ᐆᒪᔪᑦ ᐃᓄᐃᓴᓪᓚᓗᐊᕐᑯᓇᒋᑦ ᐱᕐᑯᔭᖅ (ᓵᕋ)**
A federal act whose purpose is to prevent a species from being Extirpated or becoming Extinct; to provide for the recovery of wildlife species that are Extirpated, Endangered or Threatened as a result of human activity; and to manage species of Special Concern to prevent them from becoming Endangered or Threatened.	ᒐᕙᒪᑐᕐᑲᒃᑯᑦ ᐱᕐᑯᔾᔨᒐᑦ ᐆᒪᔪᑦ ᐱᑕᕐᑲᐅᓐᓃᕐᑯᓇᒋᑦ ᐅᑎᖅᑕᕐᕕᒋᓚᐅᖅᑕᒥᓐᓂᒃ ᓅᕐᑯᓇᒋᑦ ᐅᕝᕙᓘᓐᓃᑦ ᓄᖑᕐᑯᓇᒋᑦ; ᐅᑎᖅᑮᒥᑎᕐᓯᓇᓱᐊᕐᑯᓪᓗᒋᑦ ᐱᑕᕐᑲᐅᓐᓃᕐᑐᓂᒃ ᐅᑎᖅᑕᕐᕕᒋᓚᐅᖅᑕᒥᓐᓂᒃ ᓅᓯᒪᓕᕐᑐᓂᑦ, ᓄᖑᑐᐃᓐᓇᙵᐊᕐᑲᓕᕐᑐᓂᒃ ᐊᑦᑕᖅᑯᓲᑕᐅᓕᕐᑐᓂᓪᓘᓐᓃᑦ ᑭᒃᑯᐃᓐᓇᑦ ᐱᔪᑎᒋᓪᓗᒋᑦ; ᐊᒻᒪ ᒥᐊᓂᕆᔭᐅᓗᑎᒃ ᐆᒪᔪᑦ ᐃᓱᒫᓗᒋᔭᐅᔪᑦ ᑕᐃᒫᑦᑕᐅᖅ ᓄᖑᑐᐃᓐᓇᙵᐊᕐᑲᓕᕐᑯᓇᒋᑦ ᐊᑦᑕᕐᑯᓱᑕᐅᓕᕐᑯᓇᒋᓪᓗ.
Committee on the Status of Endangered Wildlife in Canada	**ᐆᒪᔪᕐᓂᑦ ᑭᓪᓕᓯᓂᐊᕐᑏᑦ ᑲᓇᑕᒥ**
Council of wildlife experts that decides the level of risk of extinction (disappearing) of a species in Canada.	ᑲᑎᒪᔩᑦ ᑭᒡᒐᕐᑐᐃᔩᕐᑲᕐᑐᑎᒃ ᐆᒪᔪᓕᕆᔾᒪᕆᙱᑦ ᐃᓱᒪᓕᐅᕐᓂᒃᑯᑦ ᓇᓗᓇᐃᕐᔫᕚᒃᑐᑦ ᐆᒪᔪᑦ ᓄᖑᓐᓂᐊᓐᖏᒃᑲᓗᐊᕐᒪᖔᑕ (ᐱᑕᕐᑲᐅᓐᓂᐊᓐᖏᑲᓗᐊᕐᒪᖔᑕ) ᐆᒪᔪᑦ ᑲᓇᑕᒥ.
Status Report	**ᕐᑲᓄᐃᓕᙵᓕᕐᒪᖔᑕ ᐅᓂᒃᑳᑦ**
A report, commissioned by the Committee on the Status of Endangered Wildlife in Canada, on the status of a species. The report contains a summary of the best available information on the wildlife species, including scientific knowledge, community knowledge, and aboriginal traditional knowledge.	ᐅᓂᒃᑳᖅ, ᑐᒃᓯᕌᖑᓯᒪᔪᖅ ᐆᒪᔪᕐᓂᑦ ᑭᓪᓕᓯᓂᐊᕐᑏᑦ ᑲᓇᑕᒥ ᑲᑎᒪᔩᕋᓛᙵᓐᓄᑦ, ᕐᑲᓄᐃᓕᙵᓕᕐᒪᖔᑕ ᐆᒪᔪᕐᑯᑎᑦ ᐅᕐᑲᐅᓯᐅᔪᑦ. ᐅᓂᒃᑳᑦ ᓇᐃᓈᕐᓯᒪᔪᓂᒃ ᐅᓂᒃᑳᓕᐅᕐᓯᒪᕚᒃᑐᑦ ᑐᑭᓯᓇᓛᖑᓇᓱᐊᕐᑐᓂᒃ ᑐᓴᒃᓴᓕᐅᕐᐸᒃᑐᑎᒃ ᐆᒪᔪᑦ ᒥᒃᓵᓄᑦ, ᐱᕐᑲᓯᐅᔾᔭᐅᕙᒃᑐᑎᒃ ᕐᑲᐅᔨᓴᕐᑎᒻᒪᕇᑦ ᑭᓪᓕᓯᓂᐊᕐᑎᑦ ᕐᑲᐅᔨᒪᔾᔨᑦ, ᓄᓇᓖᑦ ᕐᑲᐅᔨᒪᔾᔨᑦ ᐊᒻᒪ ᓄᓇᕐᑲᖅᑳᕐᓯᒪᔪᑦ ᕐᑲᐅᔨᒪᔾᔪᕐᑲᖏᓐᓂᑦ.
Assessment	**ᕐᑲᐅᔨᓇᓱᓐᓂᖅ**
The act of assessing the risk of extinction or extirpation (disappearing from Canada).	ᕐᑲᐅᔨᓇᓱᐊᕐᐸᒃᑐᑦ ᓇᓗᓇᐃᕐᓯᓪᓗᑎᒃ ᐃᓅᓴᓪᓚᓗᐊᓕᓐᖏᑲᓗᐊᕐᒪᖔᑕ ᓄᖑᕐᓯᐊᒻᒪᑎᓚᕐᑭᓗᑎᒃ ᐱᑕᕐᑲᐅᓐᓃᖅᑐᓪᓘᓐᓃᑦ ᐅᑎᖅᑕᕐᕕᒋᓚᐅᖅᑕᒥᓐᓂᒃ ᓅᓯᒪᓕᖅᑐᑦ (ᓄᖑᓕᕐᑐᑦ ᑲᓇᑕᒥ).
Assessment Criteria	**ᕐᑲᐅᔨᓇᓱᓐᓂᕐᒧᑦ ᒪᓕᒐᑦ**
The factors that the Committee on the Status of Wildlife in Canada considers when determining the overall health of a species or population.	ᑐᓐᖓᕕᒋᔭᐅᕙᒃᑐᑦ ᐆᒪᔪᕐᓂᑦ ᑭᓪᓕᓯᓂᐊᕐᑏᑦ ᑲᑎᒪᔩᕋᓛᙵᓐᓄᑦ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑎᕐᑲᓕᕋᐃᒐᒥᒃ ᑕᒪᒃᑭᕐᑐᒋᑦ ᕐᑲᓄᐃᓕᙵᓕᕐᒪᖔᑕ ᐆᒪᔪᑦ ᓇᓗᓇᐃᕐᑕᑦ ᐃᓚᔫᓂᓪᓘᓐᓃᑦ ᑕᕝᕙᙵᑦᓴᐃᓐᓈᕐᑐᑦ.

List of Species at Risk	**ᐆᒪᔪᑦ ᐃᓅᓴᓪᓕᓗᐊᕐᑯᓇᒋᑦ ᐱᕐᑯᔭᑎᒍᑦ ᓇᓗᓇᐃᕐᑕᐅᓯᒪᔪᑦ**
The legal list of species that are classified as either extirpated, endangered, threatened, or special concern, under the *Species at Risk Act*.	ᒪᓕᒐᕐᑎᒍᑦ ᐆᒪᔪᑦ ᐊᑎᓕᔭᐅᓯᒪᔪᑦ ᓇᓗᓇᐃᕐᑕᐅᕙᒃᑐᑦ ᐱᑕᕐᑲᐅᓐᓃᖅᑐᑦ ᐅᑎᖅᑕᕐᕕᒋᓚᐅᖅᑕᒥᓐᓂᒃ ᓅᓯᒪᓕᖅᑐᑦ, ᓄᖑᑐᐃᓐᓇᓇᐊᕐᑲᓕᕐᑐᑦ, ᐊᑦᑕᕐᑯᓲᑕᐅᓕᕐᑐᑦ, ᐅᕝᕙᓘᓐᓃᑦ ᐃᓱᒫᓗᓇᕐᓯᔪᑦ, ᒪᓕᒃᑐᒍ *ᐆᒪᔪᑦ ᐃᓅᓴᓪᓕᓗᐊᕐᑯᓇᒋᑦ ᐱᕐᑯᔭᖅ*.
Threatened	**ᐊᑦᑕᕐᑯᓲᑕᐅᓕᖅᑐᑦ (ᑐᖅ)**
A wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction (disappearance).	ᐆᒪᔪᑦ ᐱᑕᕐᑲᐅᓐᓃᕐᓂᐊᕐᓱᕆᔭᐅᔪᑦ ᕐᑲᓄᐃᓕᔭᐅᓐᖏᒃᑯᑎᒃ ᐅᑎᖅᔩᒥᑎᑕᐅᓇᓱᐊᓐᖏᒃᑯᑎᒃ ᐱᑕᕐᑲᐅᓐᓃᖅᑐᑦ ᐅᑎᖅᑕᕐᕕᒋᓚᐅᖅᑕᒥᓐᓂᒃ ᓅᓯᒪᓕᖅᑐᑦ ᐅᕝᕙᓘᓐᓃᑦ ᓄᖑᓯᒪᓕᕐᑐᑦ (ᐱᑕᕐᑲᐅᓐᓃᕐᑐᑦ).
Critical Habitat	**ᐆᒪᔪᕐᑲᐅᕐᑐᑦ ᓂᕐᑭᑦᓴᕐᓯᐅᕐᕕᓪᓗᐊᑕᑦ**
The habitat of a listed species that is legally protected because it is necessary for its survival or recovery.	ᐊᑎᓕᐅᖅᑕᐅᕐᑲᓯᐅᔾᔭᐅᓯᒪᔫᑉ ᓂᕐᑭᑦᓴᕐᓯᐅᕐᕕᖓ ᓇᔪᒐᓇᒐᔪᒃᑕᖓᑦ ᒪᓕᒐᕐᑎᒍᑦ ᓴᐳᔾᔭᐅᔪᖅ ᐅᐱᓐᓇᕐᓂ ᐆᒪᔪᑦ ᐊᓐᓇᐅᒪᔾᔪᑎᒋᒻᒪᔾᔪᒃ ᐅᑎᖅᐸᓪᓕᐊᕐᑯᓪᓗᒋᓪᓗ.
Recovery	**ᐅᑎᖅᔩᒥᑎᑦᑎᓇᓱᐊᕐᓂᖅ**
Return to the original or to a healthy, sustainable state or condition. For a wildlife species this usually involves increasing in numbers and/or distribution.	ᐅᑎᖅᔩᒥᕐᑯᓪᓗᒋᑦ ᐱᐅᓯᓇᓚᐅᕐᑕᖓᓄᑦ ᐅᕝᕙᓘᓐᓃᑦ ᕐᑲᓄᐃᓐᖏᑦᓯᐊᒃᑲᓐᓂᓕᕐᑯᓪᓗᒍ, ᐊᓐᓇᐅᒪᕕᐅᔪᓐᓇᕐᓯᓗᓂ ᐱᐅᓯᖓ ᕐᑲᓄᐃᓐᓂᖓᓘᓐᓃᑦ. ᐆᒪᔪᐃᓪᓕ ᐱᓪᓗᒋᑦ ᐊᒥᓲᕈᕐᓴᐃᓇᓱᒃᐸᒃᑐᑦ ᐊᒻᒪ/ᐅᕝᕙᓘᓐᓃᑦ ᐅᑎᖅᑕᕐᕕᖏᑦ ᐅᖓᓯᓪᓕᕙᓪᓕᐊᒃᑲᓐᓂᕐᓗᑎᒃ.
Recovery Strategy	**ᐅᑎᖅᔩᒥᑎᑦᑎᓇᓱᐊᕐᓂᖕᒍᑦ ᐸᕐᓇᐅᑏᑦ**
A written document that identifies what will be done to help a species recover.	ᑎᑎᕋᕐᓯᒪᔪᑎᒍᑦ ᓇᓗᓇᐃᕐᑕᐅᓯᒪᔪᑦ ᕐᑲᓄᖅ ᐅᑎᖅᔩᒥᑎᑕᐅᓇᓱᓐᓂᐊᕐᒪᖔᑕ ᐃᓅᓴᓪᓕᓯᒪᔪᑦ.
Threats	**ᐊᑦᑕᕐᑯᓲᑎᑦ**
An activity or process (natural or human-caused) that has caused, is causing or may cause harm, death or behavioural changes to a species at risk, or destroy or degrade its habitat.	ᕐᑲᓄᐃᓕᐅᕐᑐᕐᑲᕐᑎᓪᓗᒍ ᐅᕝᕙᓘᓐᓃᑦ ᐱᐅᓯᓇᔭᐅᓂᐊᕐᑐᖅ (ᐃᒻᒥᓂᑐᐃᓐᓇᖅ ᐃᓄᓐᓄᓪᓘᓐᓃᑦ ᑕᐃᒪᓕᕐᑭᑎᑕᖅ) ᐊᑦᑕᕐᑯᓲᑕᐅᓕᕐᑎᑦᓯᔪᑦ, ᒫᓐᓇ ᐊᑦᑕᖅᑯᓲᑕᐅᓕᕐᑎᑦᓯᓂᐊᕐᑐᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐊᑦᑕᖅᑯᓲᑕᐅᓕᕐᑎᑦᓯᑐᐃᓐᓇᓇᐊᑖᑦ, ᑐᕐᑯᓗᑎᒃ ᐅᕝᕙᓘᓐᓃᑦ ᐃᓕᖅᑯᓯᕐᓱᕈᓐᓃᑎᑦᓯᔪᑦ ᐆᒪᔪᕐᓂᒃ ᐃᓅᓴᓪᓕᓯᒪᔪᓂᒃ, ᐅᕝᕙᓘᓐᓃᑦ ᓱᕐᑦᑎᓇᑦᑎᐊᒻᒪᓇᒃᑐᑦ ᐊᓲᓐᓇᓈᓯᒪᔪᓪᓘᓐᓃᑦ ᓇᔪᕐᐸᒃᑕᖏᓐᓂᒃ ᓂᕐᑭᑦᓴᕐᓯᐅᕐᕕᓪᓗᐊᑕᖏᓐᓂᒃ.

Please fax this form to 867-9754645 or email it to hayley.roberts@canada.ca

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Barren-ground Caribou

Proposed listing as Threatened

The following questions are intended to assist you in providing comments. They are not limiting and any other comments you may have are welcome. We also encourage you to share descriptions and estimates of costs and benefits where possible.

Questionnaire filled out by:

____

(Print name / title)

Organization:

____

Date questionnaire completed:

____

Have you seen Barren-ground Caribou in your area? ☐ Yes ☐ No

Do you have enough information to make a decision on your position/opinion on the proposed listing of Barren-ground Caribou as Threatened under the federal *Species at Risk Act*?

☐ Yes ☐ No *If you need more information, someone will contact you to see how best to provide this information*

What is your organization's position/opinion on the proposed listing of Barren-ground Caribou as Threatened?

☐ Support the proposed listing of Barren-ground Caribou as Threatened
☐ Do not support the proposed listing of Barren-ground Caribou as Threatened
☐ Indifferent to the proposed listing of Barren-ground Caribou as Threatened

What are your reasons for this position?

Canada

Please fax this form to 867-9754645 or email it to hayley.roberts@canada.ca

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Do you have any additional comments?

Some points to consider:

- How do Barren-ground Caribou benefit you or the environment? (this can include economic, cultural, spiritual, and environmental benefits)
- Do any of your current or planned activities have the potential to kill, harm or harass Barren-ground Caribou?
- What are you currently doing or what could you do to avoid killing, harming or harassing Barren-ground Caribou?
- What impact do you think that listing Barren-ground Caribou as a wildlife species at risk would have on your activities?
- What impact do you think that listing Barren-ground Caribou as a wildlife species at risk would have on the species?
- Do you have any other information or concerns that the federal Minister of the Environment should consider before making a recommendation on the listing of the species?

A.Gunn

Canada

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Canada

Caribou (Barren-ground population)

Photo: © Anne Gunn

Scientific name
Rangifer tarandus

Taxon
Mammals

COSEWIC Status
Threatened

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

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 ≥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 within five years.

Wildlife Species Description and Significance

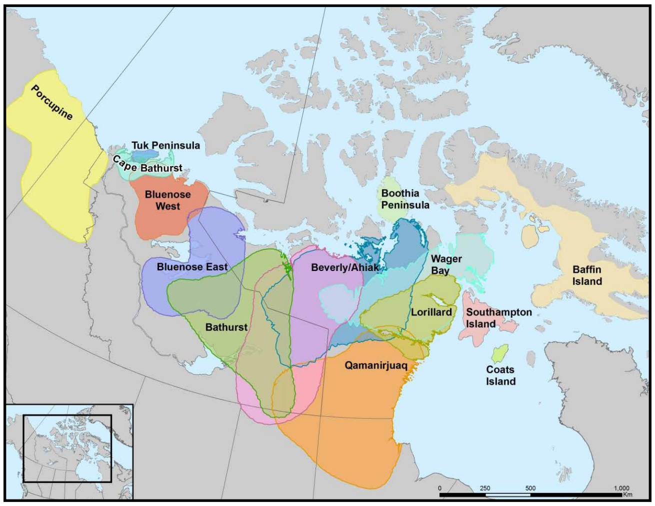
All the world's caribou and reindeer belong to a single cervid species, *Rangifer tarandus*, and are found in arctic and subarctic regions as well as in northern forests. Barren-ground Caribou are characterized by long migrations and highly gregarious behaviour, often travelling in groups of hundreds or thousands. As a relatively large herbivore with an extensive distribution and high numbers, Barren-ground Caribou is a keystone species, playing a key ecological and cultural role in northern ecosystems.

The significance of Barren-ground Caribou to the peopling of northern Canada is evident from archaeological findings tracking the distribution of people and Barren-ground Caribou relative to the retreating glaciers some 8,000 years ago in the central barrens and as long as 12-15,000 years ago in the central range of the Porcupine subpopulation. Barren-ground Caribou have been and continue to be a key resource for people in northern Canada; in some cases these animals have such importance that families would follow their migration. They have significant direct economic value from harvest, primarily for subsistence use. They also contribute to the northern economy through wildlife tourism and recreational hunting; beyond this, they have incalculable cultural value for people throughout the subpopulation ranges.

Distribution

The global range of Barren-ground Caribou extends from Alaska to western Greenland, and is continuous across northern continental mainland Canada, from northwestern Yukon to Baffin Island. The northern extent is the Arctic mainland coast; the southern extent is northern Saskatchewan, Alberta and Manitoba. Sampling efforts and methods have varied among subpopulations, leading to differences in interpreting subpopulation structure; 14-15 are recognized in this report. Some are combined for the purposes of generating population abundance and trend estimates, for a total of 13 units. Ten subpopulations have been consistently identified for the past several decades, mainly through fidelity to calving areas.

Fluctuating abundance of individual subpopulations affects distribution; as Barren-ground Caribou decline in abundance their distribution (especially during winter) changes, reducing the length of fall and pre-calving migration. Mainland subpopulations of Barren-ground Caribou generally migrate toward the Arctic coast to calve, and occur during summer and fall on the tundra of the Southern Arctic ecozone. Western and central mainland subpopulations usually winter in the boreal forests of the Taiga Cordillera, Taiga Plains or Taiga Shield ecozones.



Distribution of Caribou subpopulations in the Barren-Ground Caribou designatable unit. Map by Bonnie Fournier, GNWT.

Habitat

Habitat requirements are partly driven by the need for forage, which depends on the timing of the caribou's annual breeding cycle and its nutritional costs relative to the brief plant growing season and long winters of the sub-arctic and arctic regions. Caribou are generalist foragers, especially in summer, and select among grasses, sedges, shrubs and forbs for nutrient content according to the stage of plant growth rather than plant species. Barren-ground Caribou require large annual ranges (several hundred thousand square kilometres in size) to enable selection of alternative habitats in response to annual variations in the environment, such as snow cover, plant growth, and/or predation or parasite risk. Habitat attributes that are important for calving include those that reduce predation risk and maximize nutrition intake; these vary among calving grounds. Forage requirements depend on the timing of the annual breeding cycle relative to the brief plant growing season and long winter that is characteristic of the sub-arctic and arctic regions. On summer ranges, caribou seek habitats that reduce exposure to insect harassment, while obtaining high-quality forage. While most subpopulations winter in the boreal forest, several remain in tundra habitats at that time.

Within the previous three generations, there has been some reduction in habitat as a consequence of the natural fragmentation of the winter ranges caused by forest fires and increasing human presence (i.e., infrastructure) on the caribou ranges. However, habitat outside the forested winter range is still largely intact at the landscape scale. The generally increasing trends in human population will increase economic development (industrial development, roads and traffic) within Barren-ground Caribou ranges in the future.

Biology

Caribou usually first calve at three years of age, although they can calve at two years when conditions are favourable. Females give birth to a single calf and may breed every year, although if nutritionally stressed they do not conceive every year. Calving is highly synchronized, generally occurring over a 2-week period in June. The breeding system is polygynous. Annual migrations and gregarious behaviour are the most conspicuous characteristics of most Barren-ground Caribou subpopulations. They are adapted to a long winter season when

cold temperatures, wind chill and snow impose high energetic costs. Those costs are met through reducing their maintenance energy requirements and mobilizing fat and protein reserves.

Predation is an important factor affecting many facets of caribou ecology, as caribou movements and habitat choices are often made to minimize exposure to predators. An array of predators and scavengers depend on Barren-ground Caribou: Grizzly Bears (*Ursus arctos*) are effective predators on newborn calves, while Gray Wolves (*Canis lupus*, hereafter referred as Wolves) are predators of all sex and age classes throughout the year. Pathogens (including viruses, bacteria, helminths and protozoa) together with insects, play an important role in caribou ecology with effects ranging from subtle effects on reproduction through to clinical disease and death.

Population Sizes and Trends

The current population of Barren-ground Caribou is estimated at about 800,000 individuals. Between 1986 and mid-1990s, the overall trend was an increase to > two million, followed by a decline, which has persisted through today. Of 13 subpopulation units used to derive abundance estimates, eight are declining, two are increasing, and three are unknown. The median three-generation percentage decline in the total number of Barren-ground Caribou was 56.8% (range = -50.8 – -59.0%), based on the summed population change for seven subpopulations with sufficient survey data, which comprise almost 70% of the total current population. Four of these seven subpopulations declined by >80% during this period, one had a median decline of -39%, characterized by marked variability, whereas the remaining two increased. Available survey data for three additional subpopulations, representing about 25% of the total population, also suggest declines; the current trajectories of another three subpopulations are unknown, due to lack of recent surveys.

Evidence from ATK and scientific study suggests that Barren-ground Caribou subpopulations undergo periods of high and low numbers (fluctuations) that might resemble population cycles. The evidence is, however, insufficient to consistently infer a naturally occurring cyclic increase across the full range of subpopulations. Available demographic data, cumulative changes to the environment, habitats, and harvest regimes for many of these subpopulations are without historical precedent, such that it would be risky to assume there will be a naturally occurring recovery, at least to numbers recorded in the 1990s, for many of the subpopulations.

Threats and Limiting Factors

Climate and weather influence other limiting factors important for Barren-ground Caribou, including forage availability, predation, parasites and diseases – in complex non-linear and cascading ways. So many aspects of caribou ecology are affected by weather that a warmer climate could have a significant but complicated suite of positive and negative effects.

Industrial exploration and development in Barren-ground Caribou ranges has increased over the past several decades, such that there are several new mines and hundreds of prospecting permits, mineral claims and mineral leases on several subpopulation ranges. Subsistence and sport harvest can be significant causes of mortality that can increase the rate of decline and lead to a lower population size after populations have been reduced for other reasons. Chemical contaminant levels in tissues are generally low at present. The changing conditions on the caribou ranges also include the administrative and political complexity of a mix of settled and unsettled land claims, with changes in jurisdictional boundaries and mandates. The implementation of management actions is challenged by the inter-jurisdictional complexity between political, land management and wildlife management agencies, combined with the migratory nature of caribou and their use of extensive seasonal ranges.

Protection, Status, and Ranks

Protection of Barren-ground Caribou subpopulations by territorial and provincial jurisdictions is through harvest regulation and habitat protection. The co-management regime is a shared management responsibility among governments and bodies established through land claim legislation and through renewable multi-jurisdictional agreements among public governments (for the Porcupine, Beverly and Qamanirjuaq subpopulations). The Porcupine Caribou subpopulation is the only subpopulation of Barren-ground Caribou covered by an international agreement signed between Canada and the United States in 1987. The Barren-ground Caribou designatable unit (DU) was assessed for the first time by COSEWIC as Threatened in November 2016. It is currently not scheduled under the federal Species at Risk Act (SARA). The 2015 national general

status for Caribou in Canada will not be available until the 2015 General Status Report is published August 2017. This Canada-wide rank will apply to all DUs of Caribou combined, with nothing specific to Barren-ground Caribou. The 2015 territorial rank for Yukon for Barren-ground Caribou is Vulnerable to Apparently Secure, and for Northwest Territories is Sensitive. At present, there is no specific rank for Barren-ground Caribou for Nunavut; however, for all DUs combined, the territory-specific general status rank for Caribou in Nunavut is Apparently Secure. Federal protected areas that exclude industrial land uses but allow continued subsistence hunting cover about 6% of Barren-ground Caribou ranges, including eight national parks.

Source: COSEWIC. 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.

For more information, please visit www.sararegistry.gc.ca.

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BARREN-GROUND CARIBOU IN CANADA
Proposed Listing as Threatened under the federal *Species at Risk Act*

Should Barren-ground caribou be added to the Federal List of Species at Risk as a Threatened species?

Scientific Name: *Rangifer tarandus*

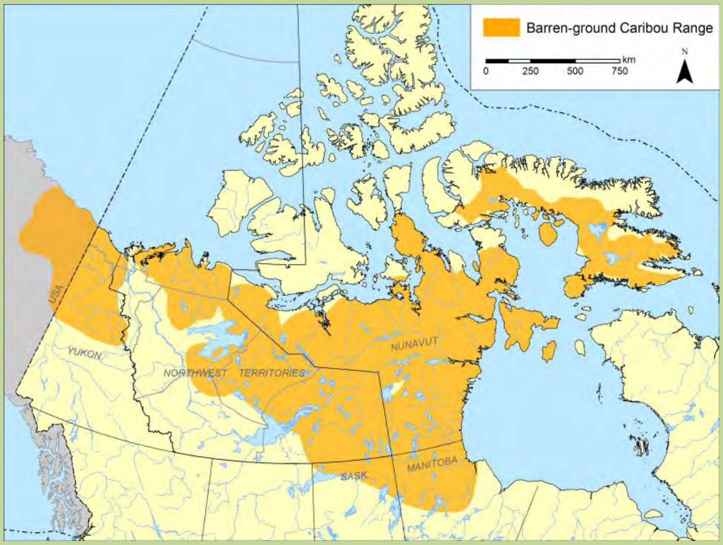
Description:

Barren-ground caribou are a medium sized caribou with dark brown legs and backs. They have a distinctive brown and white coat pattern in the fall. They are shorter than Boreal caribou and have longer legs than Peary caribou or Dolphin and Union caribou.

Photo © A. Gunn

Barren-ground caribou travel in huge groups and require large annual ranges to accommodate their long seasonal migrations.

Barren-ground caribou are widespread across northern Canada and into Alaska.



Range of Barren-ground Caribou

Assessment:

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed Barren-ground caribou as Threatened in November 2016. A Threatened species is a wildlife species that is likely to become endangered if limiting factors are not reversed.

Most of the Barren-ground caribou herds have declined dramatically. Overall, the decline is estimated at 56% over the past three generations. The Porcupine and Southampton caribou herds are some of few exceptions to this trend and are increasing. There are currently around 800,000 Barren-ground caribou, down from over 2 million in the early 1990s.

Four of the seven subpopulations (Cape Bathurst, Bluenose-East, Bluenose-West and Bathurst) have declined by > 80% in the past 3 generations. Available information for the Tuktoyaktuk Peninsula, Baffin and Beverly-Ahiak herds also indicate declines. The overall decline of the species is so drastic that it could have been assessed as Endangered. However, COSEWIC has recommended the Threatened status.

Threats:

A number of threats are thought to be causing the decline of Barren-ground caribou:

- Climate and weather changes affecting forage availability, predation, parasites and diseases
- Industrial exploration and development
- Fragmentation of habitat in winter range from forest fires and increasing human presence
- Subsistence and sport harvest can be significant causes of mortality

What Happens if Barren-ground Caribou are Listed as Threatened?

If Barren-ground caribou are listed under the federal *Species at Risk Act* a national recovery strategy will be written that identifies the threats to the species and its habitat, and sets population and distribution objectives for the survival and recovery of the species. The national recovery strategy will identify critical habitat to the extent possible. After critical habitat is identified, CWS will work with partners to find the best method to protect the habitat from activities that would destroy it. Prohibitions against killing or harming Barren-ground caribou will automatically come into force if the species is listed. In the territories, these automatic prohibitions only apply on federal lands that are under the authority of the Minister of the Environment or the Parks Canada Agency, such as National Parks and National Wildlife Areas. As well, these automatic prohibitions do not apply to people engaging in activities in accordance with conservation measures under a land claims agreement.

We want to hear from you!

- Should Barren-ground caribou be added to the federal list of Species at Risk as a Threatened species? Why or why not?
- How do Barren-ground caribou benefit you or the environment? (this can include economic, cultural, spiritual, and environmental benefits)
- Do any of your current or planned activities have the potential to kill, harm or harass Barren-ground caribou?
- What are you currently doing or what could you do to avoid killing, harming or harassing Barren-ground caribou?
- What impact do you think that listing Barren-ground caribou as a wildlife species at risk would have on your activities?
- What impact do you think that listing Barren-ground caribou as a wildlife species at risk would have on the species?
- Do you have any other information or concerns that the federal Minister of the Environment should consider before making a decision on the listing of the species?

To tell us your views or for more information, please contact:

Species at Risk
Canadian Wildlife Service, Northern Region
Environment and Climate Change Canada
PO Box 2310
Yellowknife, NT X1A 2P7
Tel: 867-669-4710 Fax: 867-873-6776
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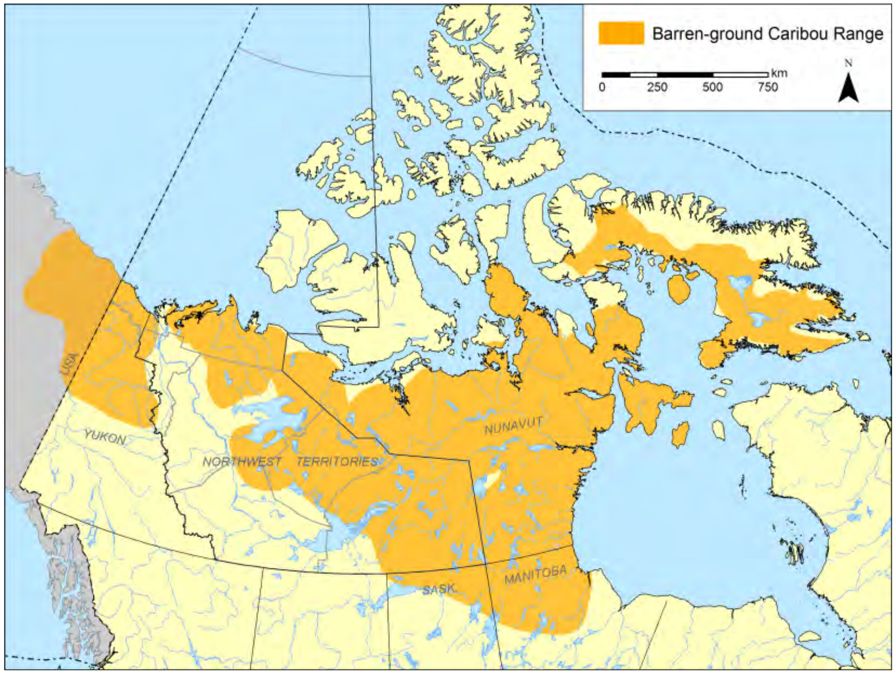
Canada

Barren-ground Caribou

(Rangifer tarandus)

Photo by A. Gunn



Proposed Listing as <u>Threatened</u> under the federal *Species at Risk Act*

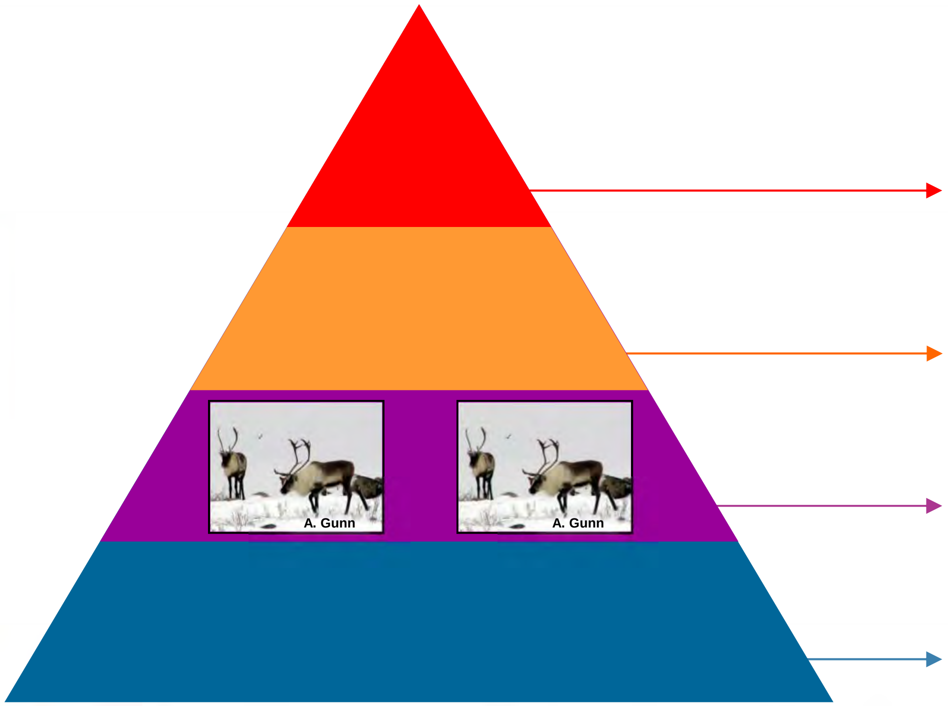
Species at Risk Program
Canadian Wildlife Service
2017

Species at Risk Act (SARA)

What is a "species at risk"?

- Plants and animals that are in danger of disappearing from the wild in Canada

Different levels of "at risk"



Status	Definition
EXTINCT	No longer exists anywhere
EXTIRPATED	No longer exists in the wild in Canada
ENDANGERED	Facing imminent disappearance from Canada
THREATENED	Likely to become endangered unless threats are addressed
SPECIAL CONCERN	Likely to become endangered or threatened unless threats mitigated

Species at Risk Act (SARA)

A national approach is needed for conservation of species that may be at risk of extinction in Canada

Purpose of SARA

- Prevent wildlife from becoming extirpated or extinct in Canada
- Provide for the recovery of extirpated, endangered or threatened species
- Manage special concern species to prevent them from becoming further at risk

COSEWIC Assessment Process

- The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is an independent advisory panel

<u>Species Selected</u>

- Knowledge, information and available data gathered
- Draft report written

<u>Draft Report Reviewed</u>

- Drafts are sent to partners (eg. WMBs) for review and comment
- 3 comment/review periods
- Last period includes a proposed risk status

<u>COSEWIC Decision</u>

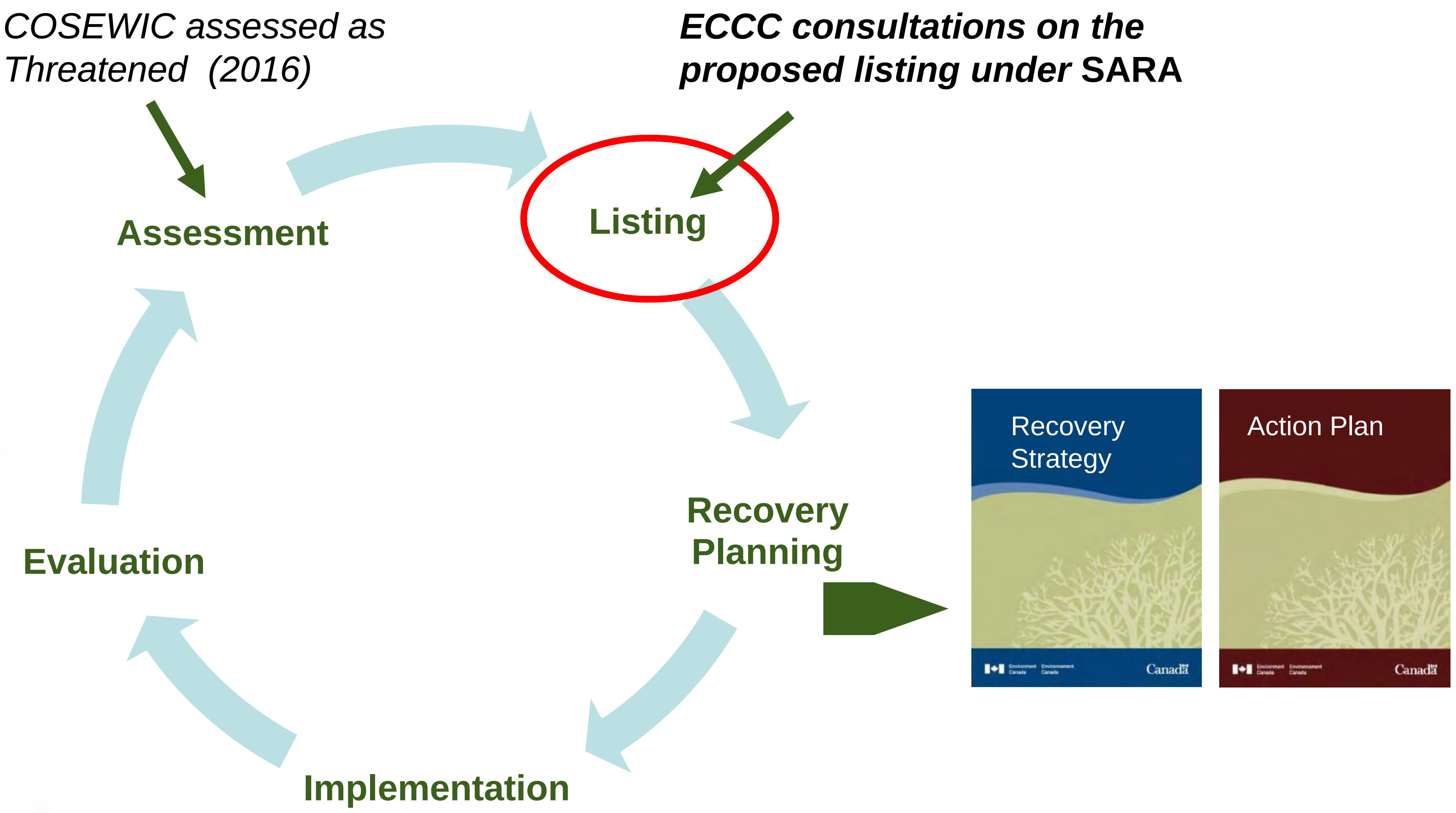
- Meetings twice per year
- Discussion and debate proposed risk status
- Vote on risk status

<u>Final report and assessment</u>

•Given to Minister of Environment
•Released to public

ECCC Process Begins

Federal *Species at Risk Act* (SARA) Process – Barren-ground Caribou



Essential Role of Indigenous Peoples

- The *Species at Risk Act* recognizes that the roles of Indigenous peoples and Wildlife Management Boards established under land claims agreements in the conservation of wildlife in Canada are essential
- Caribou ATK Source Report and the Caribou ATK Assessment Report
- The *Act* requires:
  - **Consideration of traditional knowledge** in assessment, planning and implementation
  - **Cooperation** with directly affected Indigenous organizations and Wildlife Management Boards when preparing recovery documents
  - **Consultation** with directly affected persons before making decisions that may impact them

Barren-ground Caribou – Description

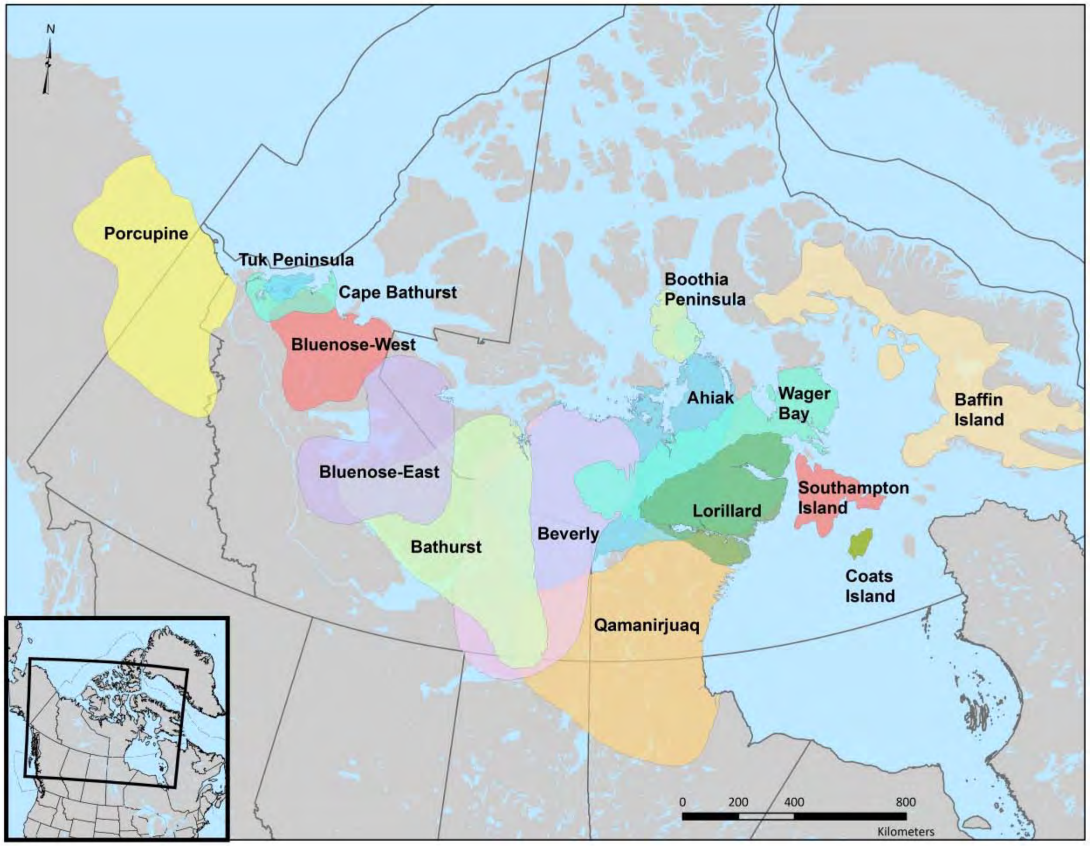
- Medium size
- Longer legs than Peary and Dolphin & Union Caribou; shorter than Boreal Caribou
- Dark brown legs and backs
- Distinctive brown and white coat pattern in the fall

Photo by A. Gunn

Lisa Pirie-Dominix

Barren-ground Caribou – Range

- Long migrations
- Travel in huge groups
- Require large annual ranges
- 14-15 herds (or subpopulations) across Canada
- Incalculable cultural value for people throughout the distribution
- Current population estimated at about 800,000 (down from more than 2 million in the early 1990s)



Barren-ground caribou annual ranges by subpopulation. Map by Angus Smith, Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, NT. 2017.

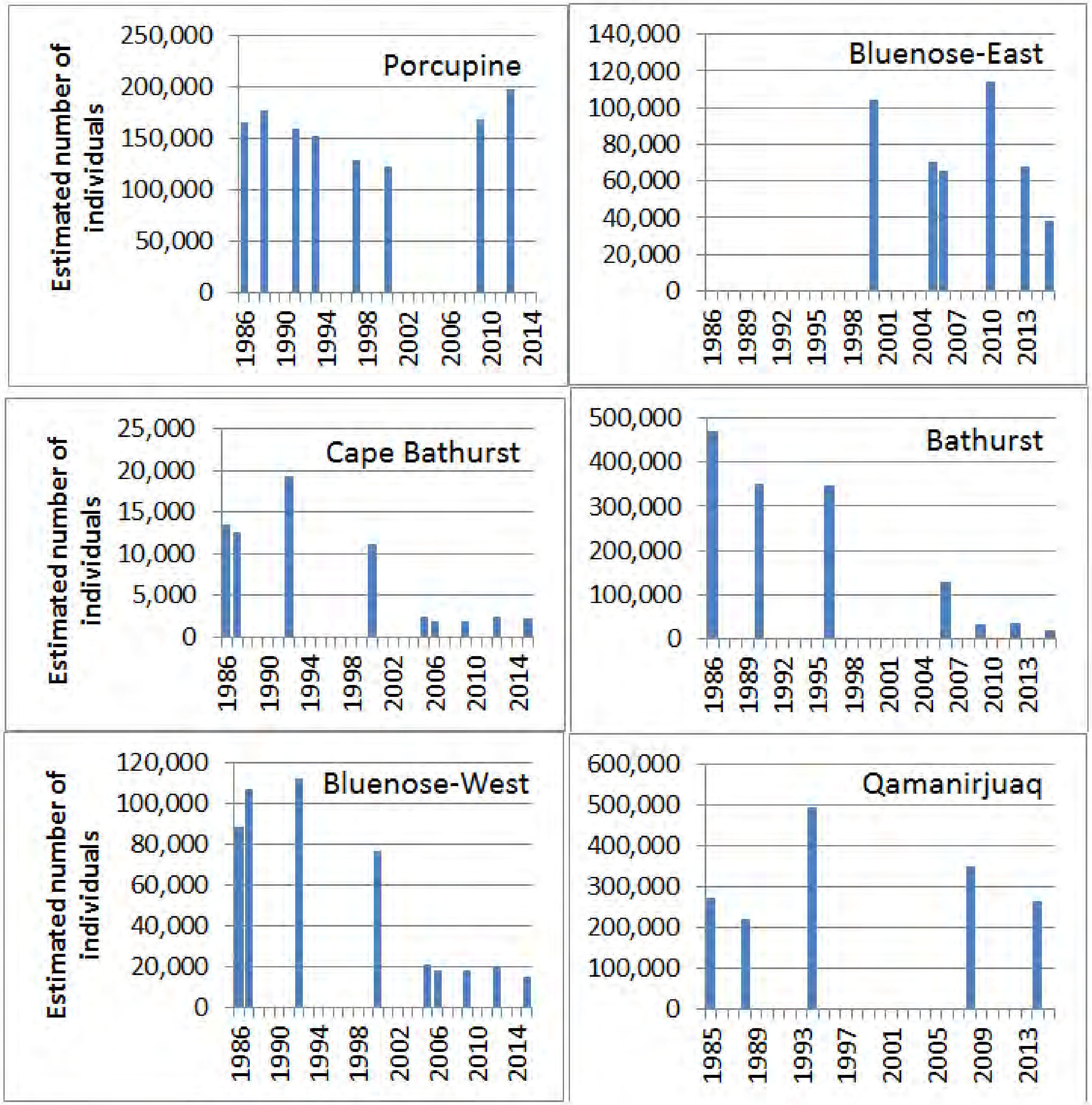
COSEWIC Assessment

- Assessed nationally by COSEWIC as Threatened in November 2016. This national assessment considers the status of Barren-ground Caribou across their entire Canadian distribution.
  - A Threatened species is a wildlife species that is likely to become endangered if limiting factors are not reversed.

Reason for Designation as Threatened

- **Most herds have declined dramatically**
  - Overall the decline is estimated at 56% over the past three generations of caribou (~27 years)
  - Currently around 800,000 Barren-ground Caribou, down from over 2 million in the early 1990s
  - Two herds are increasing: the Porcupine and Southampton Caribou Herds
  - Recognize that population levels naturally fluctuate, however there is no sign of recovery at this time

- **Meets criteria to be assessed as endangered (>50% decline) but COSEWIC is recommending Threatened status**
  - Recognize the initiation of numerous management actions by governments, wildlife management boards and communities
  - Barren-ground Caribou do not appear to be facing imminent extinction at this time



Available population survey numbers over three generations for six large and well-surveyed Barren-ground Caribou subpopulations, representing approximately 67% of the total population.

Reason for Designation as Threatened

- **Threats:**
  - Climate and Weather changes affecting: forage availability, predation, parasites and diseases
  - Industrial exploration and development
  - Fragmentation of habitat in winter range from forest fires and increasing human presence
  - Subsistence and sport harvest can be significant causes of mortality

What does it mean if Barren-ground Caribou are listed under the federal *Species at Risk Act*?

- Prohibitions against killing or harming Barren-ground Caribou will automatically come into force if the species is listed. However:
  - In the Territories, these automatic prohibitions only apply on federal lands that are under the authority of the Minister of the Environment or the Parks Canada Agency (eg. National Parks and National Wildlife Areas)
  - These automatic prohibitions do not apply to people engaging in activities in accordance with conservation measures under a land claims agreement
  - If any restrictions on harvest are needed under SARA, the Minister of the Environment will consult with impacted WMBs and Indigenous organizations

- Day-to-day management of Barren-ground Caribou will remain the responsibility of governments and co-management boards.

What does it mean if Barren-ground Caribou are listed under the federal *Species at Risk Act*?

- A recovery strategy and action plan(s) will be developed for Barren-ground Caribou

  - A recovery strategy is a planning document that:
    - Describes the species and its needs
    - Identifies the threats to the species and its habitat
    - Sets population and distribution objectives for the survival and recovery of the species
  - Provides a nationally consistent standard for conservation of species
  - Prepared in cooperation with Wildlife Management Boards and affected Indigenous organizations
  - Other existing plans can be adopted as part of the recovery strategy

- Critical habitat must be identified to the extent possible
  - Once identified, CWS will work with partners to find the best method to protect critical habitat from activities that would destroy it.

The species listing process under the federal *Species at Risk Act*

COSEWIC completes a species assessment **November 2016**

The Minister of the Environment receives species assessments from COSEWIC (usually once per year) **November 2017**

Review completed of the level of consultation and socio-economic analysis needed **January 2018**

Consultations **January - October 2018**

The Minister of the Environment forwards the COSEWIC assessment report and her recommendation to the Governor in Council

Governor in Council has nine months to decide whether or not to list the species or to refer the assessment back to COSEWIC for further information or consideration. During this time it is posted for a 30 day public comment period.

Species is added to SARA
Once a species is added to *SARA*, it benefits from prohibitions and recovery planning

Questions to Guide your Comments

- How do Barren-ground Caribou benefit you or the environment? (this can include economic, cultural, spiritual, and environmental benefits)
- Do any of your current or planned activities have the potential to kill, harm or harass Barren-ground Caribou?
- What are you currently doing or what could you do to avoid killing, harming or harassing Barren-ground Caribou?
- What impact do you think that listing Barren-ground Caribou as a wildlife species at risk would have on your activities?
- What impact do you think that listing Barren-ground Caribou as a wildlife species at risk would have on the species?
- Do you have any other information or concerns that the federal Minister of the Environment should consider before making a decision on the listing of the species?

Comments can be added to the questionnaire included in the information package

We want to hear from YOU!

- Consultation with partners on the proposed listing will be held between January and October 2018.

- Your comments and input are very valuable.

- If you would like a telephone call or face-to-face presentation of this material at a board meeting during the consultation period, please let us know by **April 13th, 2018**.

- Please complete the attached questionnaire and return to the Canadian Wildlife Service by **October 22nd 2018**.
  - Email: ec.sarnt-lepnt.ec@canada.ca
  - Fax: 867-873-6776

Caribou (Barren-ground population)

Photo: © Anne Gunn

Scientific name
Rangifer tarandus

Taxon
Mammals

COSEWIC Status
Threatened

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

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 ≥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 within five years.

Wildlife Species Description and Significance

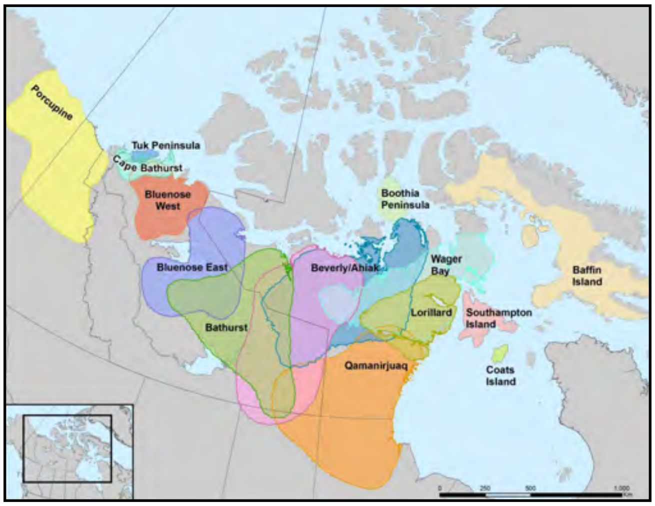
All the world's caribou and reindeer belong to a single cervid species, *Rangifer tarandus*, and are found in arctic and subarctic regions as well as in northern forests. Barren-ground Caribou are characterized by long migrations and highly gregarious behaviour, often travelling in groups of hundreds or thousands. As a relatively large herbivore with an extensive distribution and high numbers, Barren-ground Caribou is a keystone species, playing a key ecological and cultural role in northern ecosystems.

The significance of Barren-ground Caribou to the peopling of northern Canada is evident from archaeological findings tracking the distribution of people and Barren-ground Caribou relative to the retreating glaciers some 8,000 years ago in the central barrens and as long as 12-15,000 years ago in the central range of the Porcupine subpopulation. Barren-ground Caribou have been and continue to be a key resource for people in northern Canada; in some cases these animals have such importance that families would follow their migration. They have significant direct economic value from harvest, primarily for subsistence use. They also contribute to the northern economy through wildlife tourism and recreational hunting; beyond this, they have incalculable cultural value for people throughout the subpopulation ranges.

Distribution

The global range of Barren-ground Caribou extends from Alaska to western Greenland, and is continuous across northern continental mainland Canada, from northwestern Yukon to Baffin Island. The northern extent is the Arctic mainland coast; the southern extent is northern Saskatchewan, Alberta and Manitoba. Sampling efforts and methods have varied among subpopulations, leading to differences in interpreting subpopulation structure; 14-15 are recognized in this report. Some are combined for the purposes of generating population abundance and trend estimates, for a total of 13 units. Ten subpopulations have been consistently identified for the past several decades, mainly through fidelity to calving areas.

Fluctuating abundance of individual subpopulations affects distribution; as Barren-ground Caribou decline in abundance their distribution (especially during winter) changes, reducing the length of fall and pre-calving migration. Mainland subpopulations of Barren-ground Caribou generally migrate toward the Arctic coast to calve, and occur during summer and fall on the tundra of the Southern Arctic ecozone. Western and central mainland subpopulations usually winter in the boreal forests of the Taiga Cordillera, Taiga Plains or Taiga Shield ecozones.



Distribution of Caribou subpopulations in the Barren-Ground Caribou designatable unit. Map by Bonnie Fournier, GNWT.

Habitat

Habitat requirements are partly driven by the need for forage, which depends on the timing of the caribou's annual breeding cycle and its nutritional costs relative to the brief plant growing season and long winters of the sub-arctic and arctic regions. Caribou are generalist foragers, especially in summer, and select among grasses, sedges, shrubs and forbs for nutrient content according to the stage of plant growth rather than plant species. Barren-ground Caribou require large annual ranges (several hundred thousand square kilometres in size) to enable selection of alternative habitats in response to annual variations in the environment, such as snow cover, plant growth, and/or predation or parasite risk. Habitat attributes that are important for calving include those that reduce predation risk and maximize nutrition intake; these vary among calving grounds. Forage requirements depend on the timing of the annual breeding cycle relative to the brief plant growing season and long winter that is characteristic of the sub-arctic and arctic regions. On summer ranges, caribou seek habitats that reduce exposure to insect harassment, while obtaining high-quality forage. While most subpopulations winter in the boreal forest, several remain in tundra habitats at that time.

Within the previous three generations, there has been some reduction in habitat as a consequence of the natural fragmentation of the winter ranges caused by forest fires and increasing human presence (i.e., infrastructure) on the caribou ranges. However, habitat outside the forested winter range is still largely intact at the landscape scale. The generally increasing trends in human population will increase economic development (industrial development, roads and traffic) within Barren-ground Caribou ranges in the future.

Biology

Caribou usually first calve at three years of age, although they can calve at two years when conditions are favourable. Females give birth to a single calf and may breed every year, although if nutritionally stressed they do not conceive every year. Calving is highly synchronized, generally occurring over a 2-week period in June. The breeding system is polygynous. Annual migrations and gregarious behaviour are the most conspicuous characteristics of most Barren-ground Caribou subpopulations. They are adapted to a long winter season when

cold temperatures, wind chill and snow impose high energetic costs. Those costs are met through reducing their maintenance energy requirements and mobilizing fat and protein reserves.

Predation is an important factor affecting many facets of caribou ecology, as caribou movements and habitat choices are often made to minimize exposure to predators. An array of predators and scavengers depend on Barren-ground Caribou: Grizzly Bears (*Ursus arctos*) are effective predators on newborn calves, while Gray Wolves (*Canis lupus*, hereafter referred as Wolves) are predators of all sex and age classes throughout the year. Pathogens (including viruses, bacteria, helminths and protozoa) together with insects, play an important role in caribou ecology with effects ranging from subtle effects on reproduction through to clinical disease and death.

Population Sizes and Trends

The current population of Barren-ground Caribou is estimated at about 800,000 individuals. Between 1986 and mid-1990s, the overall trend was an increase to > two million, followed by a decline, which has persisted through today. Of 13 subpopulation units used to derive abundance estimates, eight are declining, two are increasing, and three are unknown. The median three-generation percentage decline in the total number of Barren-ground Caribou was 56.8% (range = -50.8 – -59.0%), based on the summed population change for seven subpopulations with sufficient survey data, which comprise almost 70% of the total current population. Four of these seven subpopulations declined by >80% during this period, one had a median decline of -39%, characterized by marked variability, whereas the remaining two increased. Available survey data for three additional subpopulations, representing about 25% of the total population, also suggest declines; the current trajectories of another three subpopulations are unknown, due to lack of recent surveys.

Evidence from ATK and scientific study suggests that Barren-ground Caribou subpopulations undergo periods of high and low numbers (fluctuations) that might resemble population cycles. The evidence is, however, insufficient to consistently infer a naturally occurring cyclic increase across the full range of subpopulations. Available demographic data, cumulative changes to the environment, habitats, and harvest regimes for many of these subpopulations are without historical precedent, such that it would be risky to assume there will be a naturally occurring recovery, at least to numbers recorded in the 1990s, for many of the subpopulations.

Threats and Limiting Factors

Climate and weather influence other limiting factors important for Barren-ground Caribou, including forage availability, predation, parasites and diseases – in complex non-linear and cascading ways. So many aspects of caribou ecology are affected by weather that a warmer climate could have a significant but complicated suite of positive and negative effects.

Industrial exploration and development in Barren-ground Caribou ranges has increased over the past several decades, such that there are several new mines and hundreds of prospecting permits, mineral claims and mineral leases on several subpopulation ranges. Subsistence and sport harvest can be significant causes of mortality that can increase the rate of decline and lead to a lower population size after populations have been reduced for other reasons. Chemical contaminant levels in tissues are generally low at present. The changing conditions on the caribou ranges also include the administrative and political complexity of a mix of settled and unsettled land claims, with changes in jurisdictional boundaries and mandates. The implementation of management actions is challenged by the inter-jurisdictional complexity between political, land management and wildlife management agencies, combined with the migratory nature of caribou and their use of extensive seasonal ranges.

Protection, Status, and Ranks

Protection of Barren-ground Caribou subpopulations by territorial and provincial jurisdictions is through harvest regulation and habitat protection. The co-management regime is a shared management responsibility among governments and bodies established through land claim legislation and through renewable multi-jurisdictional agreements among public governments (for the Porcupine, Beverly and Qamanirjuaq subpopulations). The Porcupine Caribou subpopulation is the only subpopulation of Barren-ground Caribou covered by an international agreement signed between Canada and the United States in 1987. The Barren-ground Caribou designatable unit (DU) was assessed for the first time by COSEWIC as Threatened in November 2016. It is currently not scheduled under the federal Species at Risk Act (SARA). The 2015 national general

status for Caribou in Canada will not be available until the 2015 General Status Report is published August 2017. This Canada-wide rank will apply to all DUs of Caribou combined, with nothing specific to Barren-ground Caribou. The 2015 territorial rank for Yukon for Barren-ground Caribou is Vulnerable to Apparently Secure, and for Northwest Territories is Sensitive. At present, there is no specific rank for Barren-ground Caribou for Nunavut; however, for all DUs combined, the territory-specific general status rank for Caribou in Nunavut is Apparently Secure. Federal protected areas that exclude industrial land uses but allow continued subsistence hunting cover about 6% of Barren-ground Caribou ranges, including eight national parks.

Source: COSEWIC. 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.

For more information, please visit www.sararegistry.gc.ca.

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TERRESTRIAL SPECIES – JANUARY 2018

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CONSULTATION ON AMENDING THE LIST OF SPECIES UNDER THE ***SPECIES AT RISK ACT***
TERRESTRIAL SPECIES

JANUARY 2018

Please submit your comments by

May 22, 2018, for terrestrial species undergoing **normal** consultations

and by

October 22, 2018, for terrestrial species undergoing **extended** consultations.

For a description of the consultation paths these species will undergo, please see:
www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=8CF7461F-1

Please email your comments to the Species at Risk Public Registry at:
ec.registrelep-sararegistry.ec@canada.ca

Comments may also be mailed to:
Director General, Assessment and Regulatory Affairs
Canadian Wildlife Service
Environment and Climate Change Canada
Ottawa ON K1A 0H3

For more information on the *Species at Risk Act*, please visit the Species at Risk Public Registry at:
www.registrelep-sararegistry.gc.ca

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ADDITION OF SPECIES TO THE *SPECIES AT RISK ACT*

Questions to guide your comments

The following questions are intended to assist you in providing comments on the proposed amendments to the List of Wildlife Species at Risk (see Table 1 for the list of species under consultation). They are not limiting, and any other comments you may have are welcome. We also encourage you to share descriptions and estimates of costs or benefits to you or your organization where possible, as well as to propose actions that could be taken for the conservation of these species.

Respondent information

1) Are you responding as
   a) an individual, or
   b) representing a community, business or organization (please specify)?

Species benefits to people or to the ecosystem

2) Do any or all of the species provide benefits to you or Canada's ecosystems? If so, please describe these benefits. If possible, please provide a monetary or quantitative estimate of their values to you.
   For example:
   - Do any or all of the species provide benefits by supporting your livelihood, for example, through harvesting, subsistence or medicine? If yes, can you estimate the extent of these benefits, for example, how often the harvest takes place, the quantity harvested, and the uses of the harvested species (e.g., medicine, food, clothes, etc.)?
   - Do any or all of the species provide cultural or spiritual benefits, for example, recreation, sense of place or tradition? If yes, how?
   - Do any or all of the species provide environmental benefits, for example, pollination, pest control or flood control? If yes, how?

Impacts of species listing on your activities and the ecosystem

3) Based on what you know about SARA and the information presented in this document, do you think that amending the List of Wildlife Species at Risk with the proposed listing (Table 1) would have:
   a) no impact on your activities or the species;
   b) a positive impact on your activities or the species; or
   c) a negative impact on your activities or the species.

Please explain your choice above, specifically:

4) Do you think that listing the species would result in cultural, social, or economic costs or benefits to you, your community or your organization?
5) Do you think that listing the species would result in any costs or benefits to the environment or Canada's ecosystems?
6) Based on the maps provided in this document, do any of your current or planned activities overlap with any of the species ranges or occurrences?
7) Do any current or planned activities that you are aware of (e.g., land conversion for natural resource, industrial, commercial, or residential development) have the potential to kill, harm, or harass the species and/or destroy any part of its habitat?
   - If yes, what are these activities, how would they affect the species, and/or destroy any part of its habitat?
   - If yes, what is being done, planned to be done, or could be done to avoid killing, harming, or harassing the species, or destroying its habitat? Please describe what implications and/or costs may be involved (qualitative or quantitative). Would you personally have to adjust or cease any activities?

Additional information for small businesses

If you are responding for a **small business**, please provide the following details to help Environment and Climate Change Canada gather information to contribute to the required Small Business Lens analysis that forms part of the Regulatory Impact Analysis Statement that will accompany any future listing recommendation.

1. Are you an enterprise that operates in Canada?
2. Do you engage in commercial activities related to the supply of services or property (which includes goods)?

3. Are you an organization that engages in activities for a public purpose (e.g., social welfare or civic improvement), such as a provincial or municipal government, school, college/university, hospital or charity?
4. Is your enterprise owned by a First Nations community?
5. How many employees do you have?
   a) 0–99
   b) 100 or more
6. What was your annual gross revenue in the last year?
   a) Less than $30,000
   b) Between $30,000 and $5 million
   c) More than $5 million

To ensure that your comments are considered in time, they should be submitted before the following deadlines.

For terrestrial species undergoing normal consultations, comments should be submitted by **May 22, 2018**.

For terrestrial species undergoing extended consultations, comments should be submitted by **October 22, 2018**.

To find out which consultation paths these species will undergo (extended or normal), please see: **www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=8CF7461F-1**

Comments received by these deadlines will be considered in the development of the listing proposal.

Please email your comments to the Species at Risk Public Registry at: **ec.registrelep-sararegistry.ec@canada.ca**

By regular mail, please address your comments to:

Director General, Assessment and
Regulatory Affairs
Canadian Wildlife Service
Environment and Climate Change Canada
Ottawa ON K1A 0H3

The *Species at Risk Act* and the List of Wildlife Species at Risk

The Government of Canada is committed to preventing the disappearance of wildlife species at risk from our lands. As part of its strategy for realizing that commitment, on June 5, 2003, the Government of Canada proclaimed the *Species at Risk Act* (SARA). Attached to the Act is Schedule 1, the list of the species provided for under SARA, also called the List of Wildlife Species at Risk. Extirpated, Endangered and Threatened species on Schedule 1 benefit from the protection afforded by the prohibitions and from recovery planning requirements under SARA. Special Concern species benefit from its management planning requirements. Schedule 1 has grown from the original 233 to 555 wildlife species at risk. In 2017, final listing decisions were made for 44 terrestrial species and 15 aquatic species. Of these 59 species, 35 were new additions, sixteen were reclassifications, three had a change made to how they are defined, two were removed from Schedule 1, one was referred back to COSEWIC for further evaluation and two were the object of ‘do not list’ decisions. In 2017, on the recommendation of the Minister of the Environment, the Governor in Council approved listing proposals for 45 wildlife species. It is proposed that 21 species be added to Schedule 1, 11 be reclassified, 12 would have a change made to how they are defined and one would be referred back to COSEWIC for further evaluation. The listing proposals were published in *Canada Gazette*, part I for a 30-day public comment period and final listing decisions for all 45 species are expected by August of 2018.

The complete list of species currently on Schedule 1 can be viewed at: **www.registrelep-sararegistry.gc.ca/species/schedules_e.cfm?id=1**

Species become eligible for addition to Schedule 1 once they have been assessed as being at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The decision to add a species to Schedule 1 is made by the Governor in Council further to a recommendation from the Minister of the Environment. The Governor in Council is the formal executive body that gives legal effect to decisions that then have the force of law.

COSEWIC and the assessment process for identifying species at risk

COSEWIC is recognized under SARA as the authority for assessing the status of wildlife species at risk. COSEWIC comprises experts on wildlife species at risk. Its members have backgrounds in the fields of biology, ecology, genetics, Indigenous traditional knowledge and other relevant fields. They come from various communities, including academia, Indigenous organizations, governments and non-governmental organizations.

COSEWIC gives priority to those species more likely to become extinct, and then commissions a status report for the evaluation of the species' status. To be accepted, status reports must be peer-reviewed and approved by a subcommittee of species specialists. In special circumstances, assessments can be done on an emergency basis. When the status report is complete, COSEWIC meets to examine it and discuss the species. COSEWIC then determines whether the species is at risk, and, if so, it then assesses the level of risk and assigns a conservation status.

Terms used to define the degree of risk to a species

The conservation status defines the degree of risk to a species. The terms used under SARA are Extirpated, Endangered, Threatened and Special Concern. Extirpated species are wildlife species that no longer occur in the wild in Canada but still exist elsewhere. Endangered species are wildlife species that are likely to soon become Extirpated or extinct. Threatened species are likely to become Endangered if nothing is done to reverse the factors leading to their extirpation or extinction. The term Special Concern is used for wildlife species that may become Threatened or Endangered due to a combination of biological characteristics and threats. Once COSEWIC has assessed a species as Extirpated, Endangered, Threatened or Special Concern, it is eligible for inclusion on Schedule 1.

For more information on COSEWIC, visit: **www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html**

On **October 24, 2017**, COSEWIC sent to the Minister of the Environment its newest assessments of species at risk. Environment and Climate Change Canada is now consulting on changes to Schedule 1 to reflect these new designations for these terrestrial species. To see the list of the terrestrial species and their status, please refer to tables 1 and 2.

Terrestrial and aquatic species eligible for Schedule 1 amendments

The Minister of Fisheries and Oceans conducts separate consultations for the aquatic species. For more information on the consultations for aquatic species, visit the Fisheries and Oceans Canada website at **www.dfo-mpo.gc.ca**.

The Minister of the Environment is conducting the consultations for all other species at risk.

Approximately 67% of the recently assessed terrestrial species at risk also occur in national parks or other lands administered by Parks Canada; Parks Canada shares responsibility for these species with Environment and Climate Change Canada.

Comments solicited on the proposed amendment of Schedule 1

The conservation of wildlife is a joint legal responsibility: one that is shared among the governments of Canada. But biodiversity will not be conserved by governments that act alone. The best way to secure the survival of species at risk and their habitats is through the active participation of all those concerned. SARA recognizes this, and that all Indigenous peoples and Canadians have a role to play in preventing the disappearance of wildlife species from our lands. The Government of Canada is inviting and encouraging you to become involved. One way that you can do so is by sharing your comments concerning the addition or reclassification of these terrestrial species.

Your comments are considered in relation to the potential consequences of whether or not a species is included on Schedule 1, and they are then used to inform the drafting of the Minister's proposed listing recommendations for each of these species.

Questions to guide your comments are included at the beginning of the document.

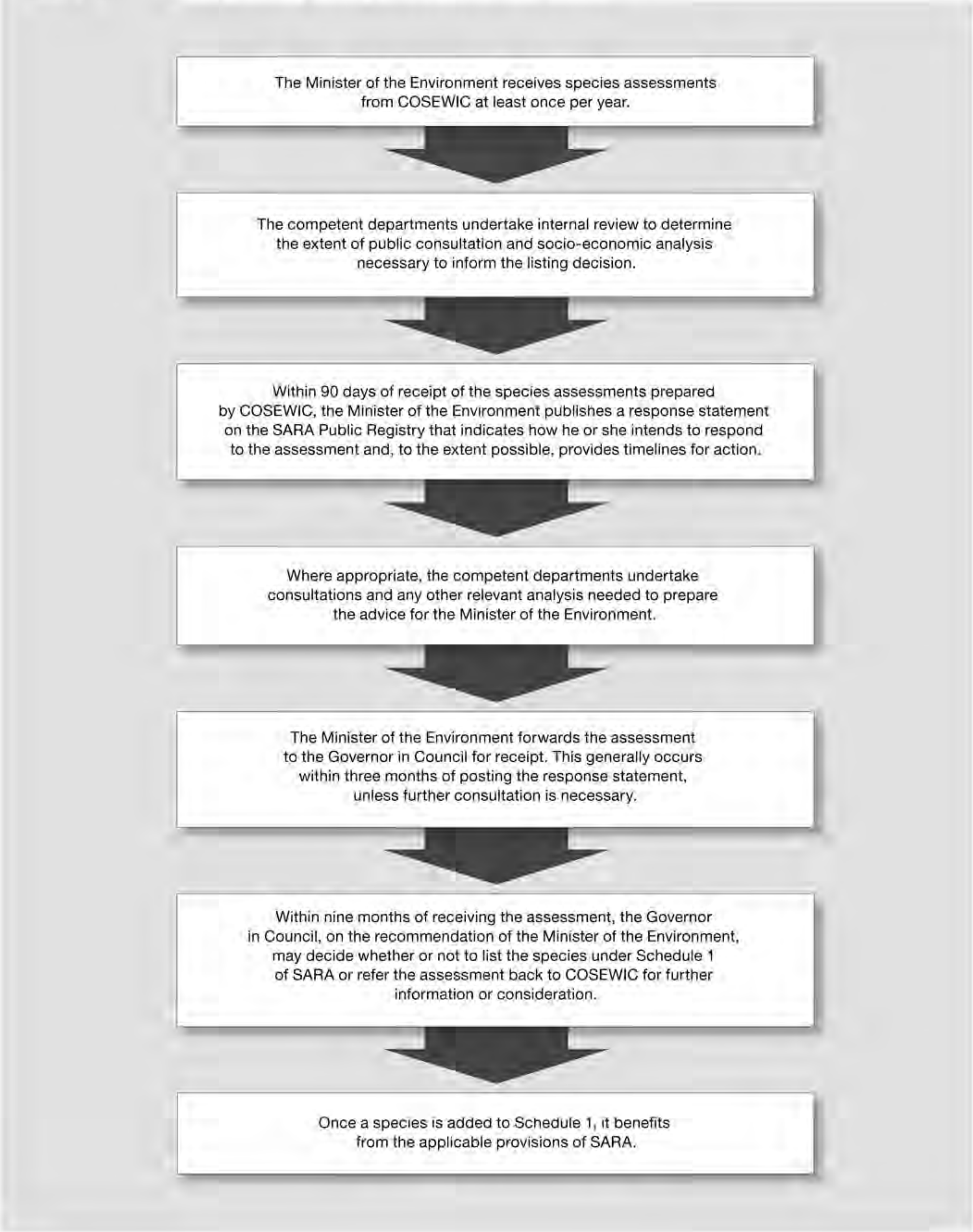
The *Species at Risk Act* listing Process and Consultation

The addition of a wildlife species at risk to Schedule 1 of SARA facilitates providing for its protection and conservation. To be effective, the listing process must be transparent and open. The species listing process under SARA is summarized in Figure 1.

The purpose of consultations on amendments to the List

When COSEWIC assesses a wildlife species, it does so solely on the basis of the best available information relevant to the biological status of the species. COSEWIC then submits the assessment to the Minister of the Environment, who considers it when making the listing recommendation to

Figure 1 : The species listing process under SARA



the Governor in Council. The purpose of these consultations is to provide the Minister with a better understanding of the potential social and economic impacts of the proposed change to the List of Wildlife Species at Risk, and of the potential consequences of not adding a species to the List.

Legislative context of the consultations: the Minister's recommendation to the Governor in Council

The comments collected during the consultations inform the Governor in Council's consideration of the Minister's recommendations for listing species at risk. The Minister must recommend one of three courses of action. These are for the Governor in Council to accept the species assessment and modify Schedule 1 accordingly, not to add the species to Schedule 1, or to refer the species assessment back to COSEWIC for its further consideration (Figure 1).

The Minister of the Environment's response to the COSEWIC assessment: the response statement

After COSEWIC has completed its assessment of a species, it provides it to the Minister of the Environment. The Minister of the Environment then has 90 days to post a response on the Species at Risk Public Registry, known as the response statement. The response statement provides information on the scope of any consultations and the timelines for action, to the extent possible. It identifies how long the consultations will be (whether they are "normal" or "extended") by stating when the Minister will forward the assessment to the Governor in Council. Consultations for a group of species are launched with the posting of their response statements.

Normal and extended consultation periods

Normal consultations meet the consultation needs for the listing of most species at risk. They usually take two to three months to complete, while extended consultations may take one year or more.

The extent of consultations needs to be proportional to the expected impact of a listing decision and the time that may be needed to consult. Under some circumstances, whether or not a species will be included on Schedule 1 could have significant and widespread impacts on the activities of some groups of people. It is essential that such stakeholders have the opportunity to inform the pending decision and, to the extent possible, to provide input on its potential consequences and to share ideas on how best to approach threats to the species. A longer period may also be required to consult appropriately with some groups. For example, consultations can take longer for groups that meet infrequently but that must be engaged on several occasions. For such reasons, extended consultations may be undertaken.

For both normal and extended consultations, once they are complete, the Minister of the Environment forwards the species assessments to the Governor in Council for the government's formal receipt of the assessment. The Governor in Council then has nine months to come to a listing decision.

The consultation paths (normal or extended) for the terrestrial species listed in Table 1 will be announced when the Minister publishes the response statements. These will be posted by **January 22, 2018**, on the Species at Risk Public Registry at: **www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=8CF7461F-1**

No consultations will be undertaken for those species already on Schedule 1 and for which no change in status is being proposed (Table 2).

Who is consulted, and how

It is most important to consult with those who would be most affected by the proposed changes. There is protection that is immediately in place when a species that is Extirpated, Endangered or Threatened is added to Schedule 1 (for more details, see below, "Protection for listed Extirpated, Endangered and Threatened species"). This immediate protection does not apply to species of Special Concern. The nature of protection depends on the type of species, its conservation status, and where the species is found. Environment and Climate Change Canada takes this into account during the consultations; those who may be affected by the impacts of the automatic protections are contacted directly, others are encouraged to contribute through a variety of approaches.

Indigenous peoples known to have species at risk on their lands, for which changes to Schedule 1 are being considered, will be contacted. Their engagement is of particular significance, acknowledging their role in the management of the extensive traditional territories and the reserve and settlement lands.

A Wildlife Management Board is a group that has been established under a land claims agreement and is authorized by the agreement to perform functions in respect of wildlife species. Some eligible species at risk are found on lands where existing land claims agreements apply that give specific authority to a Wildlife Management Board. In such cases, the Minister of the Environment will consult with the relevant board.

To encourage others to contribute and make the necessary information readily available, this document is distributed to known stakeholders and posted on the Species at Risk Public Registry. More extensive consultations may also be done through regional or community meetings or through a more targeted approach.

Environment and Climate Change Canada also sends notice of this consultation to identified concerned groups and individuals who have made their interests known. These include, but are not limited to, industries, resource users, landowners and environmental non-governmental organizations.

In most cases, it is difficult for Environment and Climate Change Canada to fully examine the potential impacts of recovery actions when species are being considered for listing. Recovery actions for terrestrial species usually have not yet been comprehensively defined at the time of listing, so their impact cannot be fully understood. Once they are better understood, efforts are made to minimize adverse social and economic impacts of listing and to maximize the benefits. SARA requires that recovery measures be prepared in consultation with those considered to be directly affected by them.

In addition to the public, Environment and Climate Change Canada consults on listing with the governments of the provinces and territories with lead responsibility for the conservation and management of these wildlife species. Environment and Climate Change Canada also consults with other federal departments and agencies.

Role and impact of public consultations in the listing process

The results of the public consultations are of great significance to informing the process of listing species at risk. Environment and Climate Change Canada carefully reviews the comments it receives to gain a better understanding of the benefits and costs of changing the List.

The comments are then used to inform the Regulatory Impact Analysis Statement (RIAS). The RIAS is a report that summarizes the impact of a proposed regulatory change. It includes a description of the proposed change and an analysis of its expected impact, which takes into account the results of the public consultations. In developing the RIAS, the Government of Canada recognizes that Canada's natural heritage is an integral part of our national identity and history and that wildlife in all its forms has value in and of itself. The Government of Canada also recognizes that the absence of full scientific certainty is not a reason to postpone decisions to protect the environment.

A draft Order (see Glossary) is then prepared, providing notice that a decision is being taken by the Governor in Council. The draft Order proposing to list all or some of the species under consideration is then published, along with the RIAS, in the *Canada Gazette*, Part I, for a comment period of 30 days.

The Minister of the Environment will take into consideration comments and any additional information received following publication of the draft Order and the RIAS in the *Canada Gazette*, Part I. The Minister then makes a final listing recommendation for each species to the Governor in Council. The Governor in Council next decides either to accept the species assessment and amend Schedule 1 accordingly; or not to add the species to Schedule 1; or to refer the species assessment back to COSEWIC for further information or consideration. The final decision is published in the *Canada Gazette*, Part II, and on the Species at Risk Public Registry. If the Governor in Council decides to list a species, it is at this point that it becomes legally included on Schedule 1.

Significance of the Addition of a Species to Schedule 1

The protection that comes into effect following the addition of a species to Schedule 1 depends upon a number of factors. These include the species' status under SARA, the type of species and where it occurs.

Protection for listed Extirpated, Endangered and Threatened species

Responsibility for the conservation of wildlife is shared among the governments of Canada. SARA establishes legal protection for individuals as soon as a species is listed as Threatened, Endangered or Extirpated, and, in the case of Threatened and Endangered species, for their residences. This applies to species considered federal species or if they are found on federal land.

Federal species include migratory birds, as defined by the *Migratory Birds Convention Act, 1994*, and aquatic species covered by the *Fisheries Act*. Federal land means land that belongs to the federal government, and the internal waters and territorial sea of Canada. It also means land set apart for the use and benefit of a band under the *Indian Act* (such as reserves). In the territories, the protection for species at risk on federal lands applies only where they are on lands under the authority of the Minister of the Environment or the Parks Canada Agency.

Migratory birds are protected by the *Migratory Birds Regulations*, under the *Migratory Birds Convention Act, 1994*, which strictly prohibits the harming of migratory birds and the disturbance or destruction of their nests and eggs.

SARA's protection for individuals makes it an offence to kill, harm, harass, capture or take an individual of a species listed as Extirpated, Endangered or Threatened. It is also an offence to damage or destroy the residence of one or more individuals of an Endangered or Threatened species or an Extirpated species whose reintroduction has been recommended by a recovery strategy. The Act also makes it an offence to possess, collect, buy, sell or trade an individual of a species that is Extirpated, Endangered or Threatened.

Species at risk that are neither aquatic nor protected under the *Migratory Birds Convention Act, 1994*, nor on federal lands, do not receive immediate protection upon listing under SARA. Instead, in most cases, the protection of terrestrial species on non-federal lands is the responsibility of the provinces and territories where they are found. The application of protections under SARA to a species at risk on non-federal lands requires that the Governor in Council make an order defining those lands. This can only occur when the Minister is of the opinion that the laws of the province or territory do not effectively protect the species. To put such an order in place, the Minister would then need to recommend the order be made to the Governor in Council. If the Governor in Council agrees to make the order, the prohibitions of SARA would then apply to the provincial or territorial lands specified by the order. The federal government would consult before making such an order.

Recovery strategies and action plans for Extirpated, Endangered and Threatened species

Recovery planning results in the development of recovery strategies and action plans for Extirpated, Endangered or Threatened species. It involves the different levels of government responsible for the management of the species, depending on what type of species it is and where it occurs. These include federal, provincial and territorial governments as well as Wildlife Management Boards. Recovery strategies and action plans are also prepared in cooperation with directly affected Indigenous organizations. Landowners and other stakeholders directly affected by the recovery strategy are consulted to the extent possible.

Recovery strategies must be prepared for all Extirpated, Endangered and Threatened species. They include measures to mitigate the known threats to the species and its habitat and set the population and distribution objectives. Other objectives can be included, such as stewardship, to conserve the species, or education, to increase public awareness. Recovery strategies must include a statement of the time frame for the development of one or more action plans that will state the measures necessary to implement the recovery strategy. To the extent

possible, recovery strategies must also identify the critical habitat of the species, which is the habitat necessary for the survival or recovery of the species. If there is not enough information available to identify critical habitat, the recovery strategy includes a schedule of studies required for its identification. This schedule outlines what must be done to obtain the necessary information and by when it needs to be done. In such cases, critical habitat can be identified in a subsequent action plan.

Proposed recovery strategies for newly listed species are posted on the Species at Risk Public Registry to provide for public review and comment. For Endangered species, proposed recovery strategies are posted within one year of their addition to Schedule 1, and for Threatened or Extirpated species, within two years.

Once a recovery strategy has been posted as final, one or more action plans based on the recovery strategy must then be prepared. These include measures to address threats and achieve the population and distribution objectives. Action plans also complete the identification of the critical habitat where necessary and, to the extent possible, state measures that are proposed to protect it.

Permits and agreements

For terrestrial species listed on SARA Schedule 1 as Extirpated, Endangered or Threatened, the Minister of the Environment may authorize exceptions to the Act's prohibitions, when and where they apply. The Minister can enter into agreements or issue permits only for one of three purposes: for research, for conservation activities, or if the effects to the species are incidental to the activity. Research must relate to the conservation of a species and be conducted by qualified scientists. Conservation activities must benefit a listed species or be required to enhance its chances of survival. All activities, including those that incidentally affect a listed species, its individuals, residences or critical habitat must also meet certain conditions. First, it must be established that all reasonable alternatives to the activity have been considered and the best solution has been adopted. Second, it must also be established that all feasible measures will be taken to minimize the impact of the activity on the listed species. And finally, it must be established that the activity will not jeopardize the survival or recovery of the species. Having issued a permit or agreement, the Minister must then include an explanation on the Species at Risk Public Registry of why the permit or agreement was issued.

Protection for listed species of Special Concern

While immediate protection under SARA for species listed as Extirpated, Endangered and Threatened does not apply to species listed as Special Concern, any existing protections and prohibitions, such as those provided by the *Migratory Birds Convention Act, 1994* or the *Canada National Parks Act*, continue to be in force.

Management plans for species of Special Concern

For species of Special Concern, management plans are to be prepared and made available on the Species at Risk Public Registry within three years of a species' addition to Schedule 1, allowing for public review and comment. Management plans include appropriate conservation measures for the species and for its habitat. They are prepared in cooperation with the jurisdictions responsible for the management of the species, including directly affected Wildlife Management Boards and Indigenous organizations. Landowners, lessees and others directly affected by a management plan will also be consulted to the extent possible.

THE LIST OF SPECIES ELIGIBLE FOR AN AMENDMENT TO SCHEDULE 1

Status of the recently assessed species and consultation paths

On **October 24, 2017**, COSEWIC submitted 28 assessments of species at risk to the Minister of the Environment for species that are eligible to be added to Schedule 1 of SARA. Thirteen of these are terrestrial species, and 15 are aquatic species. COSEWIC also reviewed the classification of species already on Schedule 1, in some cases changing their status. Four terrestrial species are now being considered for down-listing on SARA (to a lower risk status) and 3 terrestrial species are now being considered for a higher risk status on SARA. One species, the Sonora Skipper, is being considered for removal from the list, as it was found to be not at risk in its latest assessment. In all, 21 terrestrial species that are eligible to be added to Schedule 1, to be removed from Schedule 1, or to have their current status on Schedule 1 changed are included in this consultation (Table 1).

COSEWIC also submitted the reviews of species already on Schedule 1, confirming their classification. Twelve of these reviews were for terrestrial species. These species are not included in the consultations because there is no regulatory change being proposed (Table 2).

For more information on the consultations for aquatic species, visit the Fisheries and Oceans Canada website at **www.dfo-mpo.gc.ca**.

Providing comments

The involvement of Canadians is integral to the listing process, as it is to the ultimate protection of Canadian wildlife. Your comments matter and are given serious consideration. Environment and Climate Change Canada will review all the comments that it receives by the deadlines provided below.

Comments for terrestrial species undergoing normal consultations must be received by **May 22, 2018.**

Comments for terrestrial species undergoing extended consultations must be received by **October 22, 2018**.

Most species will be undergoing normal consultations. For the final consultation paths, please see **www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=8CF7461F-1** after **January 22, 2018**.

For more details on submitting comments, see the section “Comments solicited on the proposed amendment of Schedule 1” of this document.

Table 1: Terrestrial species recently assessed by COSEWIC eligible for addition to Schedule 1 or reclassification

Taxon	Species	Scientific Name	Range
Species eligible for addition to Schedule 1 (13)			
Endangered (4)			
Lichens	Golden-eye Lichen (Great Lakes population)	*Teloschistes chrysophthalmus*	ON
Mammals	Caribou (Eastern Migratory population)	*Rangifer tarandus*	MB ON QC NL
Mammals	Caribou (Torngat Mountains population)	*Rangifer tarandus*	NU QC NL
Molluscs	Eastern Banded Tigersnail	*Anguispira kochi kochi*	ON
Threatened (2)			
Birds	Lark Bunting	*Calamospiza melanocorys*	AB SK MB
Mammals	Caribou (Barren-ground population)	*Rangifer tarandus*	YT NT NU AB SK MB
Special Concern (7)			
Arthropods	Magdalen Islands Grasshopper	*Melanoplus madeleineae*	QC
Arthropods	Transverse Lady Beetle	*Coccinella transversoguttata*	YT NT NU BC AB SK MB ON QC NB PE NS NL
Birds	Evening Grosbeak	*Coccothraustes vespertinus*	YT NT BC AB SK MB ON QC NB PE NS NL
Birds	Harris's Sparrow	*Zonotrichia querula*	NT NU AB SK MB ON
Lichens	Golden-eye Lichen (Prairie / Boreal population)	*Teloschistes chrysophthalmus*	MB ON
Reptiles	Bullsnake	*Pituophis catenifer sayi*	AB SK
Vascular Plants	Long's Bulrush	*Scirpus longii*	NS
Reclassifications: Up-list (3)			
From Threatened to Endangered (2)			
Birds	Pink-footed Shearwater	*Ardenna creatopus*	BC Pacific Ocean
Reptiles	Blanding's Turtle (Great Lakes / St. Lawrence population)	*Emydoidea blandingii*	ON QC
From Special Concern to Endangered (1)			
Arthropods	Monarch	*Danaus plexippus*	NT BC AB SK MB ON QC NB PE NS NL
Reclassifications: Down-list or Delist (5)			
From Endangered to Threatened (2)			
Reptiles	Western Painted Turtle (Pacific Coast population)	*Chrysemys picta bellii*	BC
Vascular Plants	Spotted Wintergreen	*Chimaphila maculata*	ON QC
From Threatened to Special Concern (1)			
Vascular Plants	Anticosti Aster	*Symphyotrichum anticostense*	QC NB
From Endangered to Special Concern (1)			
Mosses	Rusty Cord-moss	*Entosthodon rubiginosus*	BC SK
From Special Concern to Not at Risk (1)			
Arthropods	Sonora Skipper	*Polites sonora*	BC

Table 2: Terrestrial species recently reassessed by COSEWIC (no consultations – species status confirmation)

Taxon	Species	Scientific Name	Range
Status Confirmations (12)			
Endangered (8)			
Arthropods	Gold-edged Gem	*Schinia avemensis*	AB SK MB
Birds	Burrowing Owl	*Athene cunicularia*	BC AB SK MB
Birds	Prothonotary Warbler	*Protonotaria citrea*	ON
Mammals	Ord's Kangaroo Rat	*Dipodomys ordii*	AB SK
Mosses	Nugget Moss	*Microbryum vlassovii*	BC
Reptiles	Blanding's Turtle (Nova Scotia population)	*Emydoidea blandingii*	NS
Vascular Plants	Butternut	*Juglans cinerea*	ON QC NB
Vascular Plants	Western Prairie Fringed Orchid	*Platanthera praeclara*	MB
Special Concern (4)			
Birds	Rusty Blackbird	*Euphagus carolinus*	YT NT NU BC AB SK MB ON QC NB PE NS NL
Mammals	Nuttall's Cottontail *nuttallii* subspecies	*Sylvilagus nuttallii nuttallii*	BC
Reptiles	Western Painted Turtle (Intermountain - Rocky Mountain population)	*Chrysemys picta bellii*	BC
Vascular Plants	American Hart's-tongue Fern	*Asplenium scolopendrium* var. *americanum*	ON

THE COSEWIC SUMMARIES OF TERRESTRIAL SPECIES ELIGIBLE FOR ADDITION OR RECLASSIFICATION ON SCHEDULE 1

For a brief summary of the reasons for the COSEWIC status designation of individual species, and their biology, threats, distribution and other information, please consult:

http://registrelep-sararegistry.gc.ca/document/default_e.cfm?documentID=3200

For a more comprehensive explanation of the conservation status of an individual species, please refer to the COSEWIC status report for that species, also available on the Species at Risk Public Registry at:

www.sararegistry.gc.ca

or contact:

COSEWIC Secretariat
c/o Canadian Wildlife Service
Environment and Climate Change Canada
Ottawa ON K1A 0H3

GLOSSARY

Aquatic species: A wildlife species that is a fish as defined in section 2 of the *Fisheries Act* or a marine plant as defined in section 47 of the Act. The term includes marine mammals.

Canada Gazette: The *Canada Gazette* is one of the vehicles that Canadians can use to access laws and regulations. It has been the "official newspaper" of the Government of Canada since 1841. Government departments and agencies as well as the private sector are required by law to publish certain information in the *Canada Gazette.* Notices and proposed regulations are published in the *Canada Gazette*, Part I, and official regulations are published in the *Canada Gazette*, Part II. For more information, please visit **canadagazette.gc.ca.**

Canadian Endangered Species Conservation Council: The Council is made up of federal, provincial and territorial ministers with responsibilities for wildlife species. The Council's mandate is to provide national leadership and coordination for the protection of species at risk.

COSEWIC: The Committee on the Status of Endangered Wildlife in Canada. The Committee comprises experts on wildlife species at risk. Their backgrounds are in the fields of biology, ecology, genetics, Indigenous traditional knowledge and other relevant fields. These experts come from various communities, including, among others, government and academia.

COSEWIC assessment: COSEWIC's assessment or re-assessment of the status of a wildlife species, based on a status report on the species that COSEWIC either has had prepared or has received with an application.

Down-listing: A revision of the status of a species on Schedule 1 to a status of lower risk. A revision of the status of a Schedule 1 species to a higher risk status would be up-listing.

Federal land: Any land owned by the federal government, the internal waters and territorial sea of Canada, and reserves and other land set apart for the use and benefit of a band under the *Indian Act.*

Governor in Council: The Governor General of Canada acting on the advice of the Queen's Privy Council for Canada, the formal executive body that gives legal effect to those decisions of Cabinet that are to have the force of law.

Individual: An individual of a wildlife species, whether living or dead, at any developmental stage, and includes larvae, embryos, eggs, sperm, seeds, pollen, spores and asexual propagules.

Order: An order issued by the Governor in Council, either on the basis of authority delegated by legislation or by virtue of the prerogative powers of the Crown.

Response statement: A document in which the Minister of the Environment indicates how he or she intends to respond to the COSEWIC assessment of a wildlife species. A response statement is posted on the Species at Risk Public Registry within 90 days of receipt of the assessment by the Minister, and provides timelines for action to the extent possible.

RIAS: Regulatory Impact Analysis Statement. A document that provides an analysis of the expected impact of a regulatory initiative and which accompanies an Order in Council.

Species at Risk Public Registry: Developed as an online service, the Species at Risk Public Registry has been accessible to the public since proclamation of the *Species at Risk Act* (SARA). The website gives users easy access to documents and information related to SARA at any time and location with Internet access. It can be found at **www.registrelep-sararegistry.gc.ca.**

Schedule 1: A schedule of SARA, also known as the List of Wildlife Species at Risk, which presents the list of species protected under SARA.

Up-listing: A revision of the status of a species on Schedule 1 to a status of higher risk. A revision of the status of a Schedule 1 species to a lower risk status would be down-listing.

Wildlife Management Board: Established under the land claims agreements in northern Quebec, Newfoundland and Labrador, Yukon, Northwest Territories, British Columbia, and Nunavut, Wildlife Management Boards are the “main instruments of wildlife management” within their settlement areas. In this role, Wildlife Management Boards not only establish, modify and remove levels of total allowable harvest of a variety of wildlife species, but also participate in research activities, including annual harvest studies, and approve the designation of species at risk in their settlement areas.

Wildlife species: Under SARA, a species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus. To be eligible for inclusion under SARA, a wildlife species must be wild by nature and native to Canada. Non-native species that have been here for 50 years or more can be considered eligible if they came without human intervention.

Canadian Wildlife Service
Environment and Climate Change Canada
PO Box 2310 – 5019 – 52nd Street
Yellowknife, NT X1A 2P7

22 January 2018

RE: Proposed Listing of **Barren-ground Caribou** under the federal Species at Risk Act as a Threatened species

The purpose of this package is to share information and get your feedback on the proposed listing of **Barren-ground Caribou** as a Threatened species under the federal *Species at Risk Act* (SARA).

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) completed the assessment of Barren-ground Caribou in November 2016 as a Threatened species. The assessment report was released in January 2018.

You are invited to submit comments on the potential impacts of amending the List of Wildlife Species at Risk according to this COSEWIC status assessment. Your comments will be considered and will inform the federal Minister of the Environment's recommendation on whether to add Barren-ground Caribou to the list of Species at Risk as a Threatened species.

We are sending you a narrated PowerPoint presentation, fact sheet and questionnaire about the proposed listing of Barren-ground Caribou. Please review these items and complete the questionnaire with input from your board / group members.

The COSEWIC status and assessment report is available for download at:
http://sararegistry.gc.ca/document/default_e.cfm?documentID=3189

We hope you will review the information in this package. If you have any additional questions, concerns or information that you feel should be considered in the listing decision, please let us know and we will follow up with you as needed. If you feel this package provides enough information for you to make a decision, please respond in writing to the Canadian Wildlife Service telling us your formal position on the proposed listing of Barren-ground Caribou as a Threatened species. You can either send us a letter or you can fill in the attached questionnaire.

There will also be an opportunity to provide comments during the 30-day public consultation period associated with pre-publication in Canada Gazette Part I.

Environment and Climate Change Canada | Environnement et Changement climatique Canada

If you would like to request a call-in or a face to face presentation of this material, please let us know by **April 13th, 2018**. Otherwise, we request your response by **October 22, 2018.**

If you have any questions about this process, please contact:

Amy Ganton, Species at Risk Biologist
Canadian Wildlife Service
P.O. Box 2310
Yellowknife, NT X1A 2P7
Phone: 867-669-4710
Fax: 867-873-6776
Email: ec.sarnt-lepnt.ec@canada.ca

Yours sincerely,

Christian Bertelsen
A/Regional Director | A/Directeur regional
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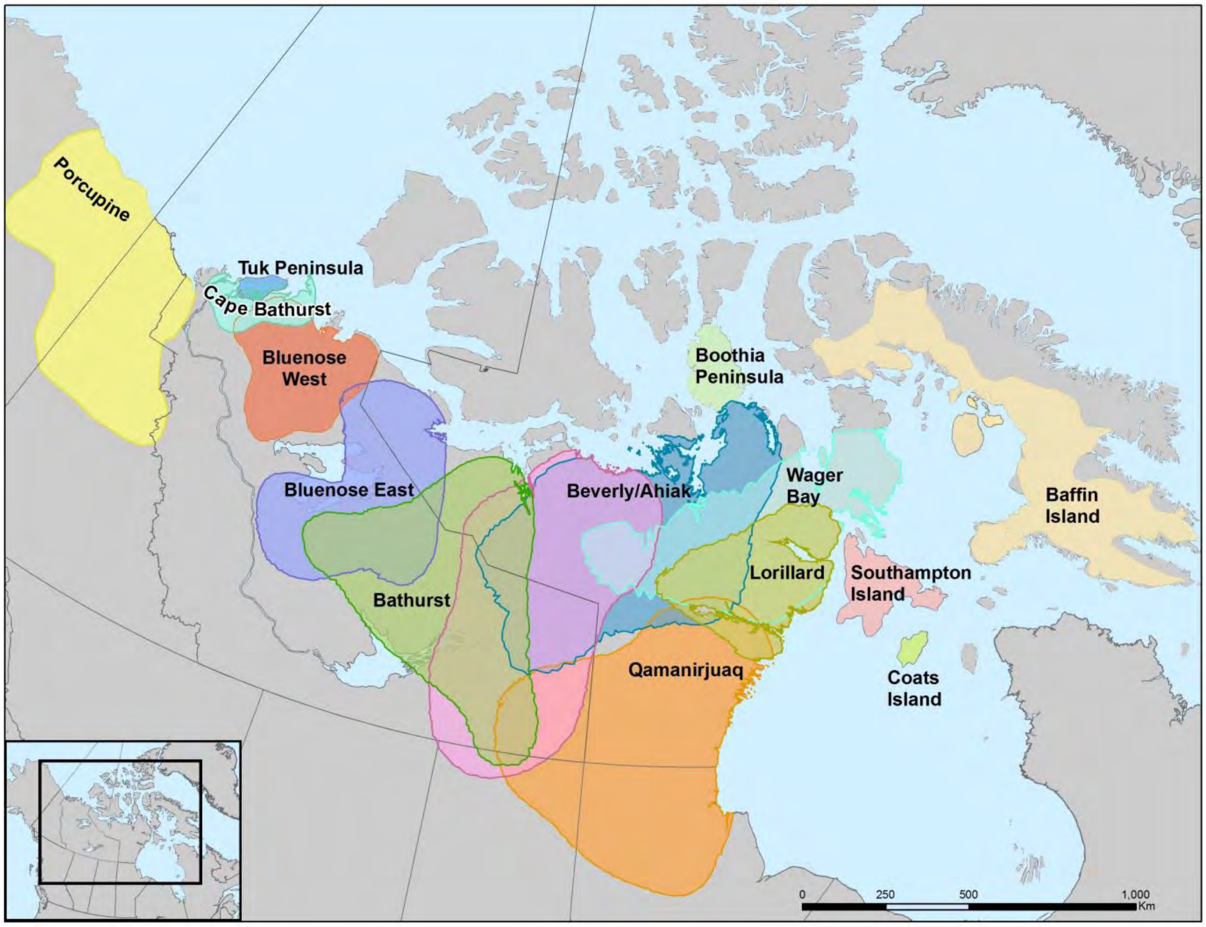


Figure 1. Distribution of Barren-ground Caribou subpopulations. Map by Bonnie Fournier, GNWT.

COSEWIC Wildlife Species Assessments, November 2016

https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html

Barren-ground Caribou | *Rangifer tarandus*

Status: Threatened

Last Examination and Change: Not applicable

Canadian Occurrence: YT, NT, NU

Photo © A. Gunn

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 ≥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 within five years.

Status History: Designated Threatened in November 2016

Environment and Climate Change Canada | Environnement et Changement climatique Canada

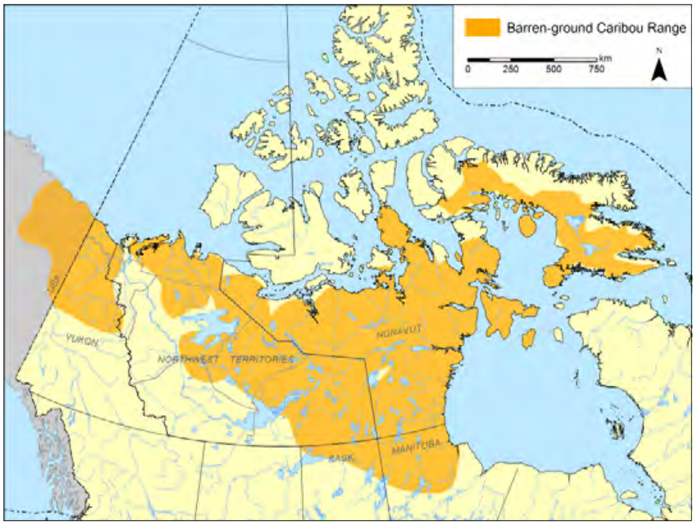
Submission to the Nunavut Wildlife Management Board

For

Information: X Decision:

Issue: Pre-listing consultations for the Barren-ground Caribou as Threatened under the federal *Species at Risk Act* (SARA)

Photo © A. Gunn



Background:

- Barren-ground caribou was assessed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November 2016.
- Barren-ground caribou are medium-sized and have longer legs than Peary caribou and Dolphin and Union caribou, but shorter legs than Boreal caribou. They have dark brown legs, backs and antler velvet, with a distinctive brown and white coat pattern in the fall.
- COSEWIC's reason for designation: Most of the Barren-ground caribou herds have declined dramatically. Overall, the decline is estimated at 56% over the past three generations. The Porcupine caribou herd is one of the few exceptions to this trend and is increasing. There are currently 800,000 Barren-ground caribou, down from over 2 million in the early 1990s.
- A number of threats are thought to be causing the decline, such as climate and weather changes that are affecting forage availability, predation, parasites and diseases. Some others are Industrial exploration and development, fragmentation of habitat in their winter range from forest fires and increasing human presence, as well as subsistence and sport harvests that are a significant cause of mortality.

Canada

- The decline of Barren-ground caribou is so drastic that it could have been assessed as Endangered. However, COSEWIC recommended the Threatened status in recognition of the numerous management actions that are being initiated by governments, wildlife management boards and communities, and because Barren-ground caribou do not appear to be facing imminent extinction at this time.
- In October 2017, COSEWIC submitted its assessment of the species to the Minister of the Environment. The Minister of the Environment will respond within 90 days, by posting a response on the SARA Public Registry. The response statement will indicate the scope of the consultation and timelines.
- Environment and Climate Change Canada (ECCC) will consult with the appropriate Minister(s), wildlife management boards and Indigenous organizations on changes to the List of Wildlife Species at Risk (Schedule 1) of the *Species at Risk Act* for terrestrial species.
- For species that are listed as Threatened, a recovery strategy is to be prepared within two years of the species' addition to Schedule 1 and added to the Species at Risk Registry. Recovery strategies are prepared in cooperation with the jurisdictions, wildlife management boards, and Indigenous organizations.
- If Barren-ground caribou are listed under the federal *Species at Risk Act* a national recovery strategy will be written that identifies the threats to the species and its habitat, and sets population and distribution objectives for the survival and recovery of the species. The national recovery strategy will identify critical habitat to the extent possible. After critical habitat is identified, CWS will work with partners to find the best method to protect the habitat from activities that would destroy it.
- Prohibitions against killing or harming Barren-ground caribou will automatically come into force if the species is listed. In the territories, these automatic prohibitions only apply on federal lands that are under the authority of the Minister of the Environment or the Parks Canada Agency, such as National Parks and National Wildlife Areas. As well, these automatic prohibitions do not apply to people engaging in activities in accordance with conservation measures under a land claims agreement.

Next Steps - Consultation Process:

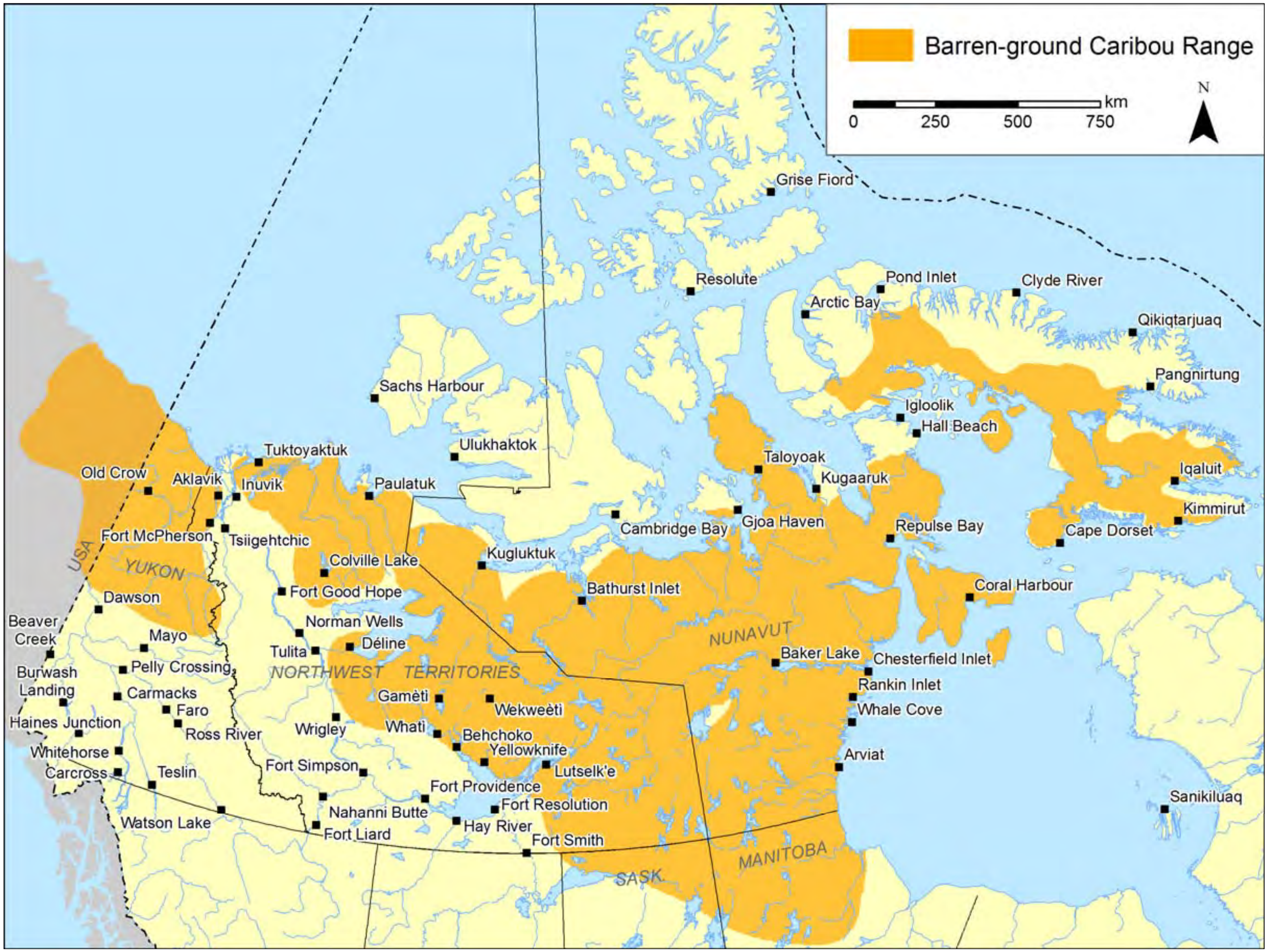
- Jurisdictions and wildlife management boards, including the NWMB and the Government of Nunavut, will be asked to review and provide input into the draft Terrestrial Issues Flagging (TIF) document, which outlines the species' current status, presence on the landscape, projected impact of listing, and issues flagged. This process helps inform the decision on the consultation timeline – normal or extended.
- It is expected that consultations on the proposed listing will be held between January and October 2018. Organizations such as hunters and trappers organizations (HTOs) and regional wildlife boards are asked to provide their formal position on the proposed listing (i.e. oppose, support or are indifferent) and with any other comments, concerns or information that they feel should be considered. ECCC will ask partners to provide feedback by April 30, 2018 in order for ECCC to follow up on any outstanding questionnaires or participation in meetings by October 2018.
- Given the range of the species, CWS plans to consult all Nunavut communities with the exception of Grise Fiord and Resolute Bay.
- Consultation packages, in Inuktitut and English, will be sent by mail and email, include: a letter, a PowerPoint, and a questionnaire. The full COSEWIC Assessment and Status Report will be provided in digital format in English only.
- To support consultations, CWS will extend an offer to provide more information, if requested, in the best means possible, including attending a board meeting by teleconference or in-person. A reminder email and

follow-up phone calls, to the extent possible, will be done to seek input from as many organizations as possible.

- Following consultations, CWS will summarize the consultation results and present them to the Board at the next quarterly meeting following the consultation period and seek NWMB's decision on the proposed listing of the species.

Request of the NWMB:

- That the NWMB provide Environment and Climate Change Canada with any feedback on the consultation process to obtain input and a decision on support from Hunters and Trappers Organizations for the proposed listing of Barren-ground Caribou as Threatened under the federal *Species at Risk Act*.



Barren-ground Caribou – Range

Prepared by: Amy Ganton, Species at Risk Biologist
Canadian Wildlife Service, Yellowknife, NT
Phone: 867-669-4710
Date Drafted: 2017-Nov-03

Beverly and Qamanirjuaq Caribou Management Board

Beverly and Qamanirjuaq Caribou Management Board

3 June 2021

Director General, Assessment and Regulatory Affairs
Canadian Wildlife Service
Environment and Climate Change Canada
351 St. Joseph Blvd
Gatineau, QC K1A 0H3

By email: ec.registrelep-sararegistry.ec@canada.ca
ec.leprpn-sarapnr.ec@canada.ca
ec.sarnt-lepnt.ec@canada.ca

BQCMB Support for Proposed Federal "Threatened" Listing of Barren-ground Caribou

I am writing to provide input from the Beverly and Qamanirjuaq Caribou Management Board (BQCMB or Board) about the proposal from Environment and Climate Change Canada (ECCC) to list barren-ground caribou as a "Threatened" species under the federal *Species at Risk Act* (SARA). I am pleased to report that at the May 11-13, 2021 meeting of the BQCMB, the Board passed the following motion:

> *"That the Board support designating barren-ground caribou as a Threatened species in Canada."*

This letter follows two previous submissions to the Species at Risk Public Registry by the BQCMB, in January and October 2019, which provided questions from board members about the listing proposal. We had indicated that we would comment more fully when the Board was able to develop a position on the proposal, but that would first require a response to our questions and concerns to reduce uncertainty about the implications of the listing proposal. The BQCMB received written responses to our questions from ECCC's Canadian Wildlife Service (CWS) on November 4, 2020 and our spring 2021 meeting was the first opportunity for board members to discuss them.

The BQCMB's understanding of the federal listing proposal for barren-ground caribou in Canada, and our ability to develop a position about the proposal, is based primarily on the information provided by CWS staff over the last three years (see Attachment). We appreciate the efforts that staff from both the Northern and Prairie regions of CWS have made to respond to the BQCMB's many questions and concerns. Written responses received in November 2020 to two of the BQCMB's key questions about the implications of listing for Indigenous harvesting rights (see Attachment) were particularly important to the Board's decision to support the listing proposal. It should be noted that the Board's decision is in part based on ECCC's assurance that the listing would not infringe on Indigenous harvesting rights and that there would be a legal Duty to Consult if any infringement of harvest rights is contemplated in the future. Our expectation is that full and meaningful consultation would be undertaken if this situation occurs.

BQCMB Secretariat: Box 629, Stonewall MB R0C 2Z0
Phone: 204-467-2438 E-mail: rossthompson@mymts.net Website: www.arctic-caribou.com

The BQCMB requests that if barren-ground caribou are listed as “Threatened”, a clear timeline and next steps for the process will be communicated to all relevant parties as soon as possible, and that ECCC honour the requirement to post a recovery strategy for public review and comment on the Species at Risk Public Registry within two years of listing.

The Board would welcome the opportunity to work on recovery planning with other regional wildlife boards, communities, and Indigenous organizations in the range of barren-ground caribou, as well as with all public governments with mandates for conservation and management of the species. We would expect the recovery strategy to incorporate Indigenous Knowledge and to focus on outlining measures required to reduce threats to barren-ground caribou and their habitat, identifying critical habitat, and developing stewardship and education objectives. We would also expect it to establish a time frame for developing action plans for implementing the strategy.

We would encourage ECCC to incorporate and support implementation of existing caribou conservation plans and strategies as much as possible during recovery planning to take advantage of substantive co-management planning efforts and to facilitate taking action to support caribou recovery as soon as possible. Plans and strategies relevant to Beverly and Qamanirjuaq caribou and their habitat include the Beverly and Qamanirjuaq Caribou Management Plan, the Recovery Strategy for Barren-ground Caribou in the NWT, the Draft Nunavut Caribou Strategy Framework, and the Nunavut Land Use Plan. In addition, we would ask that you also integrate Indigenous community protocols, management plans and stewardship frameworks that exist in communities around the caribou range. These are rich with knowledge and strategies and will ensure a balanced approach with the inclusion of Indigenous Knowledge.

The BQCMB appreciates the opportunity to take part in discussions about the federal listing proposal and looks forward to participating in the recovery planning process, should the listing go ahead. If you have any questions about the comments provided in this letter, please contact Ross Thompson, BQCMB Executive Director (rossthompson@mymts.net).

Sincerely,

Earl Evans
BQCMB Chair

cc.
Athabasca Denesuline Né Né Land Corporation (SK)
Kivalliq Wildlife Board (NU)
Lutsel K’e Dene First Nation (NWT)
Northlands Denesuline First Nation (MB)
Northwest Territory Métis Nation
Sayisi Dene First Nation (MB)
Government of Northwest Territories, Environment and Natural Resources
Government of Nunavut, Department of Environment
Manitoba Agriculture and Resource Development
Saskatchewan Ministry of Environment
Northwest Territories Conference of Management Authorities
Nunavut Wildlife Management Board

Attachment. Information sources considered by the BQCMB regarding proposed listing of barren-ground caribou in Canada under the federal SARA.

1) The consultation document that was widely circulated by ECCC in February 2018: "Consultation on Amending the List of Species under the Species At Risk Act - Terrestrial Species - January 2018".

2) Two in-person presentations by CWS staff to BQCMB board meetings in May 2018 and May 2019, with staff in attendance from both Northern and Prairie regional offices of CWS.

3) Two update presentations provided for BQCMB staff to present on behalf of CWS to the Board at its November 2018 and November 2019 meetings.

4) The extensive (19-page) written response received by the BQCMB from CWS Northern Region on November 4, 2020 to BQCMB questions submitted to the Species at Risk Public Registry in January and October 2019, and an update submitted directly to CWS Northern and Prairie region staff in December 2019.

Key BQCMB questions and ECCC responses regarding the implications of listing, excerpted from ECCC's written response received in November 2020:

BQCMB Question:

What are the implications of listing under SARA for harvesting opportunities and rights?

ECCC Response:

Indigenous harvesting:

No infringement of existing aboriginal or treaty *rights-based harvest by SARA is contemplated at this time. If any infringement of harvest rights were contemplated in the future, the Crown would have to first satisfy a legal Duty to Consult to explore ways to avoid or limit any infringements. As well as follow, existing processes i.e. NWMB as an example in Nunavut.*

BQCMB Question:

What impact would listing have on caribou harvesting in the following areas located on Beverly and Qamanirjuaq caribou range in Saskatchewan and Manitoba:

B. First Nation reserve lands

ECCC Response:

SARA's General Prohibitions on killing, harming, harassing, possession, etc. (sections 32 and 33) would take effect automatically on federal land once SARA-listed, as described in the ECCC response to BQCMB's General question # 2 above, including on Indian Reserves in the provinces. However, the Act would not abrogate or derogate from existing aboriginal or treaty rights as affirmed under s35 of the Constitution; therefore, if rights affirmed under s35 of the Constitution were being exercised on Indian Reserves in the provinces, then these rights would not be automatically affected by SARA's General Prohibitions. If any infringement of existing aboriginal or treaty rights-based harvest were contemplated in the future, the Crown would have to first satisfy a legal Duty to Consult to explore ways to avoid or limit any infringements.

Archived: November 3, 2021 4:11:54 PM
From: Svoboda, Michael (EC)
Sent: May 1, 2019 9:46:56 AM
To: Roberts, Hayley (EC); Tufts, Teresa (EC)
Subject: FW: Request for GN position on proposed listing of Barren-ground Caribou
Response requested: No
Sensitivity: Normal
Attachments:
BGCA_DecisionRequestLetter_GN_20190225.pdf

For your records

From: Gissing, Drikus <DGissing@GOV.NU.CA>
Sent: March 15, 2019 2:41 PM
To: Christian Bertelsen (bertelsenc@icloud.com) <bertelsenc@icloud.com>
Cc: Svoboda, Michael (EC) <michael.svoboda@canada.ca>; England, Kate <KEngland@GOV.NU.CA>; Smith, Caryn <CSmith@GOV.NU.CA>; SAR-NT/ LEP-NT (EC) <ec.sarnt-lepnt.ec@canada.ca>
Subject: FW: Request for GN position on proposed listing of Barren-ground Caribou

Dear Christian

The Government of Nunavut does not support the listing of Barren-ground caribou as Threatened under the Federal Species at Risk Act for the following reasons:

- Caribou populations are cyclical, and many herds are known to be at, or near, the low point in their cycles. Just because a population may be at a low point in a population cycle does not mean it is at risk.

- Potential threats to caribou populations include harvesting, habitat loss, and climate change. However the COSEWIC assessment does not present evidence that these potential threats are the cause of the decline in population size.

- Existing legal and other management tools and initiatives in Nunavut can adequately address the declines and recovery of the Barren-ground caribou herds. For example, the GN has enacted Total Allowable Harvests as a management tool for the Baffin Island, Bluenose East, Bathurst, and Southampton Island caribou herds. Similar measures can be put into place for the other Barren-ground caribou herds in Nunavut.

Please feel free to contact me if you need any additional information.

Regards
Drikus

From: SAR-NT/ LEP-NT (EC) [mailto:ec.sarnt-lepnt.ec@canada.ca]
Sent: March 1, 2019 2:05 PM

To: Gissing, Drikus
Cc: Svoboda, Michael (EC); Bertelsen, Christian (EC)
Subject: Request for GN position on proposed listing of Barren-ground Caribou

Dear Mr. Gissing,
Please find correspondence attached regarding a request for the Government of Nunavut's position and comments on the proposed listing of Barren-ground Caribou as a threatened species under the federal *Species at Risk Act*.
Thank-you,

Dawn Andrews

Species at Risk Biologist, Canadian Wildlife Service
Environment and Climate Change Canada / Government of Canada
dawn.andrews@canada.ca / Tel: 867-669-4767

Biologiste des espèces en peril, Service canadien de la faune
Environnement et Changement climatique Canada / Gouvernement du Canada
dawn.andrews@canada.ca / Tél: 867-669-4767

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June 24, 2021

Environment and Climate
Change Canada
Attn.: Hayley Roberts

Re: Kitikmeot Regional Wildlife Board Position on the Environment and Climate Change Canada Proposal to List the Barren-ground Caribou as Threatened Under the Federal Species at Risk Act

I am writing this today to inform Environment and Climate Change Canada (ECCC) that the Kitikmeot Regional Wildlife Board (KRWB) met via conference call yesterday (June 23rd) to discuss the proposed listing.

KRWB does not support the proposed listing. The information that ECCC has provided is not enough for KRWB and its HTOs to make an informed decision on the proposal. ECCC did not provided sufficient evidence that the proposed listing is relevant for all herds (e.g., some are declining while others are increasing). Biological surveys reporting abundance estimates and trends are also herd specific, and the reliability of trend data on each herd varies. Herds are also managed individually.

It is unclear how the proposed listing incorporates or considers Inuit traditional knowledge, Inuit *qaujimajatuqangit*, and/or socioeconomic impacts in the Kitikmeot region. Consultations with Inuit traditional knowledge holders and elders were inadequate (did not include all affected Kitikmeot communities). It should also be made clear how the proposed listing and SARA affects or at minimum influences Inuit rights to hunting and relationships to caribou.

Kitikmeot Regional Wildlife Board
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Taloyoak

I'd like thank you for allowing us time to respond.

Yours truly,

Patt Kgulal for Paul

Paul Ikuallaq
Chairman

CC. Kitikmeot HTO's
Peggy Adjun, Project Coordinator KRWB
Bert Dean, NTI
Pamela Wong, KRWB

Please fax this form to 867-9754645 or email it to hayley.roberts@canada.ca

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Do you have any additional comments?

Some points to consider:

- How do Barren-ground Caribou benefit you or the environment? (this can include economic, cultural, spiritual, and environmental benefits)
- Do any of your current or planned activities have the potential to kill, harm or harass Barren-ground Caribou?
- What are you currently doing or what could you do to avoid killing, harming or harassing Barren-ground Caribou?
- What impact do you think that listing Barren-ground Caribou as a wildlife species at risk would have on your activities?
- What impact do you think that listing Barren-ground Caribou as a wildlife species at risk would have on the species?
- Do you have any other information or concerns that the federal Minister of the Environment should consider before making a recommendation on the listing of the species?

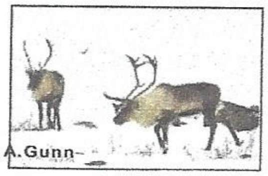
More surveys are needed for all Barren-ground caribou to determine population trends and trajectories. More consultations with Inuit representatives, e.g., elders, HTOs and harvesters are needed. Consultations need to take into account the time and capacity for communities to make an informed decision.

More background information, including scientific evidence that was used to warrant the listing, should be provided from Environment and Climate Change Canada to the Kitikmeot Regional Wildlife Board and HTOs. The Kitikmeot Regional Wildlife Board and its HTOs need time to review the information, especially in light of the pandemic that did not allow for face-to-face meetings. Evidence for how traditional knowledge from the Kitikmeot region has been considered in the proposed listing is necessary. More discussions need to occur between ECCC and HTOs/RWOs.

Based on the information provided it is unclear how the proposed listing will impact Inuit relationships to caribou, beyond TAH but also traditional relationships with and perceptions of caribou, and continued access to cultural traditions and practices.

It's best to have face to face mtg to discuss this important topic ASAP.

[signature] for KRWB. V.Chair



Canada

Region	Status of consultations	Communities/Organizations Consulted	Dates
Northwest Territories	Complete. Decisions of support received from all WMBs.	Acho Dene Koe First Nation, Akaitcho Territory Government, Akaitcho Treaty 8 Tribal Corporation, Aklavik Indian Band, Aklavik HTC, Aklavik Northwest Metis Council, Ayoni Keh Land & Dugha Financial Corporation (SSI), Behdzi Ahda First Nation, Behchoko Community, Charter Community of Deline, Charter Community of Tsiigehtchic, Deh Gah Got'ie First Nation, Deline Land & Financial Corporation, Deline First Nation, Deline Renewable Resource Council, Dene Nation, Deninu Kue First Nation (Fort Resolution), Ehdiitat Gwich'in Council, Fort Good Hope Renewable Resource Council, Fort Good Hope Metis Local #54 , Fort McPherson Metis Local #58, Fort Norman Metis Land Corporation, Gwich'in Tribal Council, Gameti Community Government (Tlicho), Gwich'in Land and Water Board, Gwich'in Social and Cultural Institute, Gwich'in Land Use Planning Board, Gwich'in Renewable Resource Council, Gwichya Gwich'in Council, Gwichya Gwich’in RRC (Tsiigehtchic), Hamlet of Aklavik, Hamlet of Fort McPherson, Hamlet of Tuktoyaktuk, Hamlet of Tulita, Hamlet of Paulatuk, Inuvialuit Joint Secretariat, Inuvialuit Land Administration, IGC, Inuvik HTC, IRC, K'asho Got'ine Charter Community Council, Ka'a'gee Tu First Nation, Lutsel K'e Wildlife Lands and Environment Committee, Nihtat Gwich'in Council, Norman Wells Land Corporation, Sahtu Dene Council & Sahtu Secretariat Inc., Sahtu Land & Water Board, Sahtu Land Use Planning Board, Sahtu Secretariat Incorporated, Tetlit Gwich’in Tribal Council, Tlicho Government , Town of Norman Wells, Tsiigehtchic Metis Local #63, Tulita Band Council, Wek'eezhii Land and Water Board, Xahweguweh Financial / Yamoga Land Corporation (SSI), Lutsel K'e Dene First Nation, Nihtat Gwich’in Renewable Resource Council (Inuvik), Norman Wells Renewable Resource Council, North Slave Metis Alliance, Paulatuk HTC, Pehdzeh Ki First Nation,	January 2018 - June 2019

		Sahtu Renewable Resource Board, Tetlit RRC (Fort McPherson), Tuktoyaktuk HTC, Tulita Renewable Resource Council, Wek'eezhii Renewable Resource Board, Wekweeti Community, Wha Ti Community, WMAC(NWT), Yellowknives Dene First Nation (Dettah), Yellowknives Dene First Nation (N'Dilo)	
Yukon	Complete. Decisions of support received from all WMBs.	Nacho Nyak Dun, Tr'ondek Hwech'in, Vuntut Gwitchin, Yukon Fish and Wildlife Management Board, Wildlife Management Advisory Council (North Slope), Porcupine Caribou Management Board, Dawson District Renewable Resources Council, Mayo Renewable Resources Council, North Yukon Renewable Resources Council, Yukon Government, Procupine Caribou Native User Agreement Working Group	January 2018 - February 2019
Manitoba	Nearing completion; awaiting verification of community comments	First Nations and Metis in northern Manitoba, Beverly & Qamanirjuaq Caribou Management Board	March 2019 - present
Saskatchewan	Nearing completion; awaiting verification of community comments	First Nations in northern Saskatchewan, Beverly & Qamanirjuaq Caribou Management Board	September 2018 - present

Topics, concerns and comments	Nunavut																					
	Qikiqtaaluk										Kitikmeot					Kivalliq						
	Pangnirtung	Qikiqtarjuaq	Clyde River	Pond Inlet	Arctic Bay	Cape Dorset	Hall Beach	Igloolik	Iqaluit	Kimmirut	Kugluktuk	Cambridge Bay*	Taloyoak	Kugaaruk	Gjoa Haven	Rankin Inlet	Arviat	Whale Cove	Coral Harbour	Naujaat	Chsterfield Inlet	Baker Lake
1. SARA listing process: consultation & engagement *COSEWIC process:* *-Lack of traditional knowledge and engagement in the assessment and decision-making process.* *-Many different herds and kinds of BGCA and they should be assessed separately.* *SARA process* *-Local caribou expert(s) are needed in the consultation meetings and during reporting.* *-IQ needs to be better valued in the process.* *-Many individuals do not support the listing as Threatened.* *-Listing is premature. Request to extend listing decision deadline in order to complete additional population surveys, work on management plans and discuss with elders.*																						
COSEWIC assessment report																						
HTO and community members expressed strong concerns about the lack of Inuit participation and traditional knowledge in the assessment of Barren-ground caribou and the decision-making process.			II	II	II	I	I	III	I	I	II	~~IIII~~ I			I							
There are many different kinds of Barren-ground caribou and they should be placed in different categories/looked at separately (herd by herd).			II	II				II	III	IIII	II	~~IIII~~ II				II				I		
Lack of understanding of who completes the assessments/COSEWIC Process	I				I					I	I	III			I							
Prince Charles Island herd should be surveyed with Baffin Island herd. Too many caribou migrating there.							I															
Lack of understanding of why it was assessed as Threatened right away instead of Special Concern.								III														I
Questioning why COSEWIC presented to government prior to the Inuit.										I												

It is a large area to cover and there should be a boundary between North and South Baffin Island.									I													
More information should be given in the assessment report on how populations are calculated within the different regions.								I														
Concerns over lack of surveys to inform assessment												~~IIII~~ III	IIII									
Want to be apart of the COSEWIC process													I									
More frequent assessment (every 2 years)												I										
Who is on the COSEWIC committee?															I					I	II
Confused as to the definition of "threatened" in Inuktitut																		I				
They are combining all of the caribou? Herds lumped together																				I	II
Does COSEWIC use IQ?															I						I
Is BQCMB part of the COSEWIC review?																					I
Want more capacity building at the species selected stage																					I
Where does COSEWIC get their list of species																					I
There should be an option for COSEWIC to have a final kick at the can before the final report stage. Then they would have all of the comments. Was there ever a thought of adding a loop to ensure the partners have another opportunity																					I
Western Science and IQ don't match up																					I
How is the Alaskan Porcupine Caribou herd included?																					I
How many COSEWIC subcommitees are there?																					I
Concerned about not being involved at the beginning																					IIII
Inuit should be included in the drafting of the report																					I
Don't see a low population as meaning the animals are threatened										I											
SARA process																						
Inuit want to be involved in the drafting of the recovery strategy/involved in the management plan.			I	I							X										
Consultation presentation should address what the impacts/benefits to Inuit are (including Inuit economic gain).								II														
SARA to lobby for stop of destruction of land through industry instead of putting a restruction on Inuit.								I														
This is our land and we need to be listened to.					I				I														

Caribou experts needed in consultation meetings and in reporting (someone local, perhaps from GN).	II					I			I													
SARA should give examples of when the Act has worked so that Inuit can have facts that build confidence in process.									I													
Need better science prior to listing.									I													
IQ needs to be better valued in the process.	I			II	I	I		I	III													
There needs to be more communication with the community and its members about the caribou.	I																					
Listing is premature. Request to extend listing decision deadline. (to complete additional population surveys, to work on plans to manage caribou and discuss with elders)					IIII			I														
Do not support listing.			I		III	~~IIII~~ IIII	III	I	I	I												
ECCC do the consultations just to fulfill "duty to consult" but after listing, the Inuit won't matter anymore.				I				I														
Support listing as long as harvest rights aren't affected.				I																		
Expressed concern that all invited stakeholders didn't attend consultation (GN, NTI, etc.)						I				I												
Want to sit together with other communities to be consulted. (so that we don't just oppose one another)							I															
When socioeconomic considerations enter the picture, it has to consider more about the people and how it will affect our life, not just the economy. The people whose lives will be affected by the listing need to take precedence over what the people from the South are saying.								I														
Community members not happy to be discussing other herds/subpopulations. Only want to discuss their caribou.										II										I		
Expressed doubts about COSEWIC and government expertise.										I												
Support listing if it will help increase caribou numbers.										I												
Would like 5 year warning to prepare for change to tags and harvesting															I							
HTO/community wants to be involved in the process														I	II							
Want more transparency in the process															I							
Want to hear what other regions are talking about															I							
Want to form a recovery strategy committee															I							

Not enough time to make a decision on listing/short notice													I	II						I		
Not enough data to make a decision													III									
Agree with listing (community member)													I									
Want restrictions on mining when listed													III									
Can recovery strategy be on a herd by herd basis																I						
If we agree to listing we look weak																I						
Can only decide on the listing based on the herds in their area																I						
At the NWMB public hearing maybe then can provided comments/suggestions/options																		I				
Thanked us for coming																			I			I
Will there be other opportunities to throw around ideas?																						I
Who is reponsible for a management plan/recovery strategy?																						II
Once the process starts can we get out of it?																						I
What are the timelines, when is the next assessment?																						I
Have you consulted with leaders in NWT, where BGCA is listed as Threatened																						I
Federal government should revisit their northern policy, build capacity, stations across their winter areas																						I
Want to know about which herds were included, which listed																			I			
Ensure IQ has proper representation at the different tables																						I
Waiting to hear back from surveys before decision can be made																					II	
Glad we are not rushing, and that we are taking the time to allow them to think																						I
Can we put them at a lower level in the future																						I
Listing the species would give more power to protcction, to manage the lands																						I
What have the positions been of GN, NTI, KIA?																						I

2. Population health and trends

Caribou populations undergo natural cycles and will eventually go up on their own.
-Caribou are not threatened.
-High caribou abundance results in die-offs due to lack of vegetation to feed on (hence the population cycles).

Good conditions or related to cycles

Caribou populations undergo natural cycles and will eventually go up on their own.	I	II	III	I	~~IIII~~ II		~~IIII~~	~~IIII~~ I	II	II								I	III			I
Kivalliq region not threatened.									I													
Kitikmeot region not threatened.									I													
There are more caribou today than in the past.	III												I	II								
Caribou are not declining.		I								I			I				I					
Caribou are not threatened.	III					I	I			I												
Population is increasing.						I		I		II											I	
The Bathurst herd is not endangered												I										
Their herds are not declining													II				I					
Caribou are not at risk													I							I		
Caribou populations have crashed in the past but then increased													I									
population is stable/healthy																	I				I	
Numbers may bounce back																I						
Our population is increasing																				I		
There used to be lots of caribou, then hardly any, now there are lots again																				I		
When population increases too much, the disease comes and causes the population to decrease again																			I			
Naujaat herd is in good health																				I		
Inuit have never hunted any animal to extinction											I											
Eggs from the land, produced from the earth will prevent extinctions											I											
Poor conditions																						
Caribou are declining in the area.		I			I					II			I									I
Coral Harbour herd is declining.										I												
The estimate of 2 million caribou in 1990s is an exaggeration.				II																		
Less caribou in the summer													II									
Caribou are threatened													I									
Caribou have declined in the past													I									
People arent catching as much as before																	I					
Heard Baffin herd has declined																			II			

Community is aware of the decrease																			I			
Concerns																						
Concerns about length of time it will take population to recover.										I												
High abundance results in die-offs due to limited vegetation.										III												
Don't want to see/hear that the caribou are threatened or extinct (would not be good to lose caribou).	I							I		II												
Concerned about tha low numbers in the Baffin region																			I			
When herd numbers are low it is easier to damage the herds																	I					
Concerned that there may not be a full recovery																	I					
Behaviour																						
Population is wide-ranging and there are likely more caribou in South Baffin area than Pond Inlet and Arctic Bay.										I												
Caribou use scent to follow previous migration routes																	I					
Migrate to Igloolik on mainland, then return to Baffin Island as part of their cycle.					I																	
3. Population distribution *Caribou are always moving and migrating, which leads to more or fewer observations in different areas.* *-Populations will move on to other areas once they have eaten all the vegetation in one area.* *-Caribou will eventually return to an area.*																						
Caribou are always moving. (leading to more/less observations in different areas)	IIII	I	II	I	III	~~IIII~~	I	III						II	I		II			II	I	
In 1970's would see vast herds moving north (in May)																	I					
Middle of Baffin Island is not suitable for caribou with the sharp rocks.		I																				
Elder knowledge indicates that populations move on to other locations once they have eaten all the vegetation in one spot.		II			I	~~IIII~~ I	II	II		I				I								
Caribou move away but will come back to the same area later.		II				II	II							~~IIII~~	~~IIII~~							
There are caribou around the Baffinland mine.					I																	
Used to hunt inland, now caribou are a lot closer.							I															
There are different types of caribou on Baffin Island, likely migrating caribou.										II												
Hunters have to travel further or in new areas to find caribou/ caribou have moved											I	I	II		II		I					

In the past caribou herds converged (e.g. herd east of Kugluktuk and Bluenose from west side)											I											
Boothia Peninsula herd is not separate from Ahiak. They are one/they mix													II		II							
Caribou timing has changed (returning later)															I							
Elder knowledge states caribou change locations and fluctuate in numbers														III	I							
Elder knowledge states that the caribou get sick and that leads to changes in population															I							
Caribou are closer to the community lately compared to the past														I								
The herds are mixing													I	III								
The Boothia Herd no longer exists, it did in the past but now it is merged with Ahiak													IIII									
Peary caribou on Boothia mixed with Barren-ground Caribou in the past													I									
Caribou migration route has changed													I				III					II
Caribou migration has changed because of predators																	I					
Migration has changed because of the road (Maguse Road)																	II					
They are not together now, they are scattered all over the place																	I					
In a different area to find a good foraging area																I						
Used to have large groups of caribou by Anada? Lake Aera, but no longer																	I					
Caribou are moving from Baffin to Southampton using an ice bridge																I						
Increase in population because going back to where they were before																I					I	
The map you are using is different than what we have seen																				I		
Caribou are coming from Coral Harbour to the land and going back, know using the fat of the caribou																				I		
Southampton caribou were imported in the 1970's from the mainland.																						I
Rutting too early																				I		

4. Threats

Wolves are a significant threat, but other threats include mines, icing events, diseases and parasites.
Helicopters frighten and disturb caribou, leading them to other areas.

Predators																						
Wolves are a threat (seeing more)	II	I	I		~~IIII~~	III	III			III	II	IIII	IIII	IIII	~~IIII~~	I	III	I			II	I
Polar bear population is growing and scaring the caribou away.		I															I					
Wolverine are a threat (seeing more)					I						I			I	I	I	III	I			II	II
Concerns about predators moving up further north due to climate change.			I																			
Grizzly Bear is a threat (seeing more)											II	III			III	I	~~IIII~~				II	
Eagles catch calves																I		I				
Predation is the main threat or cause of decline												III			I							
Competition from other species																						
Snow geese are a threat, changing land												II										
Concerns about other species (moose/bison)												I					I					
Muskox are a threat.																II	I	II			I	
muskox closer to town than before																	I					
Bot flies are a problem																		II				
Wasps, yellow jackets coming in on the crates from the barge																		I				
Research																						
Caribou are afraid of and disturbed by helicopters and planes and are being lead away by them. (nets)	I	III		I		I	I			I							II					
Concerns about caribou being disturbed by scientists.	I			I						I												
Snowmobiles scare the caribou away.			I																			
Mining																						
Mining companies were chasing and scaring the caribou away.		I																				
Mine road from Pond Inlet to the mine may have cut off the caribou migration trail.		I																				
Mines/development are a threat to the caribou.						II		I		I						I			II			
Swollen hooves from the mines																		I				
exploration campes stoping migration routes																						I
Climate change and natural disasters																						
Climate change is NOT a threat.					II			I														

When it rains and the caribou can't reach their food, this is when they die.						I																
Caribou dying from icing events.							I							I	II							
Forest fires have had a big impact on caribou.							I										I					I
Caribou drown while crossing thin ice															I							
Climate change is a threat										I						I		I	I			
Noticeable change in climate																	I					
Global warming has caused animals to come north from the south																	II					
The weather is not warming here																		I				
Weather plays a part in this cycle, long winters means less time to have their calves																	I					
Changes due to climate change																				I	I	
Increased rain causing later migrations																	I					
Harvesting																						
Overharvesting is not an issue.				I																		
Overharvesting in Kitikmeot and Kivalliq is a threat.	I																					
Quota doing more harm than good.			I																			
Hunting is a threat.										I												
Harvest plays a minimal role in the decline																						I
Harvested caribou being shipped to Baffin																						I
Diseases																						
Diseases are a threat. (Brucellosis)				I												I		II	I			I
Questions and concerns about parasites.										II												
When there are too many animals, they get diseases (also parasites).					I																	
Would insects cause diseases?																		I				
Die-offs may be cause of decline.			I																			
Pus in the caribou meat																					I	
Diseases from mixing with muskox																					I	
White spots all over their body																						I
Habitat																						
Habitat too wet																	I					
Other																						

Starvation is a threat.							I															
Caribou meat being sold through social media, unregulated, which has an impact.							I															
Would like to see investigation on threats other than harvest (predation, industry, blasting, pollution, mining, climate change, impact of research-helicopters).									IIII				I									I
Questions regarding impact of non-Inuit and commercialization									I													
Sport hunt is managed closely and less of a threat than wolves												I										
Hunting ways have changed																						
Drowning while crossing the river																	II					
Activites could be causing less caribou																	I					
Roads make it easier for hunting, speed to outrun the caribou																	I					
People use the radio to tell people the caribou are here, sometimes before the caribou are there and it changes their migration route																	I					
Sport hunting is a reason they are seeing less caribou than before.																	I		I			
Having too many could also cause problems																I						
Could there be a problem with the water																		III				
Eating grass close to wolf droppings																					I	
Food source is changing																						I
Want to see about the other data on caribou fatalities																						I
5. Impacts of listing *Significant concerns about impacts to harvest rights. Even though quotas are implemented by territorial government and NWMB, they are linked to the listing under SARA.* *Quotas are too restrictive and don't take into consideration Inuit needs and the challenges they experience.* *Concerns about food security if the species is listed and quotas are implemented.* *Community members spoke about the importance of caribou to Inuit. They talked about how caribou is their main source of food, that they depend on caribou for food, clothing and survival, and how they have always existed together with caribou.*																						
Harvest Rights																						
Concerned about impacts to harvest rights (even though quotas are not implemented by SARA, they are linked to SARA).	II		I	I	III	II	~~IIII~~	II	II	II						I						I
Quota is too small and restrictive. Need more tags. Need to consider Inuit needs.	I				III	I			I	I												

Inuit should get compensation when there is a restriction or a band, because they lose a source of food and income in some cases. (Comparison to mad cow disease when farmers got compensated.)									I													
Government didn't consult when they gave quotas.					I																	
Concerns about price of caribou skyrocketing once listed.					I																	
Concerns about food security.					IIII		~~IIII~~	III		I												I
Community members spoke about the importance of caribou to Inuit. They talked about how caribou is their main source of food, that they depend on caribou for food, clothing and survival, and how they have always existed together with caribou.							I	I		I												
Don't want restrictions or quota system on caribou. Not part of tradition.							I															
Want to be able to hunt both males and females.						IIII																
We need caribou meat.						II																
Will you treat us the same as other places that cant catch caribou anymore.																			II			
How will you enforce people not reporting																			I			
Caribou is our main source of food																						II
Would heritage rivers qualify?																						I
There is already restricted hunting all around us, this will affect our caribou																						I
Listing polar bear resulted in taking away their ability to harvest polar bears																						I
Other																						
Questions about what will happen to meat plant in Rankin Inlet.								I														
Concerned about prohibitions																I						
Concerns about being managed like Baffin																					I	
Listing the species would give more power to protection, to manage the lands																						I
Concerns about how listing will affect industry																						I
Critical Habitat																						

Could calving grounds and migration routes be critical habitat?																						I
Critical Habitat shoud be identified everywhere it occurs																I						
Want to protect calving grounds and post-calving grounds																						II
Need to conserve the range so herd can come back and get big again																						
Need to protect migration and calving areas																	III					
6. Survey methodology *Great concerns about the methods used to survey Barren-ground caribou and that the surveys miss part of the population.* *Communities would like to have greater involvement and want greater use of IQ in research activities.* *Helicopters and planes scare caribou, making them avoid areas where surveys are done.*																						
Methodology																						
Survey methodology is not clear.								I	I													
A herd-by-herd assessment would be much more relevant.									I								I					
Concerns that surveys miss part of the population.	III	I			I	I	I	I	I													
Caribou are scared of the helicopters and planes, which makes them go away and hide. They avoid areas where there are often planes/helicopters.	I						I			I												
Can't see camouflaged caribou from plane.					I	I																
Caribou don't always go to the same calving grounds.	I																I					
Don't agree with the way the survey was conducted.					I	I		I														
Collars do more harm than good.										I												
Questions on if collars are harmful																		I				
More surveys need to be done on Baffin Island, particularly South.										I												
No survey results they have heard of																I						
Too many years between when research takes place and when scientists come back to report results.	I																					
Survey is not done properly																			I			
Don’t trust the biologist																				I		
Is IQ included?																					I	
Wants to see collars																	I					
Inuit Involvement																						
Inuit should receive funding to do research, just like scientists do.	I				I																	

Should use IQ during research.	II					I																
The community would like to be involved in the scientific research.	I					I			I													
Frequency																						
23 years between surveys is too long. Should be more frequent.						II																
Government needs to be monitoring caribou annually.	I																					
Not enough survyes are going into the Lorillard and Wager Bay and Ahiak Herds																I						
Other																						
Concerns about the accuracy of the numbers																I				I		
Will there be more information coming																		I				
GN is a problem, taking too long to inform communities of results																			I			
7. Management *Community wants to do their own management instead of having outsiders involved.* *Mixed opinions on efficacy of quotas and whether they are being respected.* *Reinforcement that Inuit don't take more than they need.* *Concerns that if we only harvest males, females won't have any chance to breed.* *Wolves need to be killed in order to prevent predation on caribou.* *In order to increase the population, the transport or transfer caribou from one region to another was suggested.*																						
Community management																						
Community/HTO is working to bring back caribou and prevent them from being endangered.	I								I	I												
Community wants to do their own management instead of having outsiders involved.								IIII		I												
Willing to work with the government to protect the caribou and ensure its conservation.	I																					
HTO/community would like to assist in finding out how to bring back the caribou population.		I	I																			
Everyone should work together (including KIA)																III	I					
More tags and regulations are needed to caribou don’t decline																			I			
They stopped the wolf hunt because it was too expensive																	I					

They appreciate how to protect caribou (migration, calving grounds)																	I					
Quotas																						
Already have a quota system that is respected.										~~IIII~~												
HTO respects quotas, yet numbers are still declining.	I							I														
Some communities don't respect quota, which affects everyone.	I																					
Communities without quotas should be assessed and given quota.	IIII																					
Support use of quotas.			I																			
Perhaps quota will make the population increase too much.			I																			
We need to wait a bit longer before removing quota.										I												
Concerns about how to regulate the harvest when hunters come from multiple communities to harvest the same herd and we don't have any regulations.							I															
Inuit don't take more than we need.			I	I				III														
Want to be allowed to harvest caribou anytime of the year (winter and summer).										I												
Disagree with the tags on males																			I			
We need to be careful to only take a few caribou																	I					
Problems with sport harvesting only taking big bulls																	I					
Education																						
Training on how to identify male and female caribou is needed in order to follow recommendation to only hunt males in the winter.	II																					
Needs to be more education of youth from elders.			II																			
Management/Recovery planning																						
Transport or transfer caribou from one region to another to increase the population.		I	I		I																	
If we only harvest males, females won't have any chance to breed.			II		III	II		I		I												
Would like to have someone from the community represent them within the government. Someone who lives here and is familiar with how to manage the caribou.			I																			

NWMB should hire researcher to monitor helicopter movements.		I																				
Would like to see additional monitoring to determine if there are more caribou and in different areas.			I														I					
Concerns about how calving grounds will be protected.									I													
We must just take what we need (when harvesting).	I																					
Bluenose East doing a community plan																I						
BQ Management Board has a Management Plan																I						
Drafting the NU Land Use Plan																I						
Agreements with mining companies exist																I						
Is it possible to recognize community initiatives in the larger picture																I						
We already have our plan																II						
We can manage our own caribou																II	I		I			
Where do we see the Recovery Plan																						I
If you want to start protecting herds, need to see what is in their migration corridors in the spring and fall																						II
Their management plan can be included within our National one																			I			
Want to see the work already happening, other jurisdictional plans																						I
Are there plans to get all the groups involved together																						II
Predator management																						
Wolves need to be killed. (decrease wolf population)	II		I		I	II				II							I				I	
Should implement bounty/financial incentive for killing wolves.	I																					
Giving out wolf traps would be good.										II												
Hunters to monitor predators coming further North due to climate change.			I																			
Can a wolf management plan be created																I						
Want SARA to help increase the price of wolf pelts																	I					
Other																						

There is a generational conflict where the younger hunters want to try new wildlife management methods, but the elders disagree. The Inuit's profound respect for elders makes the younger generation hesitant to talk about it.			I																			
Difference in opinion between GN and them																I						
HTO's should be the ones proposing what to do with caribou and bring it to us																I						
Why are you talking to us about something you have no idea about																I						
The information you are presenting to us will be used against us by local Inuit, does not help with collaboration																				I		
8. Inuit traditions *Inuit enjoy eating traditional foods, however it is now expensive to get caribou that are far away and they aren't able to eat it as often.* *TK says that we are not supposed to say anything negative about animals, they're a gift to us. If we do, they will reduce their numbers.*																						
Inuit enjoy eating traditional foods.								II														
It's expensive to get caribou that are far away. Therefore don't eat it very often.			II					I		I												
Younger people don't live on country food as much as elders. People are changing their ways.							I															
Caribou taste different depending on where they are caught.								I														
Some people don't have equipment to go out hunting and current assistance is not sufficient.										I												
Idea raised about regions sharing caribou meat, like a food subsidy program.	I																					
Concerns about people drowning because they are wearing clothes that they buy at the store instead of wearing caribou skins (which are warmer). They use the caribou skin to find people.			II																			
We're not supposed to say anything negative about animals; they're a gift for us to eat. When we do, they reduce their numbers, that is TK.							I	III														
Animals don't belong to us, they belong to themselves. Nobody owns them, they are a part of the world.										II												

Note regarding wording used: "Community member: In this handout we are helping the species that aren't doing well. I don't really go for that. My father used to say if an animal or species is not well, or is sick, we should kill it. ECCC: I may have used the wrong word or language. I meant if the caribou numbers aren't good, we need to help the caribou numbers to get better. Not the sick caribou."						I																
We Inuit, we do know the slightly different characteristics from regions to regions. We have extensive knowledge of their anatomy.							I															
Want to keep hunting caribou, even if they go extinct.								I														
Don't want to speak on behalf of other regions.										I												
Hunting is changing, more speed, different bullets, knowledge should be shared																	II					
Inuit hunted caribou all their lives and grew up with country foods.						I																
Difficulty understanding because of translation.								I														
In Inuit culture, they don't waste meat, we didn't waste meat																			I			
Hunters have a lot of respect for caribou																			II			
We keep our younger generation informed																				I		I
Always been informed by elders if numbers are increasing or decreasing																				I		
Inuit are always put down by white people																				I		
hunters and elders have good information																					I	
Need to see more TK and hunting practices																						I
We need to educate our own people, young people, teach traditional hunting skills																						I
Elders know a healthy caribou from an unhealthy one																						I

9. Funding

Funding that is available could help research caribou and give Inuit opportunities and jobs.

Funding that is available could help research caribou and give Inuit opportunities and jobs. This would be a giant step for resources and funding. The universities and different government agencies would need Inuit to do these researches. Working with HTOs together.			I						I													
Bring us Caribou using federal funds if you want to put the Caribou under threatened.							I															
Funds that are available are usually way too small.							I															
Will more research be going on in the area if listing occurs																I						
In the recovery strategy stage are their funding or grants that can be associated with the strategy for education purposes?																						I
Is there technical or monetary support for us, for equipment																						I
Need proper funding/training to be a part of this (capacity buildling, wildlife-monitoring, mapping)																						I
What is that funding that NTI got, we should get that																						I

*Includes three HTOs (Burnside, Bay Chimo, Ekaluktutiak)

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Cambridge Bay
Ikaluktutiak
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Kugluktuk
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Bathurst Inlet
Kingaok
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Bay Chimo
Umingmaktok
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Gjoa Haven
Okhoktok
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Taloyoak
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Kugaaruk
ᑰᒑᕐᔪᒃ

Jason Akearok
Executive Director
Nunavut Wildlife Management Board
Iqaluit, Nunavut
X0A 0H0

November 23, 2021

Sent by e-mail: JAkearok@nwmb.com

ATTENTION: Jason Akearok Executive Director

Dear Chairman and Board Members:

RE: Environment and Climate Change Canada Proposed Listing of Barren-ground Caribou as Threatened under Federal *SARA* Legislation

BACKGROUND:

The Kitikmeot Inuit Association (KitIA) represents the interest of Kitikmeot Inuit by protecting and promoting their social, cultural, environmental, and economic well-being.

The KitIA is also the registered owner of over 100,000 square kilometers of Inuit Owned Land (IOL) in the Kitikmeot Region and is responsible for all land use and management issues on these lands, including wildlife, habitat and environmental matters.

KitIA has been advised that Environment and Climate Change Canada (ECCC) is requesting a decision from the Nunavut Wildlife Management Board (NWMB) to list the Barren Ground caribou as threatened under the *Species at Risk Act*[1] (SARA).

THE WILDLIFE MANAGEMENT ISSUE

KitIA understands that Barren ground caribou populations of have been declining across the north and that there is a need to implement a conservation approach. Caribou harvesting is essential to food security, health, and the cultural well-being of Inuit whose harvesting rights are constitutionally protected.

However, any such conservation initiative must minimally infringe on Inuit rights under the Nunavut Agreement and Constitution.

ECCC has made a significant effort at consultation with Inuit across Nunavut and in the Kitikmeot, as is required by law before any restriction on Inuit rights can take place.

[1] S.C. 2002, c. 29.

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INUIT CONCERNS AND RIGHTS

An NWMB decision in favour of legally protected status for Barren ground caribou will affect Inuit rights despite the assertions to the contrary in the ECCC documents. KitIA also suggests that there are problems with the extent and quality of ECCC consultation in relation to this proposed status change.

First, Covid restrictions on travel and meetings extended the duration and adversely affected the focus of the consultations about this status change in Kitikmeot communities. This process has now extended over several years and has been confused with community herd based consultation such as that conducted by the Government of Nunavut (GN) on the Dolphin and Union herd.

Review of the ECCC documents submitted with their listing request indicates that there is widespread disagreement with this step from the individual harvester level, to Regional Wildlife Organizations and even the GN. Decisions of the courts make it clear that the onus is on a party proposing a change which will restrict Indigenous harvesting to show that the approach or mechanism selected really is "minimally intrusive". The ECCC submissions to NWMB provide no proof that other mean to conserve caribou in Nunavut do not or will not work. The fact that the GN is opposed to this listing decision should also be given considerable weight by NWMB.

Secondly, ECCC's consultation has not included all Inuit rights holders who may be affected by the listing. More specifically, the Inuit land owners such as the Regional Inuit Associations (RIAs), and KitIA specifically have not been consulted to the extent possible – but they exercise management control of very large areas of caribou habitat on IOL. Before any provisions of SARA can be exercised on IOL in a way that impedes the RIAs management and use of their lands consultation is required. Simply put, listing Barren ground caribou as threatened under SARA has the potential to affect more than Inuit harvesting rights and KitIA has not been consulted about this.

KitIA does not support this listing of Barren ground caribou for these reasons and for those also listed below.

- The use of Inuit Quajimayatuqangit (IQ) on the barren ground caribou consultations has not been explored to the extent that it should.
- Insufficient evidence provided that proposed up-listing to "Threatened" is relevant for all 11 herds.
- Lack of current population estimates on many herds the COSEWIC addressed in their assessment.
- The COSEWIC assessment used high population peaks as a threshold, rather than the lower normal cyclical estimates.

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- In Nunavut legal management initiatives exist, including the authority for implementation of harvesting restrictions by the HTOs and they have not been attempted to reduce or stop declines and assist the recovery of the herds.
- Listing as "Threatened" rather than "Species of Special Concern" is unclear with the evidence provided.

RECOMMENDATION

Considering all of the concerns, deficiencies and additional work needed to approach some level of certainty about the need for SARA listing of Barren ground caribou, KitIA respectfully suggests that the NWMB should defer a decision on listing at this time. If ECCC is determined to proceed KitIA suggests that this initiative should be addressed in a public hearing held by the NWMB to ensure that Inuit have a fulsome opportunity to address the effects of such a decision.

Respectfully yours,

Stanley Anablak
President
Kitikmeot Inuit Association

cc.

David Akeeagok
Minister of Environment - Government of Nunavut

Aluki Kotierk
President of NTI

KIA Legal Counsel

Paul Emingak
Executive Director
Kitikmeot Inuit Association

SUBMISSION TO THE

NUNAVUT WILDLIFE MANAGEMENT BOARD

FOR

Information: **Decision: X**

Issue: Dolphin and Union Caribou Harvest Management

Background:

Abundance Surveys:

- The Dolphin and Union (DU) caribou herd is a genetically unique and small herd (historically 20,000 to 30,000 animals) that is important for the subsistence of several Kitikmeot communities and communities in the northeastern Northwest Territories.
- Population estimates derived from coastline abundance surveys indicate that the DU caribou herd declined by 88% from the 1997 estimate of 34,558 (30,275-38,841, 95% CI) to the 2018 estimate of 4,105 (2,931-5,759, 95% CI) (Figure 1).
- Climate-related changes, timing of the sea-ice freeze-up, predation, harvest, shipping, and competition with other species are considered to be the main threats to the DU caribou herd.
- The report for the 2018 survey was shared with stakeholders on May 20, 2020, and feedback received indicated that the survey area should be expanded, and that more traditional knowledge should be incorporated into future surveys.
- In response, the 2020 survey was planned and the survey area was extended based on input from local knowledge holders.

Additional Research:

- A Traditional Knowledge study conducted from 2018 to 2020 indicates the herd recently experienced a drastic decline. The results from this study and another Traditional Knowledge study conducted in 2003 indicate that there have historically been significant declines in DU caribou.
- The harvest of DU caribou in Nunavut was estimated to be between 250 and 400 caribou per harvesting season between 2015 and 2017.
- In 2016 there was a Fall Composition survey and in 2017 there was a Spring Composition survey to monitor population demographics.
- The 2015-2017 demographic indicators were consistent with a population decline:

- The pregnancy rate of female collared caribou was 88% in 2015 and 2016.
- The fall 2016 composition survey indicated a low calf:cow ratio of 25 calves/100 cows.
- The spring composition survey (2017) results indicated low over-winter survival with a calf:cow ratio of 11 calves/100 cows.

- In 2018, the Kugluktuk and Cambridge Bay Hunters and Trappers Organizations (HTOs) supported the collaring of 50 female DU caribou; 47 females and 3 male caribou were collared.
- By fall of 2020, only four collared animals remained, and a collaring program was initiated for spring 2021.

Management:

- In November 2017, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) reassessed DU caribou as Endangered.
- In June 2020, the Minister of Environment sent a letter to the Nunavut Wildlife Management Board (NWMB) requesting a Ministerial Management Initiative for the DU caribou, as per s.5.3.25 of the *Nunavut Agreement.*
- In July 2020, the NWMB sent a letter to the Minister of Environment indicating that they were not able to make a decision at this time and an Interim decision should be made, as per s.5.3.24 of the *Nunavut Agreement.*
- In August 2020, Cabinet approved an interim Total Allowable Harvest (TAH) of 42 caribou for the DU herd, to be implemented immediately and to remain in place until the NWMB was able to complete a full review and make a new decision on the TAH.
  - The interim TAH of 42 represented a 1% harvesting rate of the population estimate. This was a precautionary harvest level due to uncertainty of the status of the herd from 2018 to 2020 and was consistent with the harvest rate of neighboring caribou herds.
- A consultation took place in October 2020 to discuss the 2018 results and interim TAH.
- The NWMB reviewed the interim decision to implement a TAH of 42 caribou for the DU caribou herd, at their December 2020 meeting.
  - The board passed a resolution to increase the interim TAH to 105 caribou, representing a 2.55% harvest, based on recommended changes to the harvest limits expressed by co-management partners during consultation and in writing directly to the NWMB.
- A TAH of 105 was implemented in January 2021 and remains in place for the herd across its range in Nunavut.

Current Status:

- Although it is not the sole factor influencing population size, with the population abundance low, the risk posed by overharvest is significant and could result in

continued population decline. Managing the harvest during a population low could slow down the rate of decline and support recovery.

- A new population survey was carried out from October 23-November 2, 2020. The survey was planned with input from all the relevant stakeholders.
    - There was consensus among stakeholders on the design, which incorporated historical data, collar locations and local knowledge.
    - Local HTO and community representatives participated in the survey.
- Results of the 2020 survey produced an estimate of 3,815 (95% CI = 2,930-4,966, CV = 13%), consistent with the declines detected by the 2018 survey.
- In April 2021, 36 DU caribou were collared. Stakeholders were involved in the planning process, and an HTO representative was present for every capture.
- Research projects on wolf and grizzly bear have begun in the Kitikmeot (e.g., sample collection programs, grizzly bear survey) to address recommendations of the NWMB approved Management Plan and community concerns.
- The current “Support for Active Harvesters Program”, which provides financial support for wolf hunters, has resulted in an increase in harvesting of wolves and other carnivores.

Consultations:

- In-person consultations in spring 2020 to discuss the 2018 survey results were delayed due to COVID-19.
- On June 8, 2020, the affected HTOs and the Kitikmeot Regional Wildlife Board (KRWB) were notified that an interim TAH of 42 would be forthcoming.
- A teleconference was held on June 18, 2020, to discuss the 2018 survey results, Traditional Knowledge Study results, Health Monitoring updates, and the DOE management recommendations.
- An in-person consultation was held on October 8, 2020, in Cambridge Bay where the 2018 survey results and the Interim TAH were discussed. Presentations were also given by the University of Calgary researchers on results of the Traditional Knowledge study and the health monitoring.
- At the consultation, DOE representatives committed to make collaring a priority for the next year and to inform the Minister of Environment of the request for an increase in the TAH to a 2% harvesting rate.
- An in-person/phone-in consultation was held on September 16, 2021, to discuss the 2020 survey results, 2021 collaring results, and management recommendations. The recommendation to keep the TAH at 105 was well received by stakeholders. All co-management partners were pleased with the GN’s efforts on the 2020 survey, and 2021 collaring.

Recommendations:

- The management goal of the DU caribou herd is to avoid further declines in the population and allow for recovery. Caribou population abundances are dependent on harvest, environmental conditions, predation, and extreme weather events. Overharvest of the herd could result in continued population decline.

- Based on the current population estimate, all available scientific information, and Traditional Knowledge/*Inuit Qaujimajatuqangit,* the GN is recommending maintaining the current TAH of 105.

- An adaptive management approach is recommended including regular monitoring to advise changes to harvest restrictions so that actions reflect population size and trajectory. The DOE will continue to work with communities and co-management partners to continue close monitoring of this important caribou herd.

- DOE believes that by ensuring the harvest is set to a sustainable level using the measures noted above we can help support a recovery of Dolphin and Union caribou.

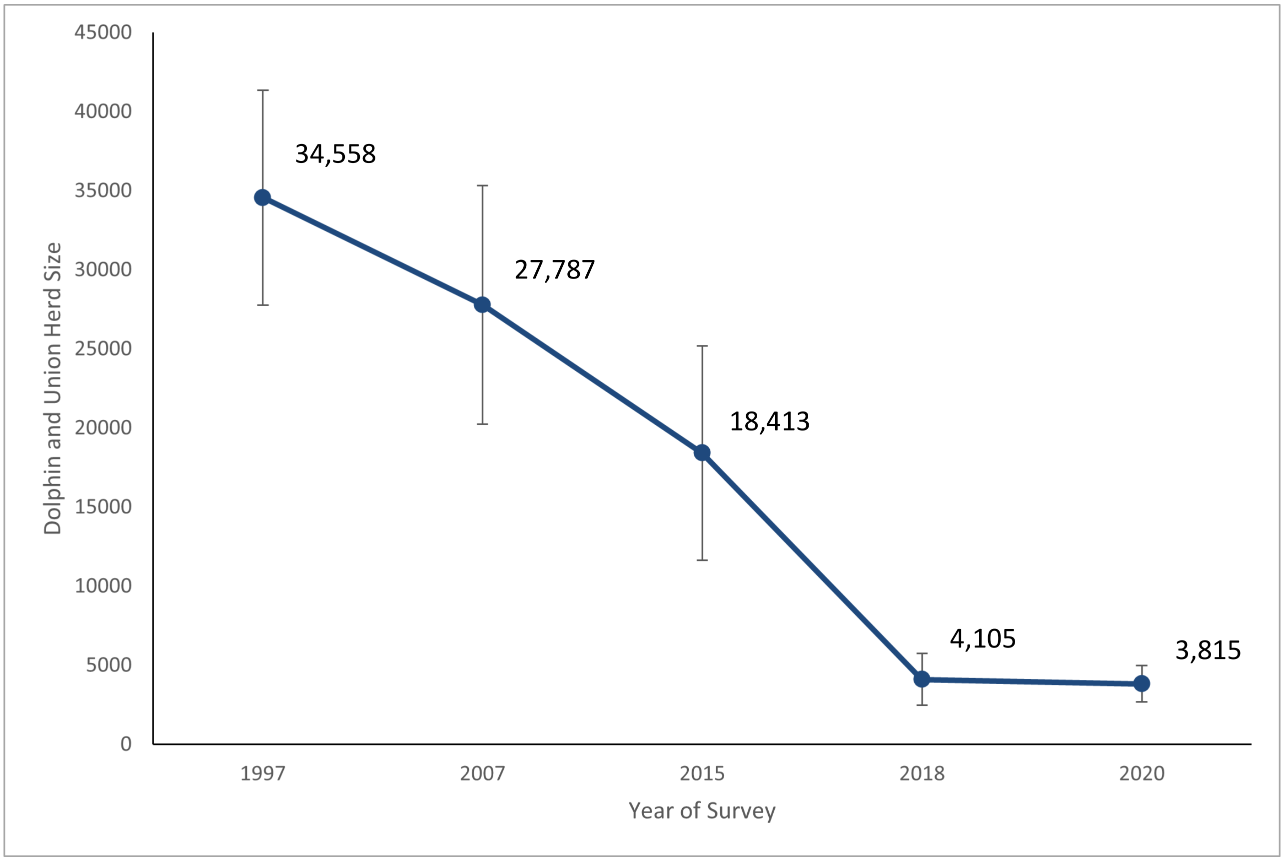

Figure 1: Dolphin and Union population estimates derived from aerial abundance surveys in 1997, 2007, 2015, 2018 and 2020

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Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

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Department of Environment
Avatiliqiyikkut
Ministère de l'Environnement

DOLPHIN AND UNION MANAGEMENT CONSULTATION

Consultation on 2020 Survey Results, 2021 Collaring Results, and Total Allowable Harvest

Summary Report

October 26, 2021

Various DOE Staff
Department of Environment
Government of Nunavut
Kugluktuk, NU

Executive Summary

Government of Nunavut (GN), Department of Environment (DOE) conducted a consultation with Omingmaktok Hunters and Trappers Organization (OHTO), Kugluktuk Angoniatit Association (KAA), and Ekaluktutialik Hunters and Trappers Organization (EHTO) on September 16th, 2021, regarding the Dolphin and Union caribou herd. Other stakeholders in attendance included Nunavut Wildlife Management Board (NWMB), Nunavut Tunngavik Inc. (NTI), Kitikmeot Regional Wildlife Board (KRWB), Kitikmeot Inuit Association (KitIA), and Environment and Climate Change Canada (ECCC).

The intent of this consultation was to discuss the 2020 Dolphin and Union caribou abundance survey results, the 2021 collaring results, and the continued Total Allowable Harvest (TAH) of 105, which was implemented in January 2021. The consultation was held to ensure the affected Hunters and Trappers Organizations (HTOs) were well informed on all the most recent information for this subpopulation and provided an opportunity to hear and better understand concerns associated with the TAH.

The consultation included two presentations given by DOE staff. The first was an overview of the 2020 abundance survey, analysis, results, management decisions, and timeline since the survey was completed. The second was a presentation given by DOE on collars that were deployed in April 2021. Each of the stakeholder groups in attendance was given an opportunity to ask questions and to provide input. There was consistent input from groups present that the GN-DOE has stepped up their efforts in addressing concerns raised regarding communication and taking into consideration HTO input in project design. Additionally, although the 2020 abundance estimate confirmed the 2018 decline, which was disappointing, there is confidence behind the number due to community input that was garnered during the survey planning process, and the vast area covered by three planes during the survey.

Predators were identified by many of the consultation participants as one of the highest threats to the Dolphin and Union caribou herd and a main cause of observed population declines. There were concerns expressed about increased human activities such as industrial development and shipping, which are believed to have detrimental impacts on the health of the herd and sea-ice integrity for migration between Victoria Island and the mainland. There was consistent agreement between the HTO representatives that the present TAH of 105 would be reasonable to keep in place at this time.

The feedback collected during this consultation will aid the GN in future management and research of the Dolphin and Union caribou herd.

This report attempts to summarize the comments made by participants during the consultation.

Preface

This report represents the Department of Environment's best efforts to accurately capture all the information that was shared during a consultation meeting with Omingmaktok Hunters and Trappers Organization (OHTO), Kugluktuk Angoniatit Association (KAA), and Ekaluktutialik Hunters and Trappers Organization (EHTO) on September 16th, 2021.

The views expressed herein do not necessarily reflect those of the Department of Environment, or the Government of Nunavut.

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1.0 Report Purpose and Structure

This report is intended to collate and summarize comments, questions, concerns and suggestions provided by participants at the September 16th, 2021, consultation in Kugluktuk on Dolphin and Union caribou research and management. Representatives from the affected HTOs, DOE, KIA, NWMB, NTI, and the KRWB attended the consultation either in person or by phone. ECCC also attended by phone.

2.1 Purpose of Consultation

The purpose of the consultation was to meet with the affected HTOs, including OHTO, KAA, and EHTO, and other relevant stakeholders to discuss the results from the 2020 population abundance survey, 2021 collaring, and the TAH recommendation. An overview of the results from the 2020 Dolphin and Union aerial survey, and 2021 collaring work was provided through a presentation given by DOE representatives.

In addition, the meeting served to provide an opportunity for representatives from affected HTOs and co-management partners to receive an overview, provide their feedback, and ask questions related to the 2020 survey results, 2021 collaring and current management actions.

The consultation was also intended to ensure that the HTOs were well informed on all the most recent information and plans regarding the upcoming Dolphin and Union survey. The consultation allowed HTOs and community members to voice any requests they may have regarding the survey. It is important that all stakeholders work together to manage this subpopulation in the future.

2.2 Format of Meetings

The meeting was held on September 16th, 2021 and ran for approximately 6 hours. The meeting was facilitated and led by the DOE Kitikmeot Wildlife Manager, Kevin Methuen. The meeting began with opening remarks by Kevin Methuen, a prayer by Peter Taptuna, and roundtable introductions. This was followed by a presentation on the 2020 abundance survey by the Kivalliq Regional Biologist, Mitch Campbell. Questions took place during the presentation and participants were invited to ask questions, raise concerns, or provide advice following the presentation. A roundtable to allow feedback and input from the HTOs and co-management partners followed. A presentation on the 2021 collaring work was given by Kitikmeot Regional Biologist, Amélie Roberto-Charron. KIA, NTI, NWMB and ECCC were also given the opportunity to provide input. Kevin Methuen presented the GN recommendation to maintain the TAH of 105. Questions were then asked regarding the process associated with the TAH, followed by closing remarks.

3.1 Summary of Consultation

The objectives of the consultation were made clear to the HTO members prior to and at the start of the meeting. Meeting was hybrid of in-person and phone-in.

Date: September 16th, 2021

Representatives:

- GN-DOE
    - Kitikmeot Regional Manager - Kevin Methuen
    - Kitikmeot Regional Biologist - Amélie Roberto-Charron
    - Kivalliq Regional Biologist - Mitch Campbell
    - Kitikmeot Wildlife Technician – Terry Milton
    - Conservation Officer III – Allen Niptanatiak
    - Kitikmeot Wildlife Technician Trainee – Lena Davies
    - Kitikmeot Regional Biologist – Lisa-Marie Leclerc

- NWMB
    - Species at Risk Biologist – Kyle Ritchie
    - Wildlife Director - Denis Ndeloh

- Kitikmeot Inuit Association
    - Environment Officer - Peter Taptuna

- Burnside HTO
    - Absent

- Omingmaktok HTO
    - Chairman - Peter Kapolak

- Kugluktuk HTO
    - Manager – Amanda Dumond
    - Chairman - Larry Adjun

- Kitikmeot Regional Wildlife Board
    - Coordinator - Ema Qaqqutaq
    - Coordinator - Peggy Adjun
    - Technical Advisor – Pamela Wong

- Cambridge Bay HTO
    - Chairman - Bobby Greenley

- Nunavut Tunngavik Inc.
    - Assistant Director of Wildlife and Environment - Bert Dean

- Environment and Climate Change Canada, Canadian Wildlife Service
    - Species At Risk Biologist - Isabelle Duclos
    - Species At Risk Biologist – Carine Cote-Germain

Summary of Comments and Questions:

- HTOs are appreciative of the improved collaboration and partnerships in the 2020 survey and 2021 collaring work and commend the GN for making the survey a priority. HTOs appreciated being asked for their input in the design and planning of both projects. Working together is very important.
- All HTOs expressed that predators are a main threat to the Dolphin and Union herd and are contributing to the population decline, and that the sample payment from the GN needs to be increased.
- Collaring is important and should be maintained going forward to help with monitoring.
- Communities want the sample kit program to continue to ensure the health of the herd is monitored.
- KAA would like more focus on the DU herd near Contwoyto Lake, and more focus on vegetation studies in DU range.
- KRWB feels posters are very effective way to keep communities informed of collaring and TAH, communication is key.
- OHTO reported DU caribou joining Beverly caribou herd near Bathurst Inlet area.
- KIA feels predator management should be core aspect of managing a declining caribou herd. They feel that HTOs should get more support from GN on predator incentives, community management plans. KIA complemented the GN on the 2020 survey effort and its attention to community concerns and involvement. KIA hopes to see this kind of collaborative effeot continue for future GN research programs.
- Most participants felt that a TAH of 105 is still reasonable to keep in place moving forward, given the 2020 abundance estimate and confidence in the result of that survey.

4.0 Summary

HTOs feel it is important to recognize that predators are a main threat to the herd and are a main contributing factor to the population decline. Harvesting is not the cause of the decline. HTOs felt comfortable with the GN recommendation to maintain the TAH of 105, based on the 2020 survey estimate.

All parties present felt the recent collaboration between the DOE and relevant stakeholders, on the 2020 Dolphin and Union population abundance survey, is a big step in the right direction for re-building relationships and trust in research. All co-management partners were also happy with the process that was followed for the 2021 collaring work, and efforts made by GN staff on that program. During the consultation, the DOE representatives were able to communicate the next steps in the management decision process. The TAH of 105 will remain in place until the NWMB has been able to review the latest submission file, based on the best available information, and decide on the harvest of Dolphin and Union caribou.

GN DU Caribou Management Consultation

Meeting Minutes
September 16th, 2021
Visitor Heritage Center (Ulu Building)

Present:

- **DoE (GN):** Kevin Methuen, Mitch Campbell, Amelie Roberto-Charron, Lisa Marie Leclerc, Allen Niptinatiak, Lena Davies, Terry Milton
- **KAA:** Amanda Dumond, Larry Adjun
- **OHTO:** Peter Kapolak
- **EHTO:** Bobby Greenley
- **KRWB:** Pamela Wong, Peggy Adjun, Ema Qaqqutaq
- **NTI:** Bert Dean
- **ECCC:** Isabelle Duclos, Karine
- **KIA:** Peter Taptuna
- **NWMB:** Kyle Ritchie and Dennis Ndeloh

Absent:

- **BHTO**

9:17am: Meeting Begins, Introduction, Opening Prayer (Peter Taptuna)

Mitch Campbell (MC):

- Presented on 2020 Fall Abundance Survey, which happened in October 2020, covid issues complicated the survey effort but were overcome. . The survey was tricky due to restricted time in which to conduct it, and the large geographic area that all stakeholders wanted to see included..

Bobby Greenley (BG):

- Add bigger range for DU since they travel further south every winter (Suggestion)

MC:

- Amelie has a collaring program to help redraw & plan moving forward.
- The survey was put together in a short time, great group effort from all stakeholders.
- We tried to draft out areas to survey. We went to communities and came up with final strata to survey.
- We used 3 aircraft, in the red area, we saw the most, but in the blue area, not so much, & black area was low density.
- For aircraft, we had 2 Caravans and one Twin Otter, the Caravans had longer endurance.
- Method: Double observer pair, distance sampling method. Double observer pairs offer extra robustness to results. Observers switched seats throughout the day, which helps with the determination of individual observer sightability determinations. Every plane had great observers chosen by the HTO's.

- Some concerns in the past surveys, weren't binning properly, worries of mistakes & reducing overall count. These concerns were not evident in this survey. We used distance sampling as HTOs were concerned that off transect observations were not included in past surveys. Distance sampling is a method that allows for more observations further from the airplane to be included in the final estimate..
- 4 active collars during survey, not ideal but gives a bit of security. All collars sighted within high density areas and predicted by historical fall range use

Lisa-Marie Leclec (LML):

- If looking at MW A strata, collar there on Oct 24, moved towards coast, when did they reach high density strata? MC: that one died before it got to the coast.
- Similar one that just died way inland, did not move much then ended up dying in middle of November?

MC:

- May have had problem before it died, we did see caribou within that strata.
- All high + medium density was done quickly with no weather issues, done in a 2 day period (Medium), high density done in 1 day.
- Downside of multiple planes is cost.
- Very little weather issues, LDWC strata did not finish a small portion due to weather.
- LDEC, top 4 transects not finished, seen nothing adjacent to that area. LDE eastern most transects not surveyed because of low clouds, some caribou seen but very low density.
- In the very high, high and medium density area, all good visibility.
- A very small amount of reduced visibility in medium density area but patchy and not extensive. Effected a very small area. We were not able to survey all the transects , but all important areas were completed and an estimated . 92-93% of low-density areas were completed.
- We had some good aggregation of caribou in yellow which is medium density areas.
- We saw 29 wolves total, which are red triangles on the map 27 were spotted in high density areas. No grizzlies were seen, two wolverines, 30 moose-on mainland, 637 muskox and some caribou on Kent Peninsula.
- In terms of the estimate, without the mainland included, working on different methods, we ended up with a number of models, (all technical talk), they look at how many caribou were missed, in terms of double observer, we picked the model that best suits the situation. The models square off the curve and populate the estimates. This result shows a higher number (more technical talk). Island count of caribou is 1264, mainland 1330. Abundance estimate overall is 3579. With mainland strata, it is closer to 4000.
- Hoping to get under 15% CV, we got 13%. 95% confidence interval. We are 95%confident that the actual number of caribou in the survey area, lie between 2,900 and 4,966(or 5000). We are almost certain that the actual number lies within that area.

Pamela Wong (PW):

- Folks not familiar with modeling, explain how you choose the model to get the estimate?

MC:

- John Boulanger was contracted out to use model, statistically, least variability, all combinations of covariates, model chosen based on his experience and covariates. (There was an extensive technical discussion, not included in these notes, on how covariates collected during the survey

the herd)

- John is used by many jurisdictions including the NWT and has an enormous amount of experience with barren-ground caribou.

Amelie Roberto-Charron (ARC):

- Covariates, fortunate that snow cover was even, which made it helpful, a bit of balance, looking at the different aspects that are being added into the model and looking at the biological rationale to fine tune.

PW:

- Which covariates come as many others be interested to know how that affects numbers?

MC:

- Covariates: Slope, elevation, ruggedness, snow cover, visibility, clouds, airspeed, altitude, green, & habitat. We have to pick the most suitable statistically robust models and covariates for an equally statistically robust estimate of abundance (more technical talk).

Kevin Methuen (KM):

- How many more minutes of your presentation? Snacks as catering has arrived? Break for 15 minutes.

MC: *Continuation of Presentation on page 12*, Conclusion, Questions?

Larry Adjun (LA):

- Conclusions – findings should be consistent with IQ + consistent surveys. They're merging into NWT herds in last two years, and have been sighted by hunters at Contwoyto Lake, and hunters WIMAC(?) also spotted DU Caribou. Who does that area fall under? Because it might be site or herd specific, who looks into those areas? Are we going to look into immigration into other herds?

KM:

- You can add to my comment, Mitch, but we manage on a herd-by-herd basis.

MC:

- Needs to be fleshed out, we aware of it, I'm not involved as much. Amelie, Kevin and Lisa can figure out genetics and get stamps, info on where they are with genetics, collaring program to determine where they are and where they're going. It's complicated, but with original info given in consultation with genetics to help with specific herds its doable.

LML:

- Collaring and movements follows will be ultimate for DU monitoring program, couple years (since 2016) IQ saying caribou DU going to islands, unusual animal, hunters think it's DU, collects samples on genetic analysis, to ID where they are being located. With time we could monitor those.
- Last winter Amelie deployed collars, management on going and on radar.

Dennis Ndeloh (DN):

- Follow up. Management we do is harvest management, issues come up on ecology and lack of resources with management, some DU would from range in NWT and beyond the Nunavut hunters

range. Will that change the way you think of it, saying oh, it is DU we are still responsible for management, because if they go beyond where Nunavut harvesters can go, we have to deal with that within the range, eventually they will come back, what extent do we have to go chasing after that one?

LML:

- Mixed caribou, very early, may see cases, need separate conversation about mixture, immigrated? Conversation and separate meeting need to happen.

PW:

- For Lisa, in regards to fecal monitoring, those reports are somewhere?

LWL:

- 2016 in one of my reports – DU 2016 population survey report (not stand alone)
  Last winter we worked with conservation officers and we worked with hunters. We collected caribou feces, bringing in scientific reports to support IQ.

ARC:

- One animal analyzed, one animal thought to be DU but was BG based on genetics. Turn around time is 6 months for genetics. 2021 DU Collaring genetics not returned yet but will inform when available.

MC:

- Some evidence in Kivalliq, looks like Southampton Island caribou have left island, steep declines, herd stabilized recently, genetics came back partially mainland BG Herd. Another example for Qamanirjuaq includes an Historic account by Anne Gunn in '85-'86-'87 suggesting many Qamanirjuaq caribou wintered North of chesterfield inlet. No collars on caribou at the time to confirm.
- Events happened, may happen, may be possible in this case. May have gone to mainland BG herds, does not mean they are gone forever but could come back. But worthwhile to track with genetics + monitoring over time.

KM:

- Great point, thanks for bringing that up, keep open mind.

Amanda Dumond (AD): (HTO Question)

- More comments, not liking Lisa's comment's of bringing scientific evidence to support IQ info. Getting back to evidence from Contwoyto family seen changes in herd, Island caribou at McKay Lake different as well, all common knowledge, all IQ. Need both to get full picture. Proof in 2020 survey.
- Want to know what future research could include from GN?
- Commitment from GN? Different meetings looking at other research and not to implement a TAH, looking into Health, environment, DU Case – travel routes, migration to ocean, predators, any specific for future research?

ARC:

- Difficult to make specific commitments with the way funding works, need recommendations, DU be tabled with collar data, pregnancy data and composition.

- Mitch mentioned that consistency with Abundance survey should be there? 2022 next collaring program, three years can make other programs off of that. Another long term, renew historic collar data on migration and changes in habitat, temperature and old data all on docket now. Priorities can change on funding and other high priority programs.

MC:

- Lots of discussions internally on DU contingent and based on info, not based in region but interest for continued monitoring and looking deeper on Mainland herd, DU are recognizable and needs to be looked in depth for reasons I mentioned earlier, don't want to get surprised going into a survey, observations are there, continue monitoring and looking at genetics to track. Low cost, easy thing to do and get started, can define an area and go onto the next stage.
- Recommendation: more info important, from experience, if they (DU Caribou) are moving outside of previously understood seasonal range, more work needed. Somebody moved somewhere, the mainland is first place to look
- If it came to a research group management decision, I'd support funding such a project.

ARC:

- DU always able to run samples from those animals with genetics, recently had a suspect harvested by Cambridge Bay adding to sampling for collaring program. Always an option, and we are looking to continue.

LA:

- Suspected DU in Baker Lake?

MC:

- Could be BG, but will confirm, it did not look like the other caribou too. It happened while I was away, so I will follow up on that.

Allen Niptinatiak (AN):

- Comment, monitoring predators, you saw 27 wolves, just had hunters on holidays and they saw 30 wolves, from 3 people, one group 13, another of 8, one of 5, and 4.
- Pack of wolves that size healthy on Victoria Island, like the olden days healthy.
- Hunters are saying: Too many wolves, Government is not stepping up. Payments to hunters not enough. Hunters say not enough, same for grizzly's, are we going to continue data entry of wolves? Not added to reports, hunters saying wolf counts are too high.

MC:

- Echoing all around, survey shows high counts of wolves, will be sure to let Malik our carnivore biologist, know and suggest a monitoring project, Ill discuss with him what he is planning..

PW:

- Curious about if caribou leave and come back and genetics mix with other herds, what are indications of that?

MC:

- DU is a mix, ongoing for long time, can't think any implications, if going away and coming, if area changes, and if there is constant interaction, annual range needs to be reassessed. Example:

southern extension in its range might be normal and needs to be added, understood and surveyed?
- Research in this area needs to be more in depth, as we've got a good start with observations by hunters.

LML:
- Compliment DU and management report, genetical reports on mixing, formed as a threat, assessment and research, brought forward a couple years ago as something to monitor.

AD:
- Comment on predators, looking at your wording Mitch, it says we've been monitoring predators, we've been doing that already. survey shown a lot of wolves, now is time for action.
- In winter time, Range of BNE, NI, BE, monitors in NWT range needs to be extended. GBL + NWR. Hearing from everyone, lots of wolves and bears, we've done our monitoring, now is the time to take action now. Results from wolf incentive hunts in NWT, lots of wolves harvested this year.

Peter Kapolak (OHTO):
- OHTO, Larry's comment. DU seen in NWT, have seen going with Beverly, here in Bathurst Inlet.

MC:
- Thank you, Peter for the info. Baker harvesters seeing different caribou. Samples sent out will check status. Herds are close to each other, could be mixing groups and can track with genetics. Lots of herds on the move, things happening that are different. Any more info from that area would be valuable, and will continue monitoring and keep a closer eye out.

BG: (NWMB Suggestion)
- Some info, NWMB suggested to GN, make it mandatory but anything has TAH should have samples done with anything pushing minimum 20 samples.
- Lot more patrolling from GN WLO's/CO's should be done whenever possible especially certain times of year.
- Collaring caribou should be posting info, shouldn't be harvesting, HTO's shouldn't be looking after it, info to hunters should come from the GN.

KM:
- Thank you patrols should be more after. Good strides for Cambridge Bay office with new patrol officer will keep patrols ongoing.

ARC:
- Thank you, Bobby, I have put out for approval with communication for posters and radio Ads on info on collaring and hunting, that its not illegal and ideally not to harvest them. The GN can't limit the ability of someone to harvest a collard animal, we can only recommend. Will follow up on status on info.

BG:
- Can't stop hunters from harvesting that animal, can only recommend to not harvest collared caribou.

Bert Dean (BD):

- Comments on predators, need to flag as follow up discussion.
- And more monitoring with more funding available, NTI can also support.
- Structure and formalize with reports
- Needs to support hunters by formalizing and documenting
- Sampling really helps with reporting, and getting data and communication
- CO's – a lot of info to gather together to HTO's have updates to formalize and document
- Funding always available in different pots and programs
- Willing to support
- Covid delay things, a while until regular routine, but can support now with monitoring and info from hunters with monitoring and harvest information.

BG:

- Adding to Bert, we were doing a Muskox monitoring that started a year ago in Cambridge Bay.

Isabel Duclos (ID):

- Comment, interesting conversation to consider to agenda to submit to COSEWIC, separate conversation. Will follow up with various groups involved in the next few days.

PT:

- Comment, thank you Mitch, having worked with S + R, it can be difficult to work with aircraft seasonal weather up here. Survey work done is pleasing from survey to organize, and coordinate. Exceeded expectations. KIA is happy.
- Expand on Amanda's comments on predators. Have to consider predators out there, of course if we are going to manage a declining herd, we have to focus on not just harvesters but whole picture, KIA is pleased to be involved as participation, that survey was conducted in a manner that included the IQ's so KIA is pleased with that.
- KIA is going to ensure Inuit rights got impeded. Thank you for involving us.

LA:

- Back to incentives, WIMAC giving Ulukhaktok hunters a lot higher then in Kugluktuk. We have been advocating for higher incentives for wolves, wolverines and grizzlies. We are right in thick of all 3 herds but incentives still low. Government needs to do something better for hunters because we have to hunt with GNWT behind GN's back. Still at base rate of 300$, something needs to be done and incentives needs to increase and we are in the middle of 3 herds so something has to be done proactively.

KM:

- Thank you, all comments heard, predator work needs to be done as well. Will continue to advocate for your HTO and all in the room when it comes to relaying that Info up the chain of command and senior management. Like you said Peter, when dealing with a declining herd, you have to look at the whole picture and looking around the room, no disagreements on that needs to be done.
- Thank you Mitch for the presentation and leading this survey, and for travelling here.

BREAK UNTIL 1PM

Morning minutes written by:

Lena Davies

1:12pm: Meeting continues.
Amelie Roberto-Charron (ARC): *Presents DU Collaring Program* 36 collars deployed out of 50. 4 mortalities during collaring.

KIA: Can the HTO be compensated for the mortalities?

Kevin Methuen (KM): Yes, it is up to the HTO, on how they want to deal with it.

Lisa Marie-Leclerc (LML): We collected the samples and sent it to University of Calgary

ARC: The collaring does not represent the whole herd (DU).

KM: The meat comes back and compensation is offered.

HTO: How long does it take from start to finish? (Collaring)

ARC: Protocol is 15 minutes, We try to alleviate the stress from the animal.

Bobby Greenley (BG): Collaring on Victoria Island might be difficult to do. By the time they go to Victoria Island, it will be difficult.

ARC: Absolutely. The reason why we looked at Victoria Island, the DU there was staying call year in Victoria Island.

BG: Lots of ground to cover on Victoria Island when they migrate.

Ema Qaqqutaq (EQ): Thanks for the caribou (4 mortalities) that was returned to the HTO, will the HTO be compensated?
KM: Yes.

EQ: Quana.

Amanda Dumond (AD): For slide 10, which community did the mortality go to? How many collars left?

ARC: Kugluktuk, 34 collars.

AD: LML, Is the pregnancy rate stable? Are the males part of the calculation? From previous collaring, why are the pregnancy rate low?

LML: Deflect to ARC.

ARC: We compared the pregnancy rates in previous years, but discrepancies were identified. Information will be verified, and as soon as possible will be shared.

LA: Clarification, the procedure is that we capture a specific caribou in a herd. (During collaring).

ARC: Yes 1 caribou is captured in a herd, specifically females. Future recommendation, continue collaring, do on the ground survey's, collaborate with HTO, and stakeholders.

BG: No questions, but you can see in the animation (map), that it will be difficult in Victoria Island for collaring/surveying.

PT: Comment, mainland has more rugged country than Victoria Island.

LCL: Try to collar in Victoria Island, collaborate with Uluhaktok for ground survey.

Peggy Adjun (PA): 1 harvested, not even 2 weeks that was collared. Maybe put it out there, in the public, that there's collaring going around in the area.

Allen Niptinatiak (AN): The hunter used a rifle with an open sight, Which makes it hard to see the collar.

MC: We try to blend the collar into the caribou as predators will single a collared caribou out if the collar is coloured.

KIA: Question, main objection was the mainland, what is the next objective on Victoria Island Caribou?

ARC: Yes, we are trying to collab with NWT to collar the area.

MC: There will be discussions at the next research meeting.

PT: For the 4 that was killed, were any tags used?

KM: Yes, for the 4 that were killed, unfortunately they came out of the TAH.

KIA: How many were pregnant?

ARC: All 4 were pregnant.

BG: Question to the HTO, were all the tags used last year?

LA: Yes and we were fortunate enough that Beverly was close. Were all the DU tags used last year?

AN: Yes.

KM: Management recommendations: 105 TAH for DY in January 2021. Due to the population estimate, the TAH stays the same (105). Update on NWT, ENR will be assisting HTC on collaring, max harvest of 50 DU caribou per year with mandatory sampling. They've increased predator collection payment. (From 200$ to 600$).

LA: We are okay with 105 as it rotates annually with Cambridge Bay. But we would like 50/50 annually but after consultations, it will rotate annually. Wolf incentives should be increased from the GN. I feel that we're way behind on the wolf incentives. Please continue the sample kits.

BG: Yes we should increase on the wolf incentives. 105 TAH is fine, better than the 42 that was recommended last year.

KM: We never had a TAH for DU before and it was challenging.

LA: I appreciate the daily input for the DU survey as it did not happen in the past.

PA: We want to inform people that this is what is happening to the herd. Keep the public informed. The more people know, the better.

EQ: We should also focus on predation issues on the caribou as well. Not just lowering the harvest of the caribou.

BG: I agree with the predation issue.

Kyle Ritchie (KR): Is the GN bringing anything to the board?

KM: Yes.

KR: Bathurst decision letter, is there grizzly bear/wolverine update?

MC: Yes, it was successful.

KIA: Agreeable to the status quo. We would like to see HTO get more support on predator incentives. We would also like to see HTO do management on their own.

End Meeting ~3:30pm

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Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

An Aerial Abundance Estimate of the Dolphin and Union Caribou (*Rangifer tarandus groenlandicus* x *pearyi*) Herd, Kitikmeot Region, Nunavut – Fall 2020

Government of Nunavut

Department of Environment

GN Technical Report Series – No: 01-2021

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1st February 2021

ABSTRACT

Between October 22 and November 2, 2020, we estimated the abundance of Dolphin and Union (DU) caribou on their fall range on Victoria Island and the Kitikmeot mainland, near the Coronation Gulf, Bathurst Inlet, and Kent Peninsula. We opted to diverge from the previous costal survey methods (conducted in fall 1997, 2007, 2015, and 2018) for three main reasons. Firstly, local hunters from the communities of Kugluktuk, Cambridge Bay, and Ulukhaktok believed current estimates of abundance, and DU caribou telemetry locations, were not representative of observed changes in DU caribou seasonal range use and migratory behaviors in recent years. Communities also reported recent declines but requested a larger survey effort to ensure changes in caribou behavior were not invalidating the coastal survey method. Secondly, only 4 collars remained from a 50-collar deployment program initiated in spring 2018. This lack of current telemetry data raised concerns that the low number of collars may not be representative of DU caribou fall distributions and movements, making the telemetry dependent coastal survey method less reliable. Thirdly, the need for a new estimate was considered urgent by stakeholders based on the 2018 survey reporting of a 78% decline in abundance between 2015 and 2018. During this period, DU caribou abundance declined from 18,413 (95% CI = 11,644 – 25,182; CV = 17%) caribou in 2015 to 4,105 (95% CI = 2,931 - 5,750; CV = 17%) in 2018. We used previous years' survey results, historical and current collar data, a spatial assessment of historical collar data, and local Inuit Qaujimajatuqangit (IQ) to develop abundance strata over a much larger area than covered in previous fall surveys. We used the double observer pair and distance sampling methods to visually assess caribou abundance. In total, we surveyed 130,187 km^2, of which 105,577 km^2 was on Victoria Island, representing half of the island's surface area. We observed 1,330 caribou within 209 groups on transect and 101 caribou that were off transect, 452 muskox within 47 groups, 30 moose within 13 groups, 28 wolves within 10 groups, and 2 wolverines. In total we estimated 3,815 (95% CI =

2,930–4,966, CV= 13%) caribou across all strata on both Victoria Island and the mainland, of which 3,579 (95% CI = 2,758-4,644; CV = 13%) caribou were estimated within Victoria Island strata, and 236 (95% CI = 57-980; CV = 74%) caribou within mainland strata. An assessment of the change in abundance between the fall 2018 and fall 2020 abundance estimates was not found to be significant, with confidence limits overlapping, thus yielding no quantitative conclusion that herd numbers had significantly changed between 2018 and 2020. However, the ratio of estimates between 2018 and 2020 suggests an overall reduction in herd size of 7% to 13%, which amounts to yearly changes between these two survey periods of 4% to 7%. Due to the importance of the Dolphin and Union herd to Inuit subsistence and culture, the implications of the decline are serious.

Key words: Caribou, Barren-Ground Caribou, Dolphin and Union Caribou, Aerial Survey, Fall, Visual Survey, Kitikmeot Region, Double Observer Pair Method, Distribution, Movements, Distance Sampling, Population Structure, Nunavut, *Rangifer tarandus groenlandicus x pearyi*, Population Survey, Caribou Fall Distribution.

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1.0 INTRODUCTION

Caribou are circumpolar in their distribution and occur in northern parts of Eurasia and North America. In Canada, caribou are represented by four subspecies; Peary (*Rangifer tarandus pearyi*), woodland (*R. t. caribou*), grant's (*R. t. granti*), and barren-ground (*R. t. groenlandicus*). However, a fifth grouping, known as Dolphin and Union caribou (*Rangifer tarandus groenlandicus* x *pearyi*), differ from both Peary and barren-ground caribou genetically, making them unique amongst North American caribou populations (McFarlane et al., 2016; Serrouya et al. 2012). Dolphin and Union (DU) caribou share traits from both barren-ground and Peary caribou in regards to their appearance and behavior. Generally, DU caribou are smaller bodied than barren-ground caribou, and lack the dark brown coloration which is typical of barren-ground caribou. While slightly larger bodied than Peary caribou, DU caribou are similar in coloration, with their characteristic lighter pelage (Poole et al., 2010). DU caribou tend to share the lighter slate grey coloration of their antler velvet with Peary caribou, while differing from the more commonly dark chocolate brown antler velvet of barren-ground caribou (Gunn et al., 1997). Behaviorally, DU caribou, like Peary caribou, spend their entire annual cycle in high arctic habitats, while their extensive seasonal migration across the sea ice to winter on the Nunavut mainland is reminiscent of the barren-ground subspecies (*groenlandicus*), with whom they seasonally mix.

DU caribou are known to occupy an annual range that encompasses the majority of Victoria Island, and the northern extents of the Nunavut mainland in the vicinity of the Coronation Gulf, Bathurst Inlet, and Kent Peninsula (**Figure 1**). Most collared DU caribou cows (from 1987 to 2020) have calved and spent their summer months on Victoria Island, at times mixing with Peary caribou within the central and northern extents of the island (Davison and Williams, 2019). Though named for the Dolphin and Union Straight where the DU caribou once commonly

migrated during fall to their mainland seasonal winter range, most migratory DU caribou now migrate across the Dease Strait to their wintering grounds along, and inland from, the eastern shores of the Coronation Gulf, and in the vicinity of Bathurst Inlet and Kent Peninsula (Gunn et al. 1997). Recent Inuit Qaujimajatuqangit (IQ), collected during pre-survey consultations, suggests that this annual cycle has changed in recent years with evidence of change in seasonal range affinity and migratory patterns (Roberto-Charron, 2020). Hunters from the communities of Cambridge Bay, Kugluktuk and Ulukhaktok are reporting larger numbers of DU caribou remaining year-round on Victoria Island, while mainland hunters have reported DU caribou in the vicinity of Contwoyto Lake mixing with the mainland herds within the last two to three years (**Figure 1**). Though DU caribou occupy a largely discreet winter range, there is overlap with barren-ground caribou, including the Beverly, and Bathurst herds, most pronounced in early fall and spring within the southern extents of the DU caribou known annual range (Campbell et al. 2012a; Campbell et al. 2012b) (**Figure 1**). Furthermore, the DU caribou overlap in range with Peary caribou (Campbell et al. 2012b; Davison and Williams, 2019; Gunn et al. 1997). Following a June 1994 calving survey across Victoria Island reported by Gunn et al. (1997), field biologists were concerned that all aggregations of DU caribou were not assessed, and that there was confusion between Peary caribou aggregations and DU caribou aggregations. Biologists at the time believed that to adequately assess DU caribou during calving, an island wide survey may have to be considered, and that consideration of such a survey, at that time, may not be logistically feasible. In response to this finding, a coastal survey methodology was developed and deployed in fall 1997 (Nishi and Gunn, 2004). This survey method had the advantage of dramatically reducing the survey study area. Additionally, it was completed when Peary caribou were largely separated from DU caribou, and it monitored the DU caribou during their pre-fall migration staging along the southern Victoria Island coast waiting for the sea ice to form just prior to their migration across the Dolphin and Union, and Dease Strait to the Nunavut

mainland. When combined with an intensive satellite telemetry program, the method proved highly successful, and in 1997 the first complete abundance estimate of the Dolphin and Union herd was realized. Since 1997, the fall survey method has been implemented in 2007, 2015, and 2018.

Throughout the coastal survey history of the DU caribou population, the overall trend has indicated a statistically significant and steady decline (Gunn et al., 2011; Leclerc and Boulanger, 2019). DU caribou herd abundance has declined from 34,558 (95% CI = 27,757 to 41,359; CV = 12%) in 1997, to 27,787 (95% CI = 20,250 to 35,324; CV = 13%) in 2007 (19% decline), to 18,413 (95% CI = 11,644 to 25,182; CV = 17%) in 2015 (34% decline), finally plummeting to 4,105 (95% CI = 2,931 to 5,750; CV = 17%) by 2018. This indicates an overall decline of 78% between 2015 and 2018 and 4.2% per year and almost a doubling in the annual rates of decline since fall 1997. The annual rate of decline between 1997 and 2015 was 2.6% per year (Nishi and Gunn, 2004; Dumond and Lee, 2013; Leclerc and Boulanger, 2018). Reasons for this dramatic decline between 2015 and 2018 are yet unknown, however contributing factors likely involve a combination of factors including, but not limited to, predation, harvesting, forage quantity, quality and availability, changes in sea ice conditions, parasites and disease. Leclerc and Boulanger (2018), estimated collared female survival at 0.62 (SE=0.07, CI=0.48-0.75), which included known hunting and natural mortality. If known hunting mortality was excluded from survival estimates, then survival increased to 0.72, providing compelling evidence to suggest that hunting mortality is likely contributing to the observed decline in demographic rates. Regardless, the estimated survival rate of 0.72 indicated a declining population.

DU caribou status was originally assessed as a single unit with Peary Caribou, and together they were identified as Threatened in 1979. In 1991, the caribou populations were separated regionally and were reassessed as follows; Banks Island (Endangered), High Arctic (Endangered), and Low Arctic (Threatened) populations. In 2004, the populations were reassessed with the Banks Island and High Arctic populations combined and designated as Peary Caribou, and the Low

Arctic population as Dolphin and Union caribou. At this time Dolphin and Union caribou were assessed as Special Concern. In 2017, the DU caribou population was re-assessed by COSEWIC as Endangered in Canada (COSEWIC 2004; Species at Risk Committee, 2013; COSEWIC, 2017).

The fall 2020 DU caribou abundance survey became a Nunavut Government priority. Both the Endangered status recommended by COSEWIC, and the reported declines from the 2018 survey, created an urgent need to re-assess the population and consider management actions aimed to prevent further decline. The coastal survey method has proven reliable in the past, and to this end aspects were retained in the development of the fall 2020 survey strata including the high coverage coastal strip strata. However, due to a lack of collared caribou cows, in combination with local observations on DU caribou overwintering on Victoria Island, and hunter observations of rutting DU caribou further inland away from the traditional coastal strip study areas, the survey design was greatly modified. In 2020, additional survey strata were drawn inland from the coastal strip strata and into the Northern extents of Victoria Island. Additionally, three mainland strata, representing early winter / post fall migration range, were established.

There were several reasons why the decision was made to modify the method. The main reasons for these modifications were driven by the loss of 46 collared DU caribou between spring 2018 and fall 2020, leaving only 4 collars active by fall 2020, while the global pandemic prevented any program maintenance in spring 2020. Without these additional collars, concerns over unrepresentative stratification, undocumented migratory movements, and punctuated movements between strata during the survey, were raised. Additionally, the communities of Cambridge Bay, Kugluktuk, and Ulukhaktok had concerns that the DU caribou herds' annual movements, migratory patterns and fall distribution, have been changing (Roberto-Charron, 2020). Local hunters were concerned that their observations of DU caribou year-round on Victoria Island were consistent with the observations from the 1920s reported by Inuit elders, in the DU herd's migration

from Victoria Island to the mainland. It's believed that severe winter storms, including icing events, led to a large-scale reduction in caribou abundance, which in turn led to the modifications in DU herd behaviour, and ultimately, range use (Roberto-Charron, 2020; Hughes, 2006; Poole et al., 2010; Hanke and Kutz, 2020). The reported declines in the 1920s persisted into the 1970s when Inuit harvesters began reporting the beginnings of a recovery on southern Victoria Island (Hughes, 2006). By the mid-1970s, small numbers of Dolphin and Union caribou were reported to be crossing the sea ice to the mainland, resuming their migratory behaviour (Hughes, 2006; Gunn et al. 1997).

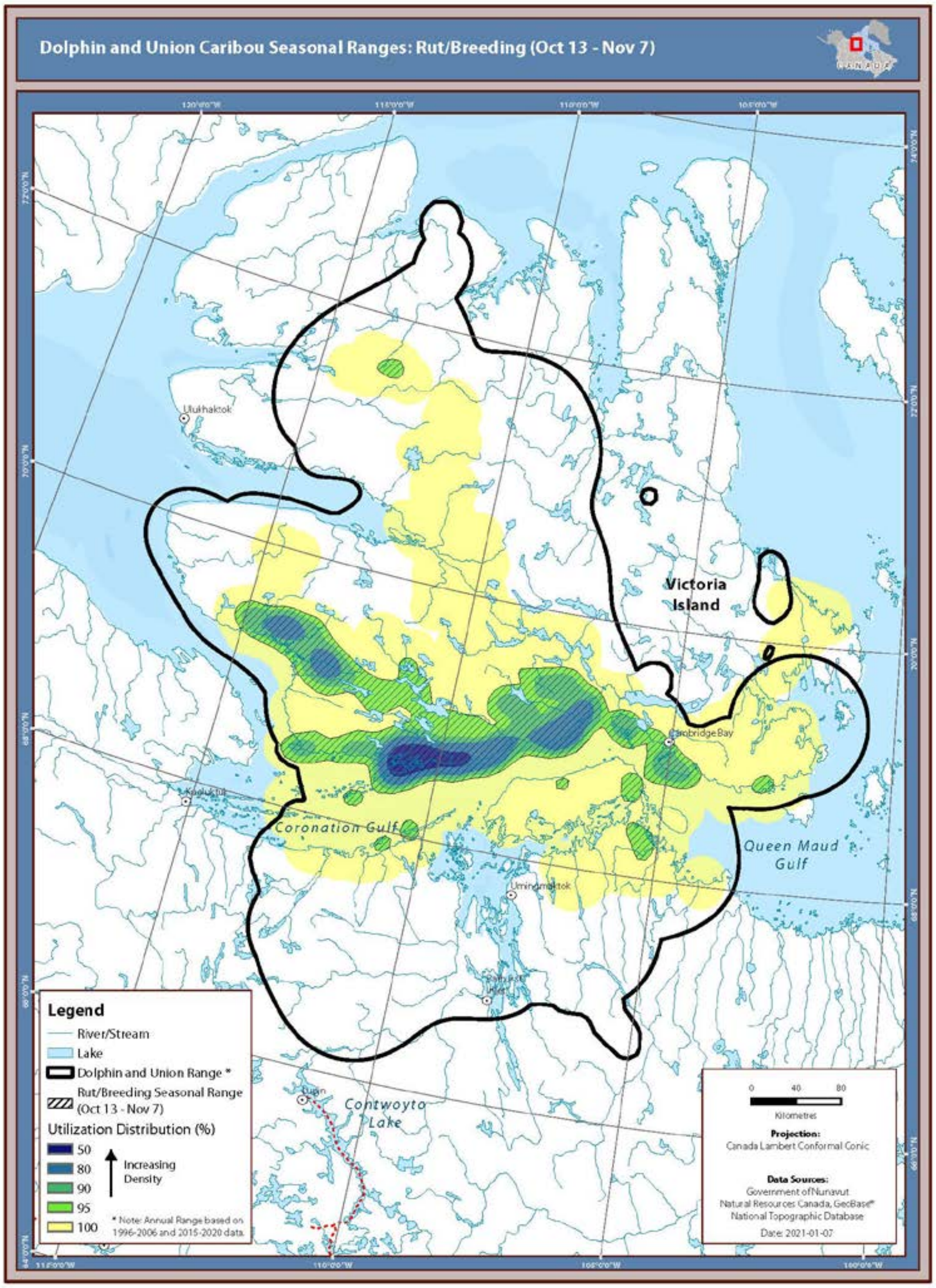

Figure 1. The Dolphin and Union (DU) caribou annual range and fall/rutting range (Oct. 13 to Nov. 7). Range extents developed using a kernel analysis of DU caribou cow telemetry data collected between 1997-2006 and 2015-2020 (**Appendix 8.1**). All core fall/rut seasonal range (green polygons) and annual range extents developed based on the 95% Utilization Distribution (UD). Yellow color represents fall/rut extents to the 100% UD. Red dashed line indicates a winter mining road.

2.0 STUDY AREA

The DU caribou herd annual range and fall/rutting seasonal range (October 13 to November 7) was estimated using a kernel analysis from the amalgamation of data from two satellite telemetry programs, the first running from 1997 through 2006, and the second running from 2015 to 2020 (Campbell et al., 2014). The estimated annual range of the DU caribou herd, based on satellite-collar location data collected between 1997 and 2020, is approximately 243,085 km^2. Of the entire annual range an estimated 157,147 km^2 (65%) lies on Victoria Island and 85,938 km^2 (35%) on mainland Nunavut. The full extent (100% UD) of the DU caribou herd fall/rutting range is estimated to cover 125,448 km^2, which represents approximately 52% of the herd's annual range. Of the fall/rut range, approximately 92,020 (73%) km^2 lies on Victoria Island, while an estimated 33,428 km^2 (27%) lies on the Nunavut mainland. As the survey was flown within the fall/rut period (October 13 to November 7), we focused survey effort within the fall seasonal range polygon (**Figure 2**). It is noteworthy that the fall/rut seasonal range extent includes the migratory period. All 2020 survey transects were flown prior to sea ice formation, therefore prior to the onset of the DU herds migration from Victoria Island south to the mainland extent of the fall/rut seasonal range.

The DU herd's annual range extends across both the Southern and Northern Arctic Ecozones (Environment Canada, 1995). From south to north, the range crosses 7 ecoregions including the Garry Lake Lowland, Takijuq Lake Upland, Queen Maud Gulf Lowland, Bathurst Hills, Amundsen Gulf Lowlands, Victoria Island Lowlands, and Shaler Mountains Ecoregions (Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995) (**Figure 3)**. Much of the DU fall/rutting seasonal range runs through the Amundsen Gulf Lowlands, and to a lesser extent through the Victoria Island Lowlands.

2.1 Northern Arctic Ecozone.

The Northern Arctic Ecozone primarily consists of low rolling plains covered by layers of glacial till and debris. Permafrost lies beneath the entire zone below a thin active layer that freezes in winter and thaws in summer. The constant freezing and thawing separate the substrate creating cell-like shapes known as patterned ground, which consequently cover much of the ecozone. Expansive flat coastal plains extending many kilometers inland typify much of the coastline within this Ecozone. Crustal recoil is active in the area and exemplified by inland beach ridges. Within the interior of this ecozone, broad plateaus are common, often showing deep V-shaped cuts along their shoulders where past and existing streams and rivers have cut through the sedimentary substrate on which they flow. Islands of this ecozone often display sheer cliffs along the edges of high plateaus making some coastline inaccessible. Within the DU annual range, this ecozone is represented by three ecoregions, the Amundesen Gulf Lowlands, Shaler Mountains, and Victoria Island Lowlands: (After Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995) (**Figure 2**);

2.1.1 Amundsen Gulf Lowlands Ecoregion.

This ecoregion occurs predominantly on southern Victoria Island and to a minor extent on the mainland. The mean annual temperature is approximately -14°C with a summer mean of 2°C, and a winter mean of -28.5°C. The mean annual precipitation ranges from 100 to 200 mm. This ecoregion is classified as having a low arctic ecoclimate and is characterized by a nearly continuous cover of dwarf tundra vegetation. Dominant vegetation consists of dwarf birch (*Betula glandulosa*), willow (*Salix spp.*), northern labrador tea (*Ledum decumbens*), mountain avens

(*Dryas integrafolia)*, and ericaceous shrubs (*Vaccinium spp*.). Tall dwarf birch, willow, and alder (*Alnus spp*.) occur on warm sites, while wet sites are dominated by willow and sedge (*Carex spp*.). The terrain of the southern one-third of Victoria Island generally slopes gently to the southwest and is composed of stratified Palaeozoic carbonate rocks. Extensive areas of drumlinoid ridges bring a characteristic grain to the minor topography on the island. Turbic Cryosols are the dominant soils, developing on a variety of smooth, undulating glacial deposits. Deep, continuous permafrost with high ice content and abundant ice wedges are characteristic, although an area with continuous low ice content permafrost runs along the coast between Minto Inlet and Prince Albert Sound, west of the Shaler Mountains ecoregion. Common wildlife includes muskox, caribou, arctic hare, arctic fox, snowy owl, raptors, polar bear, seal, seabirds, and waterfowl (After Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995).

2.1.2 Shaler Mountains Ecoregion.

This ecoregion covers the Shaler Mountains in central Victoria Island and is characterized by a 40-60% vegetative cover mixed with exposed bedrock materials. The mean annual temperature is approximately -15.5°C with a summer and winter mean of 1°C and -29.5°C respectively, with mean annual precipitation ranging from 100 to 200 mm. This ecoregion is classified as having a mid-arctic ecoclimate. Tundra vegetation includes purple saxifrage (*Saxifraga oppisitifolia*), mountain avens, and dwarf willow, along with alpine foxtail (*Hordium spp*.), wood rush (*Luzula confusa*), and other saxifrage (*Saxifraga spp*.). Wet areas have a continuous cover of sedge, cottongrass (*Eriophorum spp*.), saxifrage, and moss. The Shaler Mountains dissect Victoria Island and are composed of late Proterozoic stratified rocks intruded by gabbro sills that form cuestas and are capped by flat-lying volcanic rocks. The center part of the mountains reaches about 760 m ASL (above sea level). Turbic Cryosols developed on undulating to steeply sloping glacial deposits dominate the soils of this region, with surface bedrock common throughout the region. Continuous, low ice content permafrost occurs throughout the ecoregion. Common wildlife includes caribou, polar bear, muskox, arctic hare, arctic fox, snowy

owl, other raptors, seal, whale, walrus, seabirds, and waterfowl (After Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995).

2.1.3 Victoria Island Lowlands Ecoregion.

This ecoregion includes the northern two-thirds of Victoria Island. This ecoregion is classified as having a mid-arctic ecoclimate. The mean annual temperature is -14°C with a summer mean of 1.5°C and a winter mean of -29°C, with mean annual precipitation ranging from 100 to 150 mm. This ecoregion is characterized by a discontinuous upland vegetative cover dominated by purple saxifrage, mountain avens, and dwarf willow, along with alpine foxtail, wood rush, and other saxifrage species such as *Saxifraga tricuspidata*. Wet areas have a continuous cover of sedge, cottongrass, saxifrage, and moss. Remaining upland areas are largely devoid of vegetation, a distinguishing characteristic of this ecoregion. Smooth, undulating lowlands are formed on flat-lying Palaeozoic and late Proterozoic carbonate rocks that slope gently to the south and southwest. Extensive areas of drumlinoid ridges impart a characteristic grain to the minor topography. Elevations lie predominantly below 100 m ASL, except in central Victoria Island where elevations rise to over 200 m ASL. This ecoregion is underlain by continuous permafrost with medium to high ice content in the form of ice wedge polygons and massive ice bodies. Turbic Cryosols with Static Cryosols are the dominant soils, developing on a variety of smooth, undulating glacial deposits. Wetland areas are distributed mainly along the east coast of Victoria Island along M'Clintock Channel. These are composed of marshes, horizontal fens and low-center lowland polygon fens with small, elevated peat mound bogs. Common wildlife includes caribou, muskox, polar bear, arctic hare, arctic fox, snowy owl, other raptors, seal, whale, seabirds, and waterfowl (After Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995).

2.2 Southern Arctic Ecozone.

The Southern Arctic Ecozone primarily consists of extensive glacial deposits of soil and rock debris often in the form of boulder moraines cut by long eskers extending up to 100 km, with occasional surface intrusions of granite bedrock. Outwash aprons of crudely sorted sands, gravels and raised beach ridges once forming the shorelines of preglacial lakes, occur less frequently. Glacial carried “erratics”, or large boulders carried by glaciers, can be found throughout this ecozone. Permafrost occurs continuously throughout this ecozone, which at times can be just a few centimetres under the surface. Soils are often waterlogged or frozen, and ponds and lakes numerous. The constant freezing and thawing separates the substrate creating cell-like shapes known as patterned ground, which, as in the Northern Ecozone, cover much of the Southern Arctic Ecozone. Within the DU caribou annual range, this ecozone is represented by four ecoregions, the Takijuq Lake Upland, Bathurst Hills, Queen Maud Gulf Lowland, and the Garry Lake Lowland: (After Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995) (**Figure 2**).

2.2.1 Takijuq Lake Upland Ecoregion.

In this ecoregion, much of the upland surface is composed of unvegetated rock outcrops that are common on the Canadian Shield. The mean annual temperature is approximately -10.5°C with a summer mean of 6°C and a winter mean of -26.5°C, with mean annual precipitation ranging between 200 and 300 mm. This ecoregion is classified as having a low arctic ecoclimate. Numerous lakes form extensive coverage across the lowlands of this ecoregion. Vegetative cover is characterized by shrub tundra, consisting of dwarf birch, willow, northern Labrador tea, Mountain avens, and ericaceous shrubs. Depressions are dominated by willow, sphagnum moss (*Sphagnum spp*.), and sedge tussocks. Scattered stands of spruce (*Picea glauca*) occur along the southern boundary of this ecoregion. The geology of the region consists mainly of massive Archean rocks that form broad, sloping uplands, plateaus, and lowlands. Bathurst Hills form a prong of rugged ridges that reach

about 610 m ASL and stand as much as 185 m above nearby lakes. Turbic and Static Cryosols form the common soils on thin discontinuous sandy morainal and fluvioglacial materials, and in association with rock outcrops, dominate the uplands. Organic Cryosols are the dominant soils in the lowlands. Permafrost is deep and continuous with low ice content throughout most of the region, although the ice content along the west side of Bathurst Inlet is low to medium. The ecoregion has high mineral development potential and considerable exploration activity has taken place. Common wildlife includes caribou, muskox, grizzly bear, hare, fox, wolf, raptors, shorebirds, seabirds, and waterfowl (After Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995).

2.2.2 Bathurst Hills Ecoregion.

This ecoregion occurs along the mainland shore of Coronation Gulf and along the shores of Bathurst Inlet and adjacent offshore islands. The mean annual temperature is approximately -12.5°C with a summer and winter mean of 4°C and -28°C respectively. The mean annual precipitation ranges from 125 to 200 mm. This ecoregion is classified as having a low arctic ecoclimate and is characterized by a nearly continuous cover of shrub tundra vegetation. Dwarf birch, willow, and alder occur on warm, dry sites while sphagnum moss and sedge tussocks dominate poorly drained sites. Bathurst Hills are composed of down-faulted, folded sediments and sills that lie within, and extend south from, Bathurst Inlet between higher upland areas of massive granite rocks. The softer rocks, having been eroded in many places, lie submerged beneath bays and channels, leaving the harder deposits more than 300 m ASL. Marine silts and reworked deposits from marine sediments cover low-lying areas along the coast. Some rugged peaks reach 610 m ASL, standing as much as 185 m above nearby lakes. Rock outcrops and Turbic and Static Cryosolic soils developed on thin sandy glacial tills, are characteristic of the region. Permafrost is continuous with low to medium ice content, except in the northeastern part of the ecoregion on the Kent Peninsula, where it has medium to high ice content in the form of ice wedges. Common wildlife includes waterfowl, caribou, muskox, moose,

red and arctic fox, snowshoe hare, arctic ground squirrel, masked shrew, lemming, wolf, lynx, weasel, snowy owl, shorebirds, seabirds, raptors, seal, whale, walrus, and polar bear (After Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995).

2.2.3 Queen Maud Gulf Lowland Ecoregion.

The Queen Maud Gulf Lowland is classified as having a low Arctic ecoclimate and is characterized by a cover of shrub tundra vegetation, consisting of dwarf birch, willow, northern Labrador tea, mountain avens, and ericaceous shrubs. Tall dwarf birch, willow, and alder occur on warm sites while wet sites are dominated by sphagnum moss and sedge tussocks. Geologically the region is composed of massive Archean rocks that form broad, sloping uplands that reach about 300-m ASL in the south, and subdued undulating plains near the coast. The coastal areas are mantled by silts and clay of postglacial marine overlap. Bare bedrock is common, and turbic and static cryosols, developed on discontinuous, thin, sandy moraine, and level alluvial and marine deposits, are the dominant soils. Permafrost is continuous and deep with low ice content. The Queen Maud Gulf Lowlands are an important habitat for waterfowl and shorebirds, and the Queen Maud Gulf Bird Sanctuary covers most of the ecoregion (After Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995).

2.2.4 Garry Lake Lowland Ecoregion.

This ecoregion extends across an extensive area of massive granitic Archean rocks, forming a broad, level to gently sloping plain that reaches about 300 m ASL. The mean annual temperature is approximately -10.5°C with a summer mean of 5.5°C and a winter mean of -26.5°C, while mean annual precipitation ranges between 200 and 275 mm. This ecoregion is classified as having a low arctic ecoclimate. The characteristic vegetation is shrub tundra commonly made up of dwarf birch, willow, and alder, on warm, dry sites, and willow, sedge, and moss on poorly drained sites. The lowland is composed of Turbic and Static Cryosol soils developed on discontinuous, thin, sandy moraine, with Organic Cryosolic soils on level high-centre

peat polygons. Permafrost is continuous with low ice content throughout the ecoregion. This ecoregion provides breeding habitat for snow and Canada geese, and other waterfowl. Other common wildlife include caribou, muskox, moose, red and arctic fox, snowshoe hare, arctic ground squirrel, masked shrew, lemming, wolf, lynx, weasel, snowy owl, shorebirds, and other raptors (After Wiken, 1986; Environment Canada, 2001; Environment Canada, 1995).

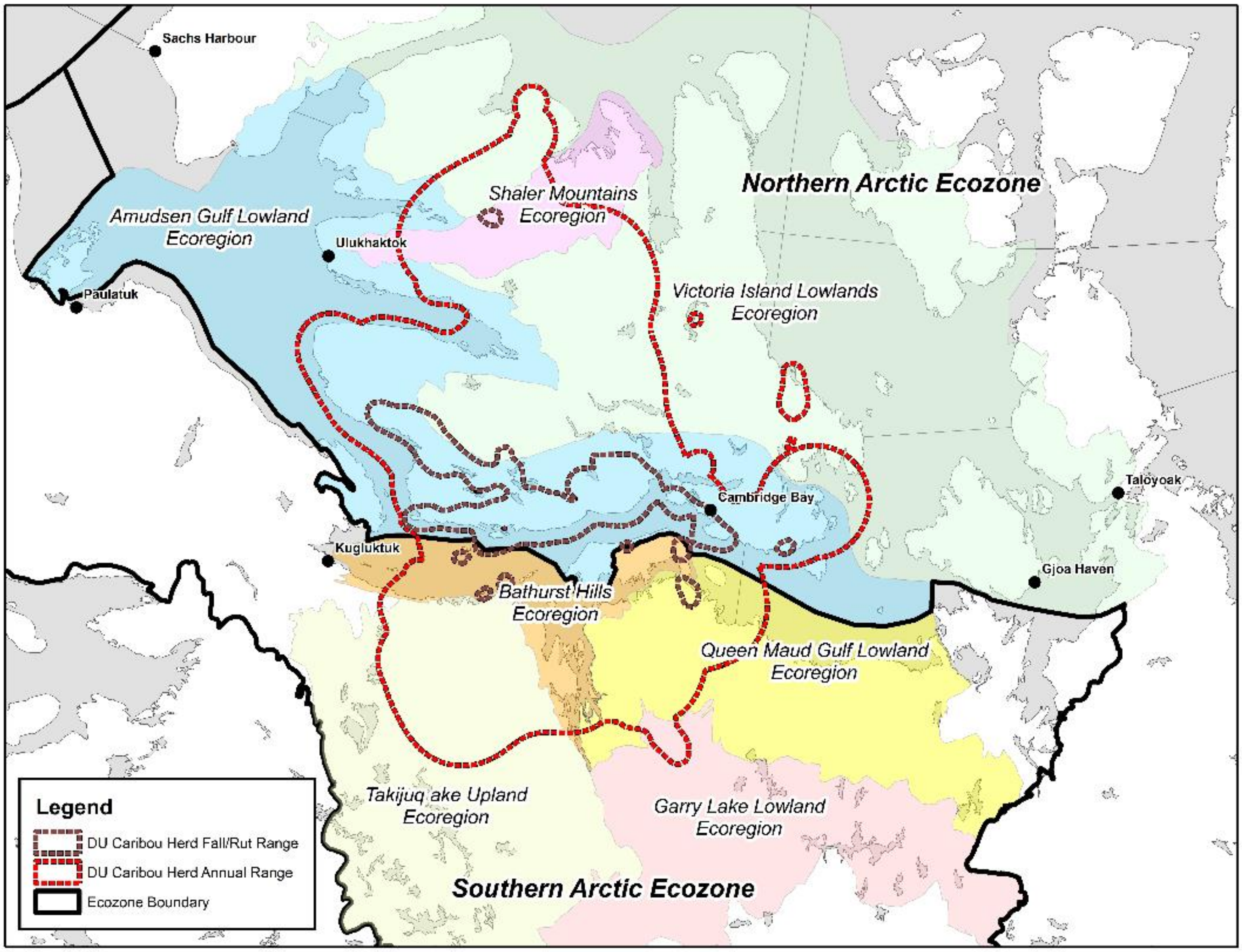

Figure 2. Ecozones and ecoregions of the Dolphin and Union caribou herds fall/rut seasonal range extents (brown dashed line) and annual range extents (red dashed line) (Ecozones and Ecoregions after Environment Canada, 1995). Fall/rut extents based on the 100% Utilization Distribution.

3.0 METHODS

The fall 2020 DU caribou distance sampling and double observer pair visual abundance survey was based out of the communities of Kugluktuk, Cambridge Bay, Nunavut, and Ulukhaktok, Northwest Territories. The survey was structured into two main components: 1) Pre-stratification using telemetry, past survey results and IQ collected during the pre-survey consultation process, and 2) Distance sampling double observer pair aerial visual survey methods.

We used telemetry data from past programs ranging from 1996 to 2020, to help define the fall/rutting period (October 13 to November 7) within which the survey was to be conducted. Initial survey stratification used both individual telemetry points and kernel analysis (KDE), to determine potential fall range and likely densities. Determining sea ice crossing dates was also important and was pre-determined to be the endpoint of survey efforts. We also examined the general vegetative characteristics and topography preferred by collared caribou and used the preferred habitats to help align survey strata and determine areas not represented by telemetry that may provide preferred habitat to DU caribou. All pre-selected fall 2020 survey strata were drafted using all these information sources, to ensure all likely caribou habitat was included in the survey effort. A summary of spatial methods, analysis, and results are provided in an appended summary analysis to this report (**Appendix 8.1 “Spatial Analysis”**).

3.3 Survey Area and Stratification

The establishment of the survey study area and the division of that study area into strata (or geographic areas) of similar relative densities of caribou was achieved prior to the October 2020 survey effort, using past aerial survey and telemetry findings, and a spatial analysis of historical telemetry data (**Appendix 8.1**), merged with local knowledge and/or IQ (Campbell et al., 2015; Roberto-Charron, 2020). The decision to diverge from the previously effective costal survey method used in fall 1997, 2007, 2015, and 2018, was due to 3 main factors:

1- Local hunters from the communities of Kugluktuk, Cambridge Bay, and Ulukhaktok believed the current collaring program was not representative of the entire DU fall range, reporting a component of the DU caribou population that in recent years has been wintering on Victoria Island. Additionally, concerns that the 2015 and 2018 mainland based collaring programs did not represent non-migratory DU caribou that spent their entire annual cycle on Victoria Island, were also raised.

2- Only four (4) active collars were remaining from a 50-collar deployment program initiated in spring 2018. This number is considered too small to develop robust strata that would be reflective of the entire DU caribou fall distribution.

3- The need for the survey was considered urgent by governments and stakeholders based on the results of a fall 2018 costal survey, which reported of a 78% decline in abundance from the previous fall 2015 coastal abundance survey. A decision to postpone the survey until a new collaring program could be initiated was deemed a high risk.

We used previous year's survey results (Leclerc and Boulanger, 2019), and collar data to develop initial strata (**Figure 3**). We then used spatially explicit polygons of the DU caribou fall/rut seasonal range, including strata based on previous surveys

and telemetry data, as a starting point for the inclusion of IQ from Hunters and Trappers Organizations (HTOs) representing Cambridge Bay, Kugluktuk, Burnside, Omingmaktok, and Ulukhaktok. We planned three consultation meetings to engage local experts and knowledge holders in the further development of survey strata (**Table 3**), through the augmentation of survey and telemetry-based maps provided to all participants, with local IQ (Roberto-Charron, 2020) (**Appendix 8.2**). Following initial consultations, DOE staff amalgamated the two mapping products into several survey strata organized into 2 main options. These refined options were further discussed, and an agreement derived. With an understanding that severe fall weather, creating conditions of icing, fog, and heavy snow, would limit our total number of consecutive flying days, the working group opted for a two-tiered approach. Using this approach all very high (highest predicted caribou densities), high (high predicted caribou densities), and medium (medium predicted caribou densities) strata would be priority, with all remaining low-density (low predicted caribou densities) strata flown if conditions, time, and budget allowed (**Figure 4**).

We used the double observer pair method combined with distance sampling methods to visually assess caribou abundance across all strata. The merging of past survey observations and telemetry data, with the mapped density distributions from consultations, yielded 13 main survey strata including one very high density (VHD) stratum, one high density (HD) stratum, four medium density strata (MD), and 7 low density strata (LD) (**Figure 5**). Survey effort, measured as transect spacing, was then allocated across survey strata based on the following constraints. Strata with the highest estimated caribou densities for the proposed survey period would receive the highest level of coverage, with survey effort for the remaining strata proportional to derived relative densities of caribou, estimated weather windows, and budgetary constraints. Effective strip width (up to a maximum of 1,500 meters per side of the aircraft) could vary depending on sightability, which in turn was dependent on measured co-variates including visibility, snow patchiness, terrain ruggedness, percent snow cover, percent cloud cover, speed, and observer ability. Very high-density strata received the highest survey effort with transects spaced 4 km apart

yielding a maximum stratum coverage of 75% (assuming perfect sightability (sightability=1) across the full 0-1500 m distance). The high-density stratum used a 5-kilometer spacing yielding a maximum coverage of 60%. Medium strata used an 8-kilometer transect spacing yielding a maximum coverage of 37%; while low-density strata used 10-kilometer transect spacing yielding a maximum coverage of 30% (**Figure 5**).

Financial and logistic constraints, Dolphin and Union caribou migratory behavior, and weather modeling of weather windows between October 15 and November 7 within the survey study area, dictated the survey window and total number of aircraft required to successfully complete the survey. The survey endpoint was dictated by the timing of the Dolphin and Union caribou migration from the southern shores of Victoria Island to the Nunavut mainland. All strata were surveyed using three high-winged aircraft with wing struts. The aircraft deployed included two Cessna Grand Caravan single turbine engine aircraft, and one Dehavillind twin-Otter, twin turbine engine aircraft.

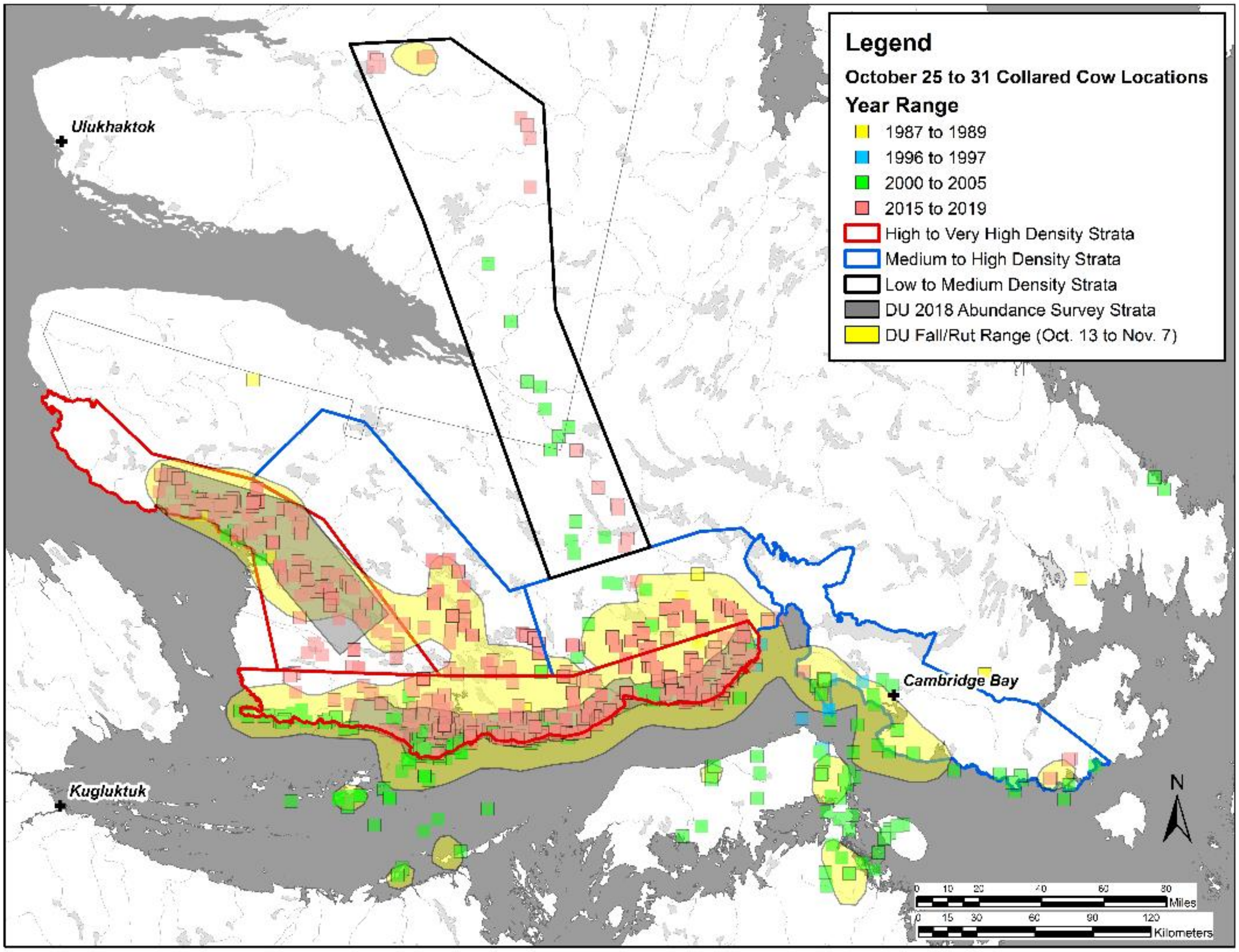

Figure 3. The initial DU fall 2020 survey stratification based solely on DU caribou telemetry data and the 2018 DU abundance survey strata. The DU fall/rut seasonal range extents (yellow) were developed using kernel analysis and based on a 95% utilization distribution using combined telemetry data from a 1997 to 2006 deployment, and a 2015 to 2020 deployment.

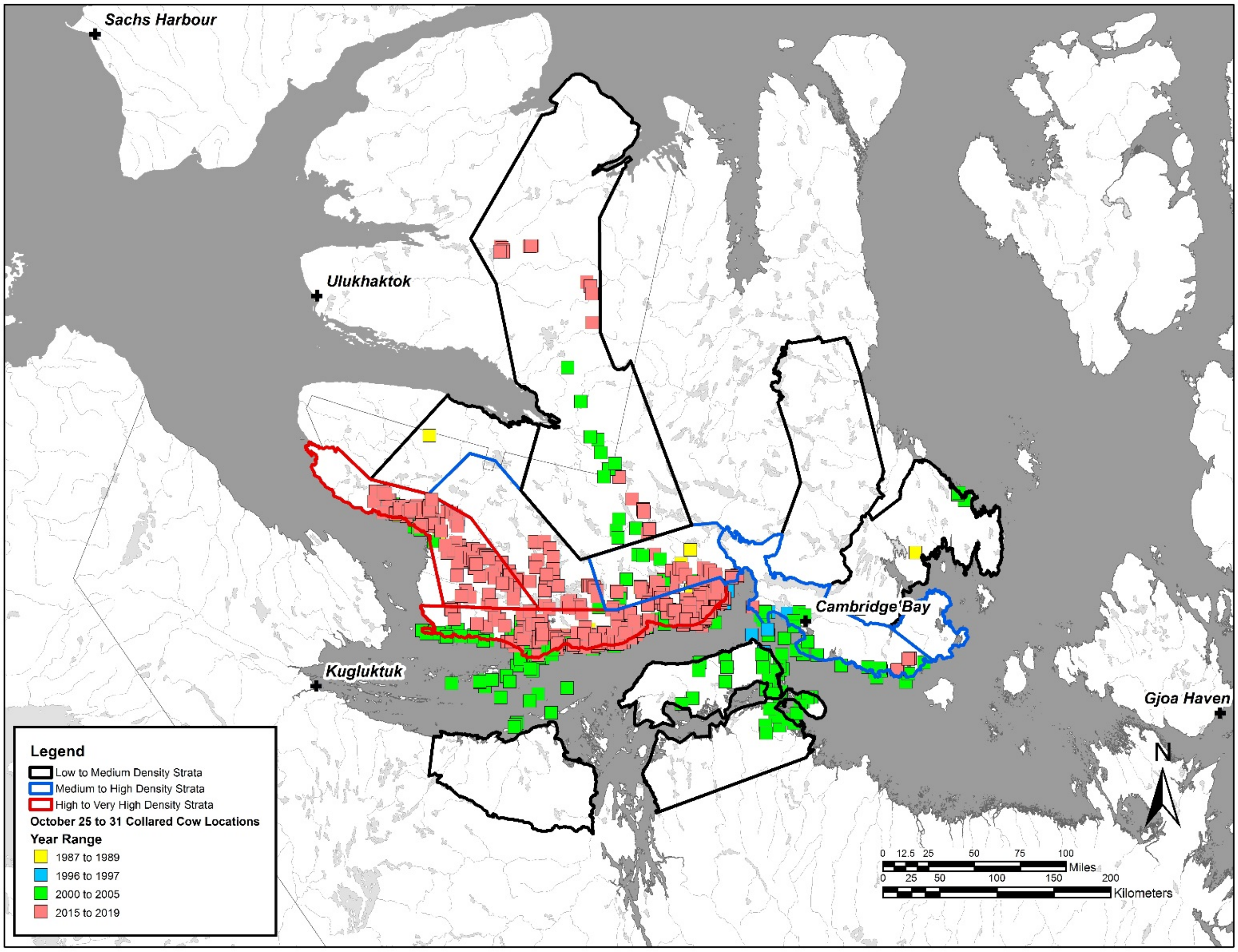

Figure 4. Final strata selection based on figure 1 above, and the inclusion of community-based IQ collected during the pre-survey consultation process.

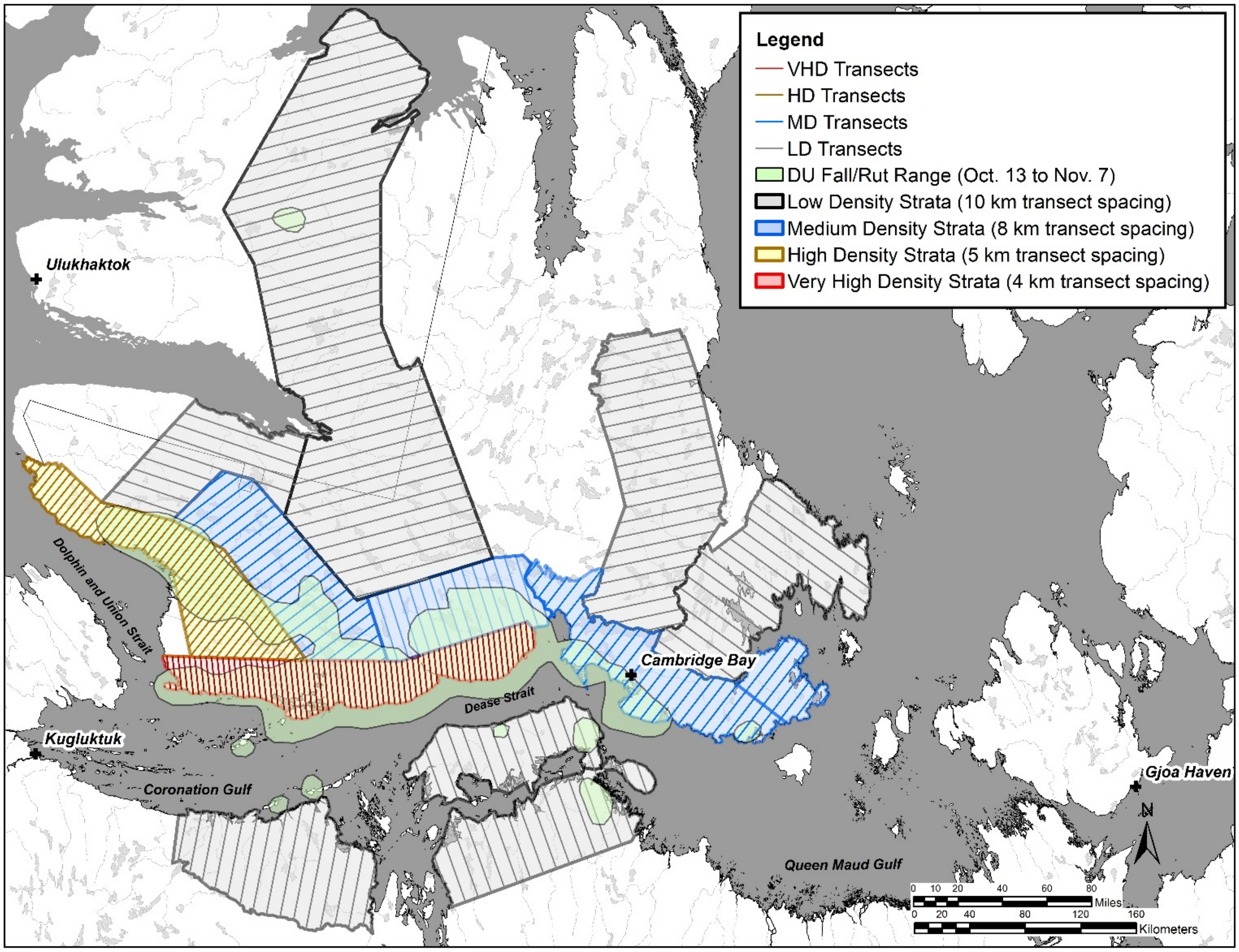

Figure 5. DU fall 2020 survey strata placement and transect effort relative to DU late fall range (October 13 through November 7). Strata and transect effort based on historic survey observations, cumulative caribou telemetry data, IQ from the communities of Cambridge Bay, Kugluktuk, and Ulukhaktok, predicted weather windows and budgetary constraints. The DU Fall/Rut seasonal range extents (green) are based on a 95% utilization distribution using a kernel analysis of combined telemetry data from a 1997 to 2006 collar deployment, and a 2015 to 2020 collar deployment.

Table 1. Dolphin and Union research and management consultation schedule and participating agencies. Dolphin and Union management concerns and survey design was discussed in meetings 1, 2, and 3. Initial survey results and reporting schedules were discussed in meetings 4 and 5.

Date & Time	***Meeting Type***	***Organizations Represented***	***# of Attendees & Reference***
1 September 16th, 2020 9:00 AM to 5:00 PM	In Person and virtually, in Cambridge Bay	Cambridge Bay HTO, Kugluktuk Angoniatit Association, Omingmaktok HTO, Burnside HTO, Kitikmeot Regional Wildlife Board, Ulukhaktok HTC, Nunavut Wildlife Management Board (NWMB), GN-Department of Environment (DOE), Nunavut Tunngavik Inc.(NTI), Wildlife Management Advisory Council (WMAC), GNWT-Environment and Natural Resources (ENR), Environment and Climate Change Canada (ECCC), University of Calgary (U of C), Kitikmeot Inuit Association (KIA).	42 Attendees (Roberto-Charron, A. 2020. Dolphin and Union Management Consultation. Summary report. 36 pp.)
2 October 2nd, 2020 9:00 AM to 12:00PM	Virtual Meeting	Cambridge Bay HTO, Kugluktuk Angoniatit Association, Omingmaktok HTO, Burnside HTO, Kitikmeot Regional Wildlife Board, Ulukhaktok HTC, Nunavut Wildlife Management Board (NWMB), GN-DOE,NTI, WMAC, GNWT-ENR, ECCC, U of C,KIA.	42 Attendees
3 October 8th, 2020 9:00 AM to 5:00PM 6:30 PM to 9:30 PM	In Person and virtually, in Cambridge Bay	Cambridge Bay HTO, Kugluktuk Angoniatit Association, Omingmaktok HTO, Burnside HTO, Kitikmeot Regional Wildlife Board, Ulukhaktok HTC, Nunavut Wildlife Management Board (NWMB), GN-DOE,NTI, WMAC, GNWT-ENR, ECCC, U of C,KIA.	42 Attendees
4 October 29th, 2020	In Person in Cambridge Bay	Cambridge Bay HTO, GN-DOE, NTI, KRWB	15 Attendees
5 October 30th, 2020	In Person in Kugluktuk	Kugluktuk Angoniatit Association, GN-DOE, NTI	17 Attendees

3.4 Aerial Abundance Survey

The fall 2020 Dolphin and Union caribou abundance survey applied a random, stratified, visual method, employing both distance sampling and double observer pair techniques (Boulanger, 2020; Boulanger et al., 2014; Campbell et al., 2012a). Transect spacing was allocated based on proportional densities as described in section 3.1 and flying effort allocated based on total available flying time (Heard, 1985; Boulanger, 2020). Transects within each stratum were aligned at right angles to the longitudinal axis of the stratum to maximize the total number of transects (N) in each stratum. In each abundance stratum, an initial transect was randomly placed perpendicular to the longest stratum boundary and the remaining transects systematically placed at regular intervals according to the allocation of survey effort (**Figure 5**). The entire aerial survey study area covered 136,889 km^2 and encompassed the known fall range extents and known migratory corridors of the Dolphin and Union caribou herd (**Figure 5**). In total, the survey included 326 transects with a mean transect length of 52.4 km, yielding 16,322 line kilometers, not including positioning and de-positioning. Transects were created using Environmental Systems Research Institute (ESRI) ArcMap Geographic Information System (GIS) software and were based on the World Geographic System (WGS) 1984 coordinate system projected into Canada Lambert conformal conic.

Visual observations were recorded using distance sampling, where five observational strips or “bins”, were marked out on left and right fixed wing struts. The 5 distance bins were divided across the strut into 0 to 200 meter, 200 to 400 meter, 400 to 600 meter, 600 to 1,000 meter and 1,000 to 1,500 meter strips. Bin development followed a similar configuration used successfully during a 2014 survey of Baffin Island caribou and based on recommended guidelines for bin intervals (Campbell et al., 2015; Buckland et al., 1993). Total strip width was marked using attached streamers at 0 meter, and 1,500 meter strut markers, while 1/8-inch-wide black electrical tape was

applied against a white strut background to visually separate the remaining bins. Bins were also numbered from 1 (0-200m) to 5 (1,000 to 1,500m) for bin identification when an observation is being called out. Strip widths or "bins" (w) were calculated using the formula from Norton-Griffiths (1978) (**Figure 6**).

$w = W * h/H$

<u>Where</u>:

***W** = the required strip width or "bin"*

***h** = the height of the observer's eye from the tarmac*

***H** = the required flying height*

Strip width calculations were confirmed by comparing bin measurements between aircraft of the same make and model used in previous surveys where bin markers were confirmed by flying perpendicularly over runway distance markers at survey altitude, with strut measurements of the 2020 survey aircraft. Due to the high potential for patchy snow conditions, and seasonally low cloud, coupled with relatively flat terrain, the decision was made to reduce survey altitude to 92 meters (300 feet) from the more commonly used 122 meters (400 feet), to enhance caribou sightability. All aircraft were equipped with radar altimeters to ensure an altitude of 92 meters above ground level (AGL) was maintained precisely. Off-transect observations were not encouraged for the purposes of ensuring a more focused search of the demarked distance bin visual strips. Observed caribou were not classified into age and/or sex classes due to the potential of negatively affecting an observer ability to effectively search his or her bins.

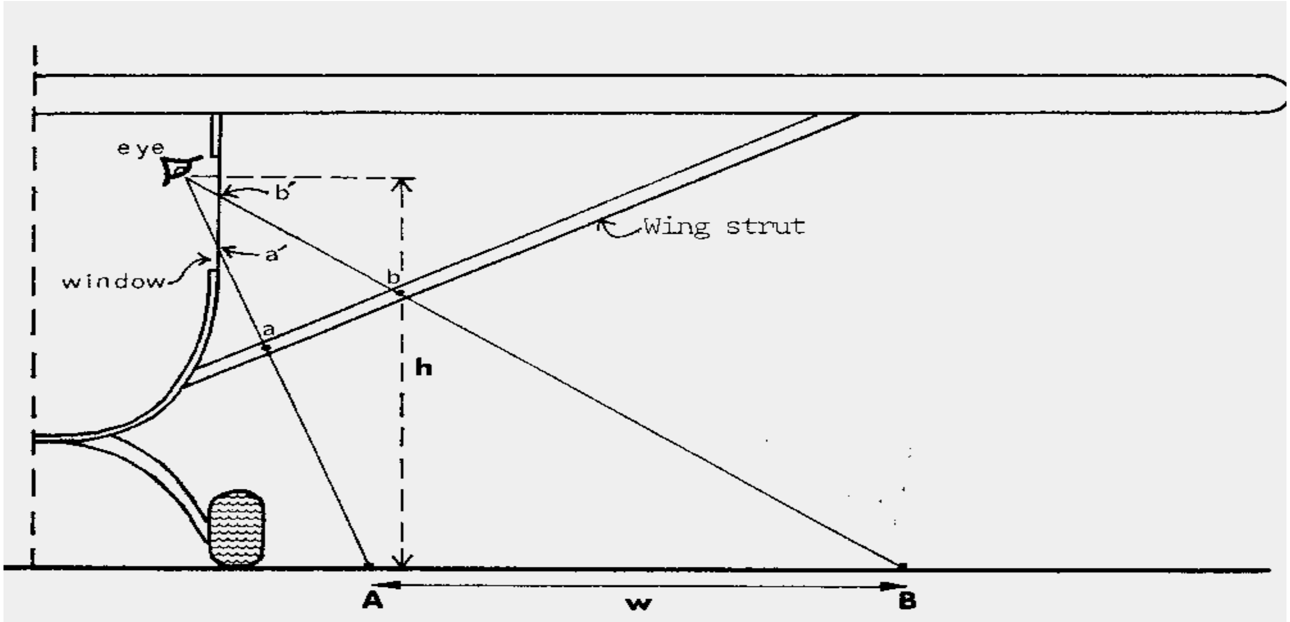

Figure 6. Schematic diagram of aircraft configuration for strip width sampling (Norton-Griffiths, 1978). W is marked out on the tarmac, and the two lines of sight a' – a – A and b' – b – B established. The streamers are attached to the struts at *a* and *b*, whereas a' and b' are the window marks (After Jolly, 1969).

The double observer pair method used two dedicated observers on each side of the aircraft and two additional observer/data recorders on each side of the aircraft. All caribou (target wildlife) called by the observers included the bin/strip number in which they were seen, an index of snow patchiness, and an index of snow cover. The observer/recorder recorded the species and number, the observation waypoint, air speed, percent cloud cover, an index of visibility, and an index of topographic ruggedness.

The topography index was a general assessment of elevation variation, expressed as a ratio of slope to ruggedness. Observers and/or data recorders assessed the overall degree of slope within the immediate area of observed individuals/groups and recorded these observations numerically as flat (1), moderate (2), or steep (3). Ruggedness was assessed using a visual sweep across a 1,000 square meter area surrounding the observation. Ruggedness assessments were also recorded numerically as flat (1), rolling (2), and mountainous (3) across the same area. For example, a topography index of 1 / 2 would indicate the observation was made in a flat area within rolling terrain.

A snow patchiness index was assessed numerically by the observers within an estimated 500 square meter buffer around the observation. Observations made in areas characterized by continuous ground cover received a value of one (1). Buffers characterized by checkerboard patches of snow and open ground estimated to be 1 to 5 meters in size or less, were given a value of two (2). Areas with checkerboard like patches 5 to 10 meters in size were recorded as a three (3), while observations made within areas representing checkerboard patches 10 to 50 meters in size were given a value of four (4). Finally, observations made within areas of contiguous snow cover with no exposed ground, were assessed as a five (5). Observations yielding a patchiness index of 2 to 4 (indicating a non-continuous snow cover) would be further assessed using snow cover estimates recorded by the recorder/observer. Snow cover was measured as a percentage of the ground covered by snow within an estimated 500 square meter area surrounding the observation. Cloud cover was

measured as a percentage of sky that obscures blue sky within an estimated 2,000 square meter area around the aircraft and observation.

The visibility index was based on the cause of the reduced visibility, and its extent. Six main mechanisms of reduced visibility were used, and included rain (R), snow (S), fog (F), ice fog (I), dust (D), and smoke (SM). The degree to which visibility was reduced used 5 additional categories including: unrestricted (1), unrestricted within visual strut markers (bins) (2), partially restricted within strut markers (3), mostly restricted within strut markers (4), and completely obscured within strut markers (5). For example, visibility that is partially obscured in snow, within observation strut markers would be recorded as S/3.

3.5 Dependent Double Observer Pair & Distance Sampling Visual Method

The double-observer pair configuration was used within all fixed wing aircraft to maximize sightability out of each of the left and right side of the aircraft, by adding one additional observer to each side (Campbell et al., 2012, 2015, and 2018). Additionally, the double observer pair configuration allowed each aircraft to maintain a minimum of two experienced wildlife observers on each of the left and right side of the aircraft throughout the survey, while providing training opportunities for community-based representatives within the remaining seats. The method, as applied to the present work, involved two pairs of observers on each of the left- and right-hand sides of the aircraft in addition to one recorder/observer on each side of the aircraft (**Figure 7**). Of the dedicated observers, one “primary” or front observer sat in the front seat of the plane with a second “secondary” or rear observer seated immediately behind the primary. The method as it applied to the Dolphin and Union caribou abundance survey adhered to five basic steps:

1) The front (primary) observer called out all groups of caribou (number of caribou and location) including the observation bin number he/she saw within each of the 0 to 200, 200 to 400, 400 to 600, 600 to 1,000, and 1,000 to 1,500 meters distance bins. Front observers were instructed to call observations just after they passed the three o’clock (right) or nine o’clock (left) positions halfway between the front and rear (secondary) observer (approximately at the wing strut). This included caribou groups that were between approximately 12 and 3 o’clock for right side observers and 9 and 12 o’clock for left side observers. The main instruction to observers was that the front observer be given time to call out all caribou seen before the rear observer called them out:

2) The rear observer called out whether he/she saw the caribou that the front observer saw and observations of any additional caribou groups. The rear observer waited to call out caribou until the group observed passed halfway between observers (between 3 and 6 o’clock for right side observers and 6 and 9 o’clock for left side observer).

3) The observers discussed any differences in group counts to ensure that they had called out the same groups or different groups and to ensure accurate counts of larger groups.

4) The data recorders in the Cessna Grand Caravan, one in the right seat beside the pilot and the other on the rearmost seat on the left side of the aircraft, categorized and recorded counts of each caribou group into “front only”, “rear only” and “both”. The sample unit for the survey was “*groups of caribou*” not individual caribou. Recorders and observers were instructed to consider individuals to be those caribou that were observed independent of other individual caribou and/or groups of caribou. If sightings of individuals were within proximity to other individuals, then the caribou were considered a group. As the data recorders were also experienced observers, data recorder observations would also be recorded. The single exception to the above configuration involved the data recorders within the Twin Otter aircraft, both of whom took positions within the left and right seats in front of the left and right observers, and behind the pilots.

5) The observers switched places approximately halfway through each survey day (i.e., at lunch or halfway through a flight) to monitor observer ability. The recorder noted the names of the primary and secondary observers.

The method used a combined distance sampling and mark-recapture approach to estimate abundance for survey stratum during the DU caribou survey effort. The basic approach involved using mark-recapture to estimate the probability of detection of caribou at 0 distance from the survey plane, and distance sampling methods to estimate the decrease in probability of detection at greater distances from the plane. This approach ensured a more robust estimate than using distance sampling methods alone, which assume that the probability of detection of caribou groups at 0 distance from the plane is 1 (Borchers et al. 1998, Buckland et al. 2004, Laake et al. 2008a, Laake et al. 2008b, Buckland et al. 2010, Laake et al. 2012). The Huggins (Huggins 1991) mark-recapture model in program MARK (White and Burnham 1999) was used for initial model selection of dominant covariates that affect sightability in the vicinity of the survey plane. For this

analysis, observations were restricted to those that occurred within 1,500 meters of the survey plane on each of the left and right sides. A removal model formulation of parameters was used to account for the dependence of front (primary) and rear (secondary) observers.

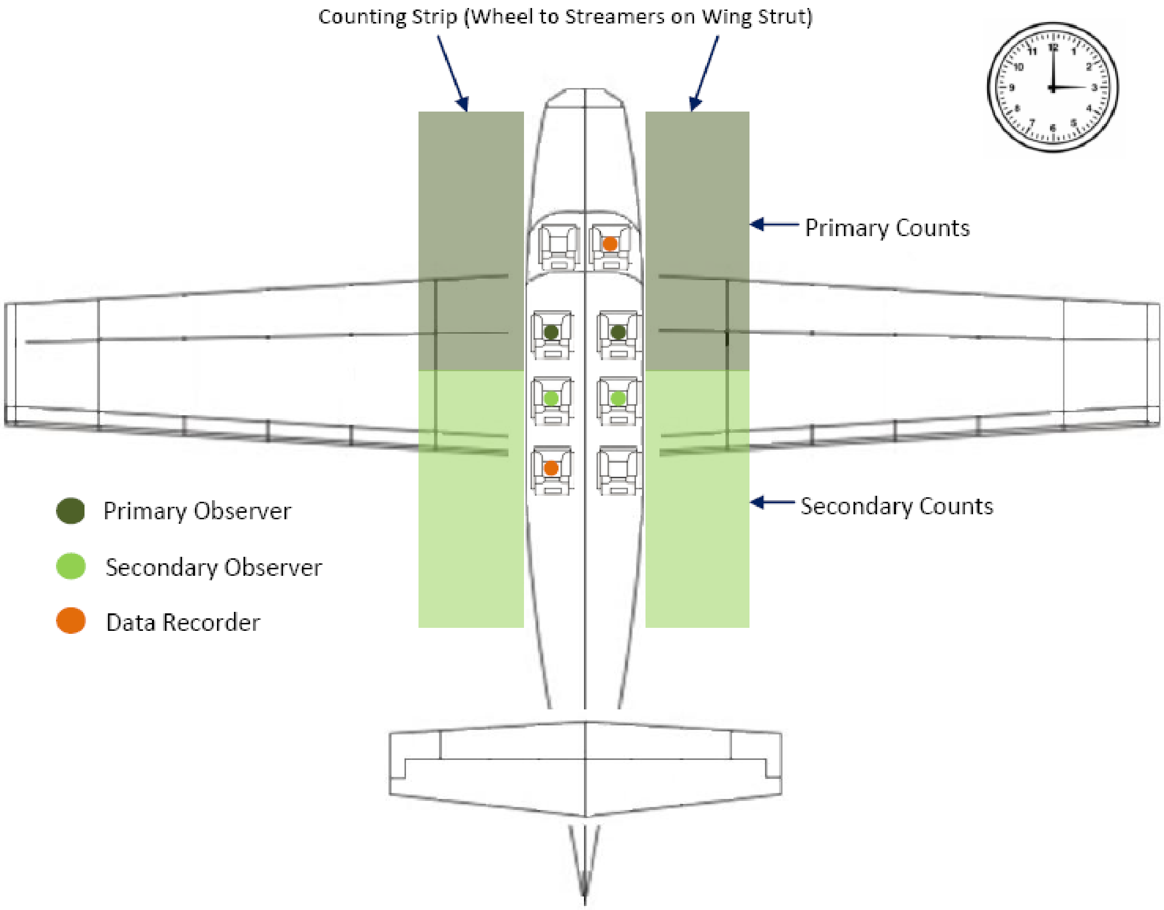

Figure 7. Observer and data recorder position for the double observer pair method employed on this survey. The rear (secondary) observer calls caribou not seen by the front (primary) observer after the caribou have passed the main field of vision of the front observer. The hour hand on a clock is used to reference relative locations of caribou groups (e.g., “Caribou group at 3 o’clock” would suggest a caribou group 90º to the right of the aircrafts longitudinal axis.). See 3.5 above for exceptions within the Twin Otter aircraft.

The main covariates used in the analysis are listed in **Table 4**. The *MRDS* R package (Laake et al., 2012) was used to build mark-recapture and distance sampling models. The approach was to initially build distance sampling models with the mark-recapture model parameters held constant and vice-versa for the double observer pair models. A composite model was then built using the most supported covariates from each of the component analyses. Estimates for strata were derived based on transect lengths and strata areas for the best fitting detection model. Estimates of variance were derived using estimators for a systematic sampling layout (Fewster, 2011).

The fit of the models was evaluated using the Akaike Information Criterion corrected for small sample size (AIC_c). The model with the lowest AIC_c score was considered the most parsimonious, thus minimizing estimate bias and optimizing precision (Burnham and Anderson, 1998). The difference in AIC_c values between the most supported model and other models (Δ AIC_c) was also used to evaluate the fit of models when their AIC_c scores were close. In general, any models with a Δ AIC_c score of less than 2 between them were considered to have equivalent statistical support. Overall model fit was also assessed using goodness of fit tests (Buckland et al. 1993; Buckland et al., 2004) as well as graphical comparison of detection functions with histograms of frequencies of observations from the survey. Analyses were conducted in program R (R Development Core Team, 2009) with plots being produced using the *ggplot* (Wickham, 2009) R package and maps produced in QGIS (QGIS Foundation 2020) using the simple features R package (Pebesma, 2018).

3.6 Trend Analysis

The DU caribou fall 2020 Victoria Island, mainland, and combined estimates were initially compared to the 2018 estimate using a t-test to determine if the two estimates

were significantly different (Gasaway et al., 1986). Confidence limits on yearly change were estimated assuming log-normal distributions of abundance estimates. Log-linear models (McCullough and Nelder, 1989; Thompson et al., 1998; Williams et al., 2002) were used to analyze longer-term trends. This model assumed an underlying quassi-Poisson distribution of estimates with population change occurring on the exponential scale. Survey estimates were weighted by the inverse of their variance therefore giving more weight to the more precise estimates. A log-link was used for the analysis therefore allowing direct estimates of yearly rate of change as one of the regression β terms.

Table 2. Covariates used to model variation in sightability for the dependent double observer analysis of the fall 2020 DU abundance survey results.

Covariate	Acronym	Description
Observer pair	obs	each unique observer pair
Data recorder observations	DRpair	Pairs who were assisted by the data recorder
	Recobs	Observations taken by data recorders
Group size	size	size of caribou group observed
	Log(size)	Natural log of group size
Snow cover	snow	snow cover (0,25,75,100)
	snowc	continuous
Snow patchyness	patch	Ordinal (1 to 6)
Visibility		Ordinal
Cloud cover	cloud	cloud cover (0,25,75,100)
	cloudc	continuous
Coastal/inland strata	Coast	Coastal strata vs inland areas

4.0 RESULTS

4.1 Observations and Survey Coverage

Though strata development used a combination of telemetry data from 1995 to 2019, as well as IQ reported through community consultations, we wished to assess strata coverage based on current telemetry locations of DU caribou. At the time of the DU caribou 2020 fall abundance survey, four (4) DU caribou collars remained active, and produced a total of 48 locations from October 23 and 24, and October 26 through 28, the interval within which all VHD, HD, and MD strata flights were completed. All collar locations were located within defined strata and as a result received complete coverage during the 2020 survey effort. We found that only 5 of those 48 locations (10%) collected during this survey period were outside of the Very High Density (VHD) strata, with 4 of the 5 (8%) within the Medium Density West stratum, and 1 of the 5 (2%) within the Medium density east stratum (**Figure 8**). Of note was the lack of any telemetry locations within the HD stratum during the survey. It is also important to note that following the completion of the survey, all collared caribou were located along the coast within the VHD stratum suggesting a general movement, throughout the survey, towards the coast. Of the 11 days taken to survey all strata, only one weather day (October 25) prevented all aircraft from flying. The VHD and HD stratum were completed in 1.5 days (October 26 and 27) and the MD west and MD east completed in 1.5 days (October 27 and 28) as well (**Table 5**).

We observed 1,330 caribou within 202 groups, 452 muskoxen within 47 groups, 30 moose within 13 groups, 28 wolves within 10 groups, and 2 wolverines. As

an initial step, transects in the LD central and LD East were adjusted based on flight track logs (**Figure 9**). Of the strata flown, some strata did not have any caribou observed and were not considered further in estimates (**Figure 10** and **Table 6**). Most caribou were observed in the High Density and Very High-Density East strata. An estimated 97% of planned transects and associated strata were successfully flown during the fall 2020 survey effort.

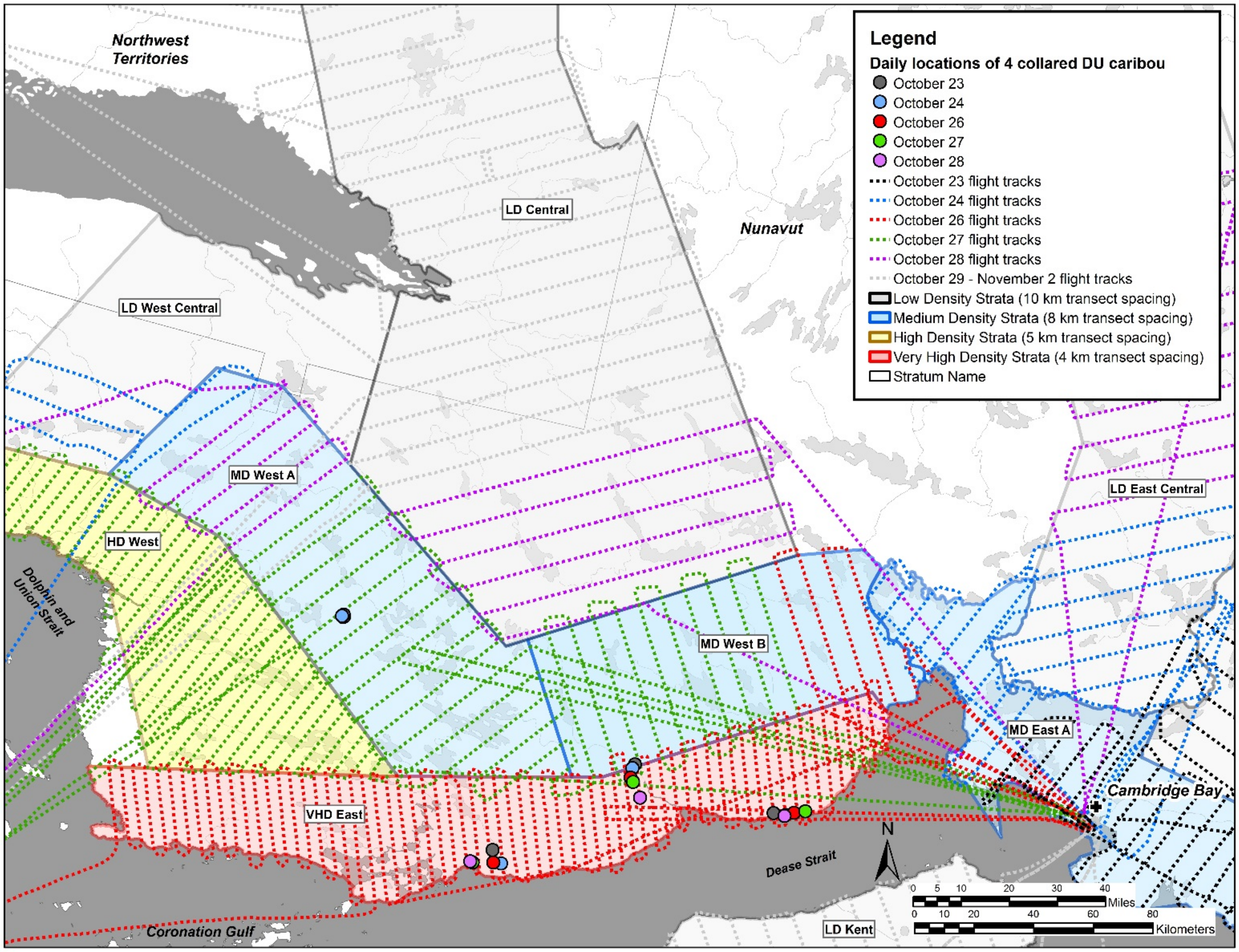

Figure 8. Daily flight tracks compared to daily collared caribou locations throughout the first 6 days of the fall 2020 DU abundance survey. Of the 48 locations collected from 4 collared caribou during the survey, only 5 were outside the VHD survey strata.

Table 3. Timing of abundance survey strata flights. Note the VHD and HD strata were flown consecutively and completed in under 2 days. Strata definitions; MDWa and MDWb = Medium density west a & b, MDEa and MDEb = Medium density east a & b, VHD = very high density, HD = high density, LDWC = low density west central, LDE = low density east, LDEC = low density east central, LDC = low density central, LDK = low density Kent Peninsula, LDSK = low density south Kent Peninsula, LDSW = low density south west mainland, and Recon = Reconnaissance flight.

DU-2020		**Aircraft & Strata**		
Month	**Day**	**GATH**	**FAFG**	**GNPS**
October	23	MDEb	MDEa	Weather
	24	LDE & LDEC	MDEa	Recon & LDWC
	25	Weather	Weather	Weather
	26	VHD & MDWb	VHD & MDWb	VHD
	27	HD & MDWb	MDWa & MDWb	HD & MDWa
	28	LDEC	LDC	MDWa
	29	LDSK	LDC	LDC
	30	LDK	LDC	LDSW
	31	Strata Complete	LDC	LDSW
November	1		LDC	LDSW
	2		LDC	Strata Complete
	3		Strata Complete	

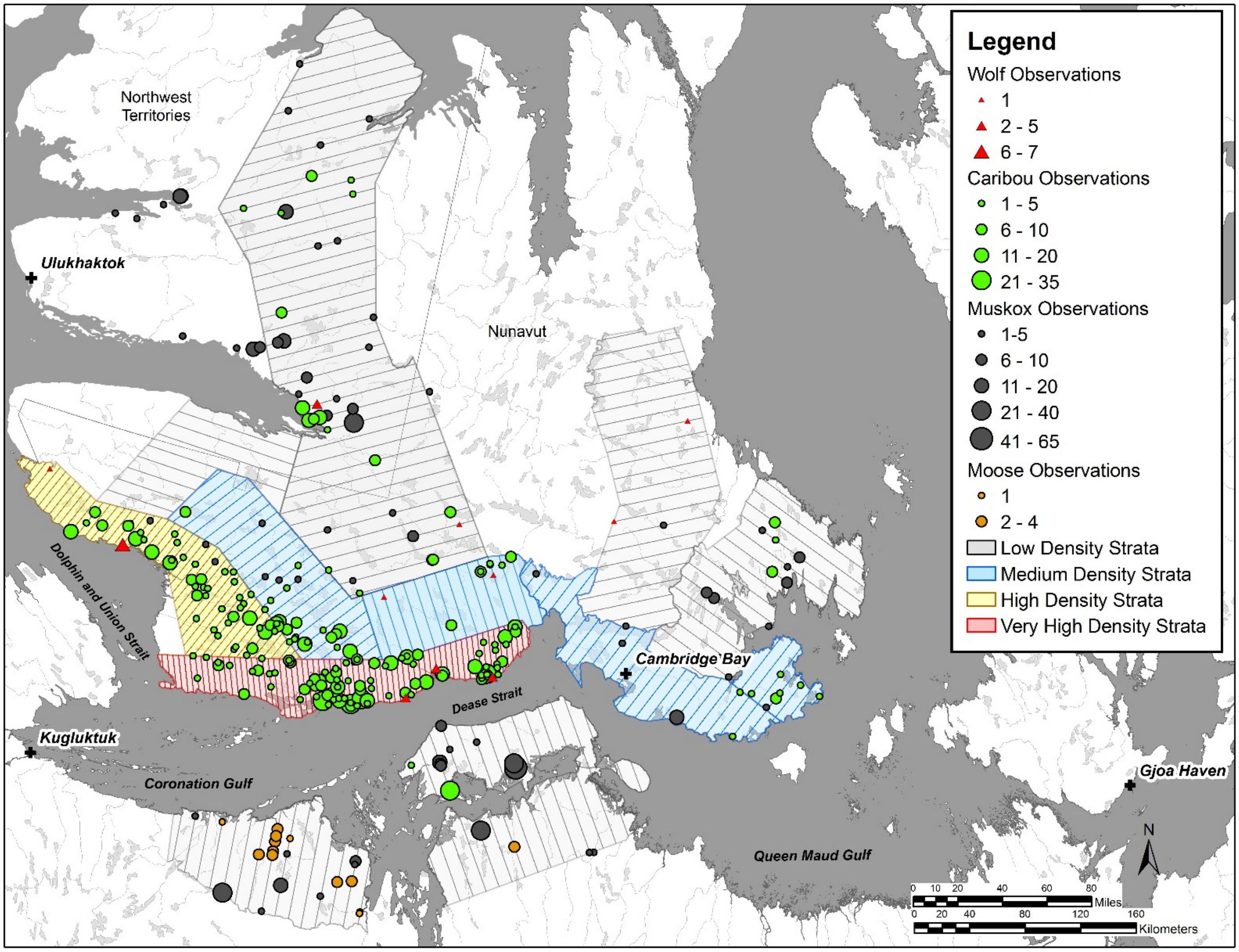

Figure 9 Caribou, wolf, muskox, and moose observations recorded during the Dolphin and Union fall 2020 abundance survey.

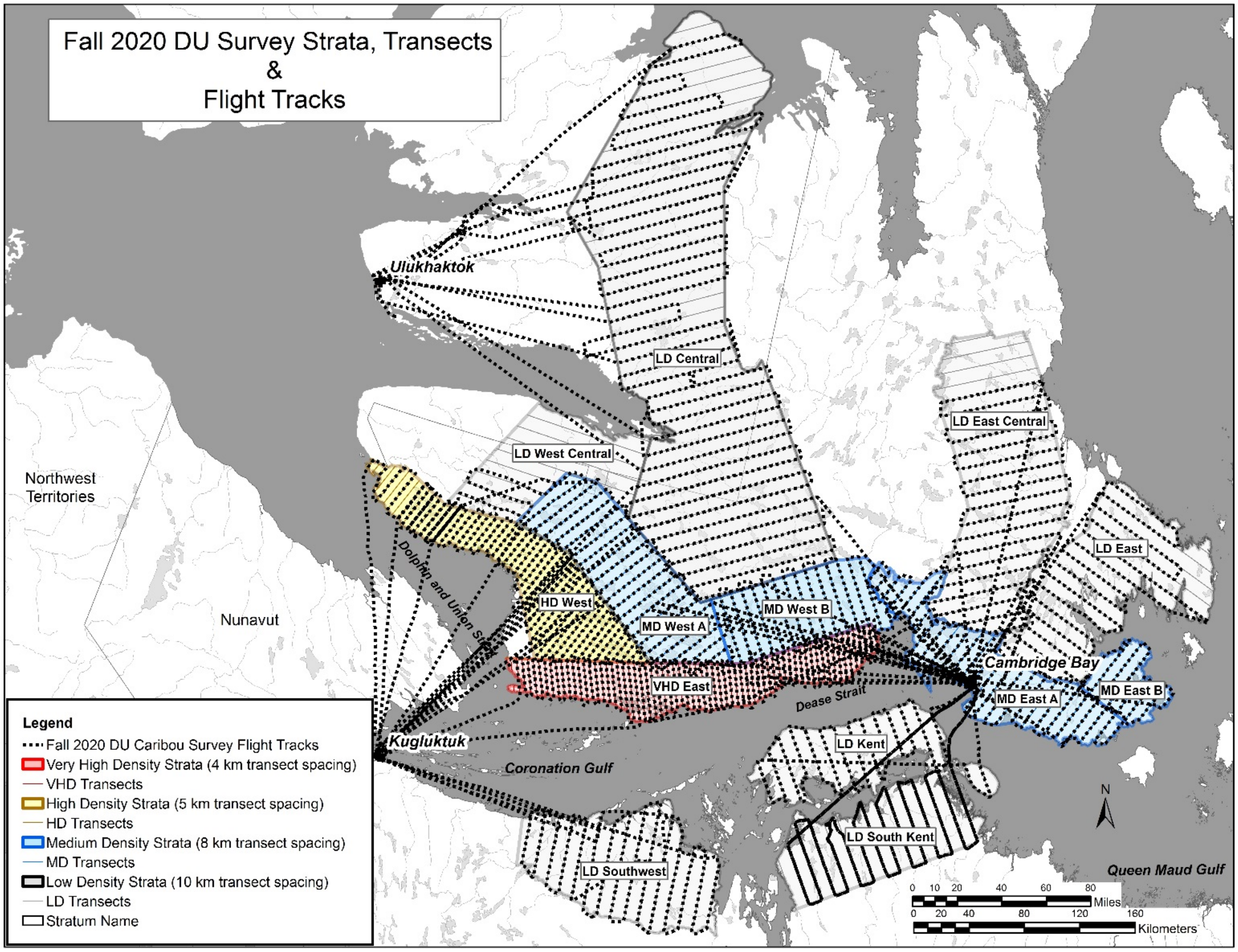

Figure 10. Actual flight tracks flown over delineated stratum and associated transects of the fall 2020 Dolphin and Union survey. Lines were shortened in the Low Density (LD)-east and LD-central strata based on actual flight paths (VHD = very high density, HD = high density, MD = medium density, and LD = low-density strata). An estimated 97% of all proposed survey transects and associated strata were successfully completed.

Table 4. Actual strata dimensions, number, and length of transects flown, and caribou observed on transect, for the DU fall 2020 aerial abundance estimate.

Strata	Strata Name	Strata_Area (km2)	No Trans	flown transect length	Total Transect Length	Caribou observed on transect
HDW	High_Density_West	8,540	50	1,709.17	1,709.17	262
VHDE	Very_High_Density_East	7,902	68	1,976.26	1,976.26	665
MDEa	Medium_Density_East_A	7,577	27	951.05	951.05	1
MDEb	Medium_Density_East_B	2,151	8	268.53	268.53	22
MDWa	Medium_Density_West_A	8,703	23	1,087.95	1,087.95	150
MDWb	Medium_Density_West_B	6,052	15	738.85	738.85	26
LDC	Low_Density_Central	40,174	40	3,732.90	4,028.41	124
LDE	Low_Density_East	11,064	15	1,028.70	1,103.42	14
LDEC	Low_Density_East_Central	14,898	22	1,506.97	1,506.97	0
LDKP	Low_Density_Kent_Penninsula	5,716	14	576.55	576.55	66
LDSK	Low_Density_South_Kent	8,248	17	807.84	807.84	0
LDSW	Low_Density_South_West	9,402	15	943.07	943.07	0
LDWC	Low_Density_West_Central	6,462	10	624.26	624.26	0

4.2 Distance and Double Observer Pair Data Summary

The distribution of caribou groups sighted relative to the distance bins marked on underwing struts was lower closest to the plane then increased as the bins moved further from the plane. Observations increased in the 200 to 400 and 400 to 600 meters bins before decreasing in the more distant bins (600 to1000 and 1,000 to 1,500 meters bin). Data recorders, especially in bins close to the plane (**Figure 11**), made a large number of observations. Additionally, the distribution of observations varied by whether strata were on the coastal or inland areas of the survey study area (**Figure 12**). Coastal strata (Very High Density East (VHDE), and High Density West (HDW)) in this case, were the two high-density strata while Medium density (MD) – East (MDEa) and MD East-B (MDEb) strata inland habitat and displayed fewer observations. Coastal VHD strata (VHDE) had a higher proportion of observations near the plane whereas inland MD strata (MDWa, MDWb, MDEa, MDEb) had a relatively high proportion of observations in the furthest survey bin. Observer data is summarized in **Table 7** by observer pairs. In addition, data recorder observations (caribou that were missed by the 2 observers but observed by the recorder) are listed for each observer pair. Single observer (p1x: 1-rear observer/total observations) and double observer ($1-(1-p1x)^2$) are listed. We note that these are for all distances rather than observations near the plane. For double observer only data, single observer probabilities average 0.9 with double observer probabilities of 0.99. When data recorder observations are added, single observer probabilities are reduced to 0.74 and double observer probabilities are 0.93. The main reductions occurred for pairs three (3), 6, and 7, which display double observer probabilities of 0.75 to 0.84 when data recorder observations are added. Most noteworthy is pair 7, where 22 (34%) of the observations were made by the data recorder. Double observer detection probabilities for pairs 2, 6, and 7, who accounted for 31 of the 37 additional data recorder observations, were modelled using the DRpair covariate.

The distributions of sightings also varied by observers with some pairs showing the more characteristic histogram shape with the most sightings near the plane, whereas the distribution of others was more dominated by sightings in the 200 to 400 meter bin (**Figure 13**). Data recorder observations occurred across all distance bins for many observers. Group size of caribou also influenced whether both observers sighted caribou. Once group size was greater than ten (10), both observers were likely to see a caribou group. Single caribou or smaller groups were more likely to be missed by single observers (**Figure 14**). Group size also influenced the shape of the detection function. Detection functions for smaller groups were dominated by higher frequencies in the closer bins to the plane whereas larger groups occurred in the further bins (**Figure 15**).

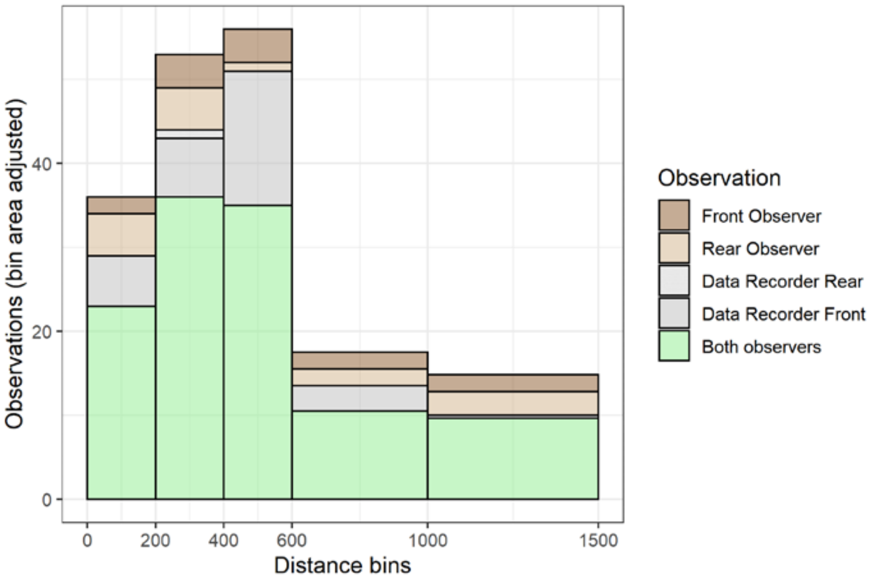

Figure 11. Histograms of detections as a function of distance from plane. Observations are also color-coded by observation type. Observation frequencies are adjusted based on bin widths.

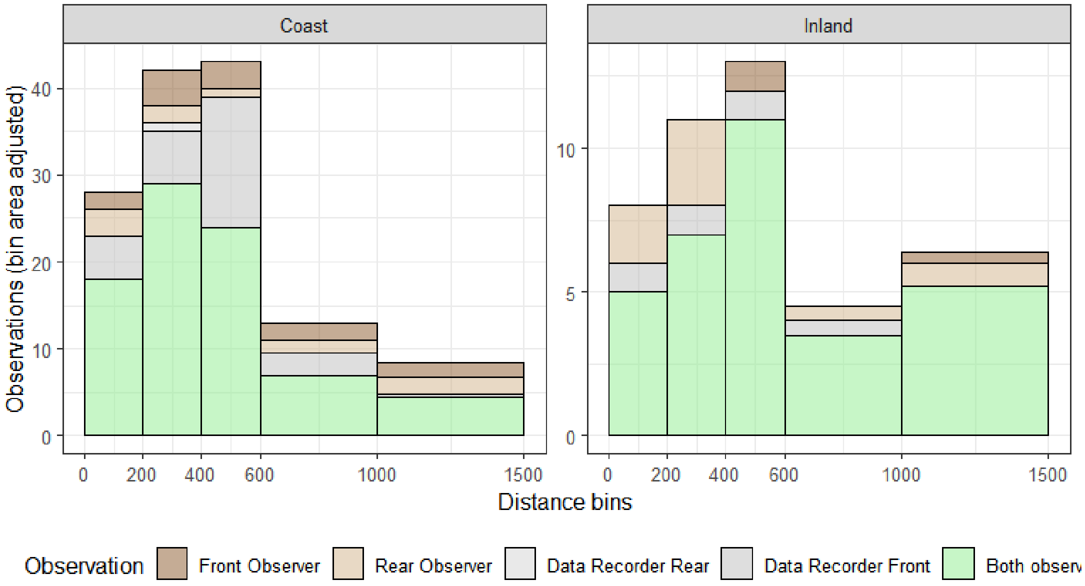

Figure 12. Histograms of detections as a function of distance from plane for coastal and inland strata. Observations are also color-coded by observation type. Observation frequencies are adjusted based on bin widths.

Table 5. Summary of double observer pair data; p1x is the single observer sighting probability and p2x is the double observer probability. Data is summarized for double observer only data and double observer with data recorder observations (DRobs: observations where only the data recorder saw a group of caribou).

Pair number	Double observer data						Data recorder (DR) + double observer data				
	front	rear	both	total	p1x	p2x	DR obs	2x+DR	Proportion DR obs	p1x	p2x
1	3	0	14	17	1.00	1.00	3	20	0.15	0.85	0.98
2	1	6	24	31	0.81	0.96	0	31	0.00	0.81	0.96
3	0	0	5	5	1.00	1.00	5	10	0.50	0.50	0.75
4	5	4	28	37	0.89	0.99	0	37	0.00	0.89	0.99
5	2	3	18	23	0.87	0.98	3	26	0.12	0.77	0.95
6	1	2	8	11	0.82	0.97	4	15	0.27	0.60	0.84
7	7	6	30	43	0.86	0.98	22	65	0.34	0.57	0.81
8	0	1	12	13	0.92	0.99	0	13	0.00	0.92	0.99
Sum/average	**19**	**22**	**139**	**180**	**0.90**	**0.99**	**37**	**217**	**0.17**	**0.73**	**0.93**

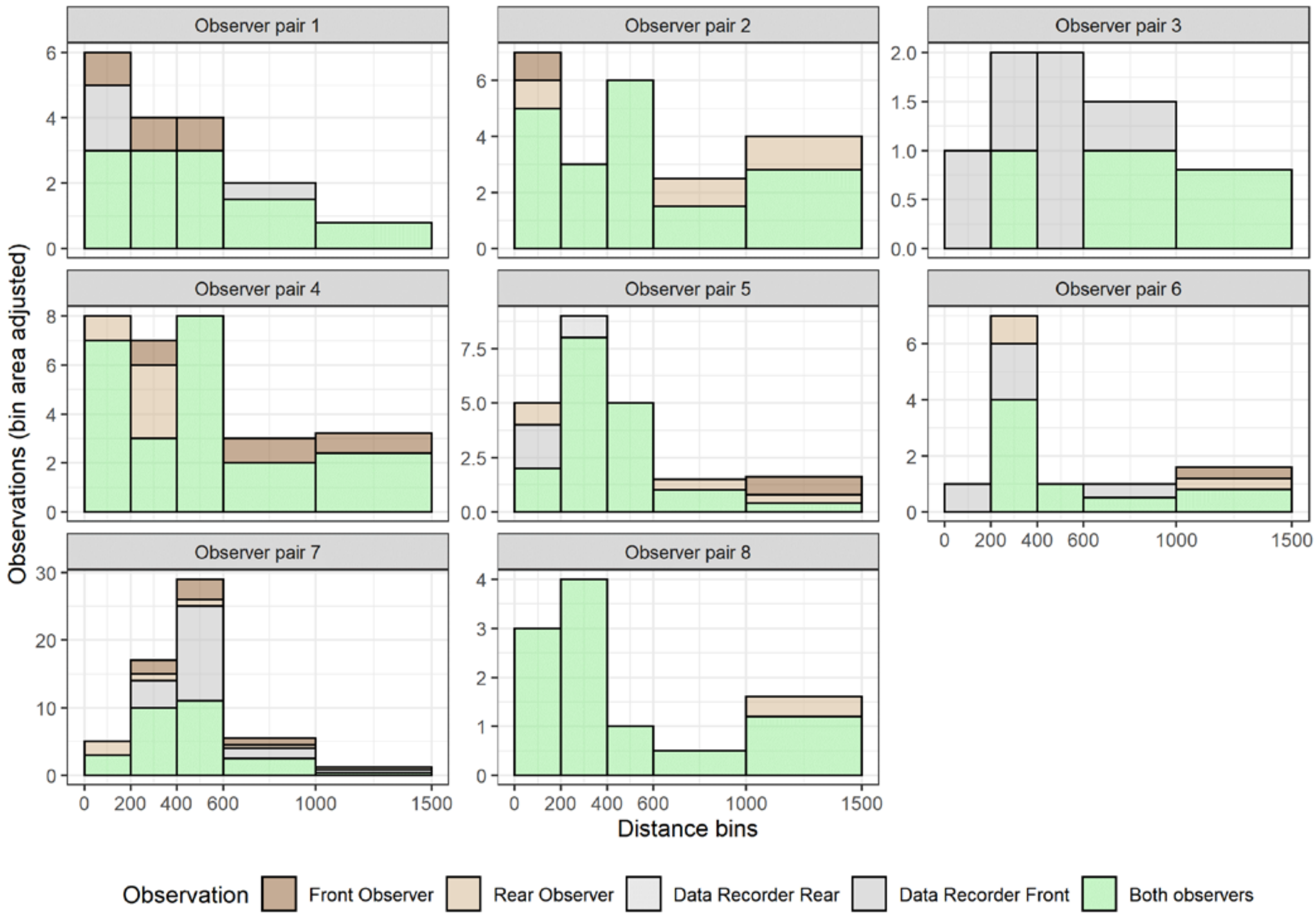

Figure 13. Histograms of detections as a function of distance from the plane for observer pairs. Observations are also color-coded by observation type. Observation frequencies are adjusted based on bin widths.

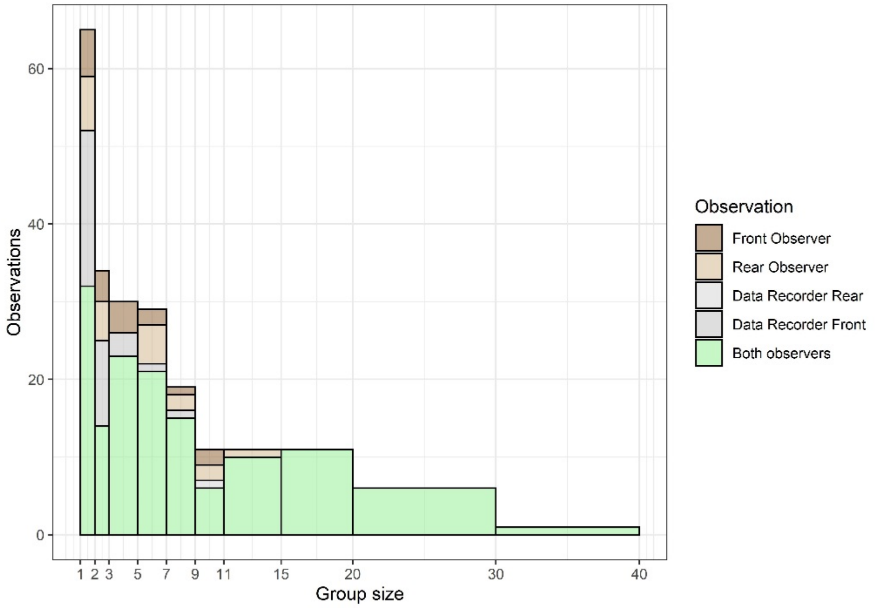

Figure 14. Histograms of detections as a function of group size. Observations are also color-coded by observation type. Observation frequencies are adjusted based on bin widths.

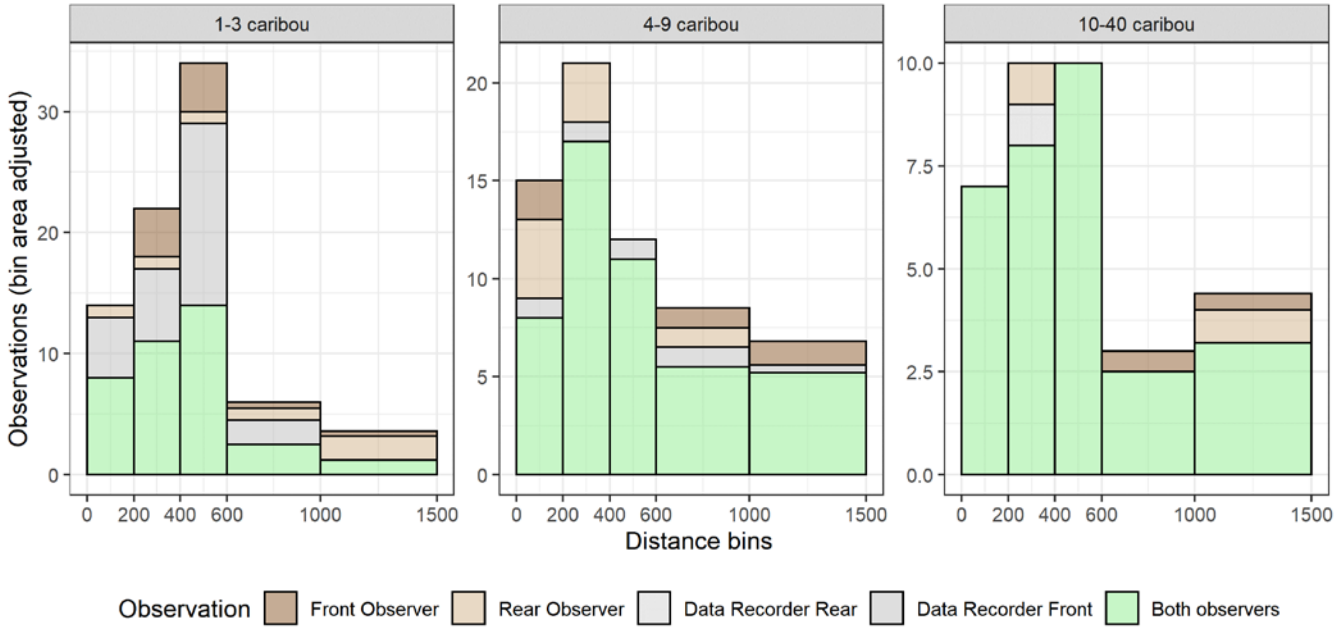

Figure 15. Histograms of detections as a function of group size and observation type.

Snow cover, snow patchiness, and cloud cover were also considered as covariates. Snow cover and snow patchiness was skewed towards high snow cover with 192 of 209 observations of caribou with snow cover over 90%, and 177 of 209 observations with snow patchiness scores of 4 or over indicating relatively continuous snow cover. Cloud cover was more variable with an average cloud cover 55% (s.d.=38.0, min=0, max=100, n=209). Each covariate was tested individually as part of the model selection procedure.

4.3 Model Selection

Initial distance sampling model selection focused on the choice of a detection function with a hazard rate function (**Table 8,** model 3) being more supported than a half-normal function. The coast/inland strata (coast) and cloud covariates were more supported than a constant model. We also considered the log-size covariate given the likelihood of size effects in the detection function (**Figure 15**). It was likely that size effect may become more relevant when double observer variation is modelled and therefore this covariate was also considered in composite models. Other covariates such as snow patchiness, elevation and visibility were less supported. Snow patchiness had low sample sizes in most classes (except 6) which created model convergence issues when modelled as a factor. Categories were pooled into low and high categories to confront this issue. In addition, recorder observations were also considered further in unison with other covariates.

The double observer/mark-recapture model selection used a hazard rate distance detection function with distance covariates held constant. The DRpair covariate which accounted for observer pair/data recorder pairing, was used as a structural covariate in all models. Observer pairs were initially modelled separately, however, this increased model complexity. A reduced observer pair model with the three pairs that showed higher frequencies of missed caribou (pairs 3, 6, and 7) were pooled, which held the highest

support of models considered (**Table 9**, model 1). Also supported was group size (model 2).

The most supported distance and double observer covariates were then combined into composite models. Immediately, the combined models were more supported than models with constant distance sampling terms (**Table 10**, model 6) or constant double observer terms (model 9). The main double observer model considered was the DRpair + size model, which gave strong support for the associated covariates (**Table 9**). Combinations of the candidate distance sampling model covariates were considered with a model that had coastal strata (coast) and the log of group size (size) being most supported (**Table 10**, model 1). Models that also had cloud cover (model 2), and just coast and cloud (model 3) were also supported. The estimates from all 3 of the most supported models were compared in the sensitivity analysis detailed later in this report.

The pooled detection function for model 1 (**Table 10**) suggests that the detection of caribou on the line (distance=0) was 0.86 (SE=0.09) with a shoulder of constant detection to approximately 400 meters after which it declined to 0.2 at the furthest bin (1,000 to 1,500 meters) (**Figure 16**). Fit of the model was marginal in the initial 0 to 200 meter bin and the 600 to 1,000 meter bin, as indicated by chi-square tests (χ^2=16.2,df=0). The complexity of the model combined with the limited number of bins meant that there were no degrees of freedom for the distance sampling component of the chi-square test. Regardless, the mark-recapture component of the model did display adequate fit ((χ^2=16.2, df=7, p=0.21). The overall χ^2 for the model was 25.6, df=2, p<0.001). The main reason for lack of fit was poor fit to the initial 0 to 200 meter bin and the 600 to 1,000 meter bin. The main reason for lack of fit was most likely due to lower than expected frequencies in the 0 to 200 meter bin which was due to less attention to bins closest to the plane. Higher frequencies in further bins were more pronounced in the inland or medium density strata (**Figure 17**). Lower detection in the closer 0 to 200 meter bin was potentially dealt with using the double observer approach, which relaxes the assumption of perfect sightability close to the plane.

Table 6. Univariate model selection for distance sampling covariates. The distance sampling detection function (DF: HR-hazard rate, HN-Half normal) is shown along with distance and double observer models. Sample size adjusted Akaike Information Criterion (AIC_c), the difference in AIC_c between the most supported model for each model (ΔAIC_c), AIC_c weight (w_i), number of model parameters (K), and deviance is given. Constant models are shaded for reference.

No	DF	Distance model	MR/2x model	AIC_c	ΔAIC_c	w_i	K	LL
1	HR	CoastStrata	constant	963.30	0.00	0.45	4	-477.6
2	HR	cloud	constant	965.09	1.78	0.19	4	-478.4
3	HR	constant	constant	966.57	3.27	0.09	3	-480.2
4	HR	logsize	constant	967.27	3.96	0.06	4	-479.5
5	HR	Recobs	constant	967.51	4.21	0.06	4	-479.7
6	HR	snow	constant	967.97	4.67	0.04	4	-479.9
7	HR	size	constant	968.01	4.71	0.04	4	-479.9
8	HR	snowpatch	constant	968.49	5.18	0.03	4	-480.1
9	HR	Visibility	constant	969.49	6.19	0.02	6	-478.5
10	HR	Elevation	constant	970.98	7.67	0.01	7	-478.2
11	HN	constant	constant	969.79	35.04	0.00	2	-482.9

Table 7. Univariate model selection for double observer covariates. The distance sampling detection function (DF: HR-hazard rate, HN-Half normal) is shown along with the distance and double observer model. Sample size adjusted Akaike Information Criterion (AIC_c), the difference in AIC_c between the most supported model for each model (Δ AIC_c), AICc weight (w_i), number of model parameters (K), and deviance is given. Constant models are shaded for reference.

No	DF	Distance model	MR/2x model	AIC_c	ΔAIC_c	w_i	K	LL
1	HR	constant	DRpair+size	938.02	0.00	0.76	5	-463.9
2	HR	constant	DRpair+logsize	940.46	2.45	0.22	5	-465.1
3	HR	constant	DRpair+snowpatch	947.73	9.71	0.01	5	-468.7
4	HR	constant	DRpair+cloud	949.70	11.69	0.00	5	-469.7
5	HR	constant	DRpair	950.42	12.40	0.00	4	-471.1
6	HR	constant	DRpair+snow	951.60	13.58	0.00	5	-470.7
7	HR	constant	Drpair+coast	952.42	14.41	0.00	5	-471.1
8	HR	constant	observers	961.26	23.24	0.00	10	-470.1
9	HR	constant	constant	966.57	28.56	0.00	3	-480.2

Table 8. Combined distance sampling and double observer analysis. Sample size adjusted Akaike Information Criterion (AIC_c), the difference in AIC_c between the most supported models for each model (ΔAIC_c), AIC_c weight (w_i), number of model parameters (K), and deviance is given. Constant models are shaded for reference.

No	DF	Distance model	MR/2x model	AIC_c	ΔAIC_c	w_i	K	LL
1	HR	Coast + logsize	DRpair + size	934.75	0.00	0.28	7	-460.1
2	HR	Coast+ cloud +logsize	DRpair+ size	934.84	0.09	0.27	8	-459.1
3	HR	Coast + cloud	DRpair + size	935.34	0.59	0.21	7	-460.4
4	HR	RecObs + Coast+logsize	DRpair + size	936.72	1.97	0.10	8	-460.0
5	HR	Coast + logsize	DRpair + logsize	937.19	2.45	0.08	7	-461.3
6	HR	constant	DRpair + size	938.02	3.27	0.05	5	-463.9
7	HR	Coast + logsize	obs+size	946.60	11.85	0.00	13	-459.4
8	HR	Coast + logsize	size	947.68	12.93	0.00	6	-467.6
9	HR	Coast + logsize	constant	963.22	28.48	0.00	5	-476.5

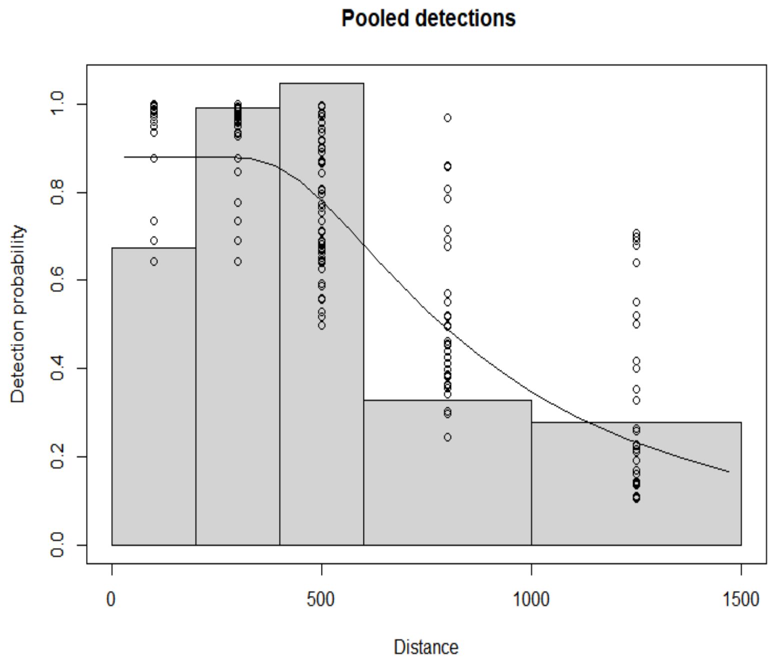

Figure 16. Fitted detection function for the most supported MRDS model.

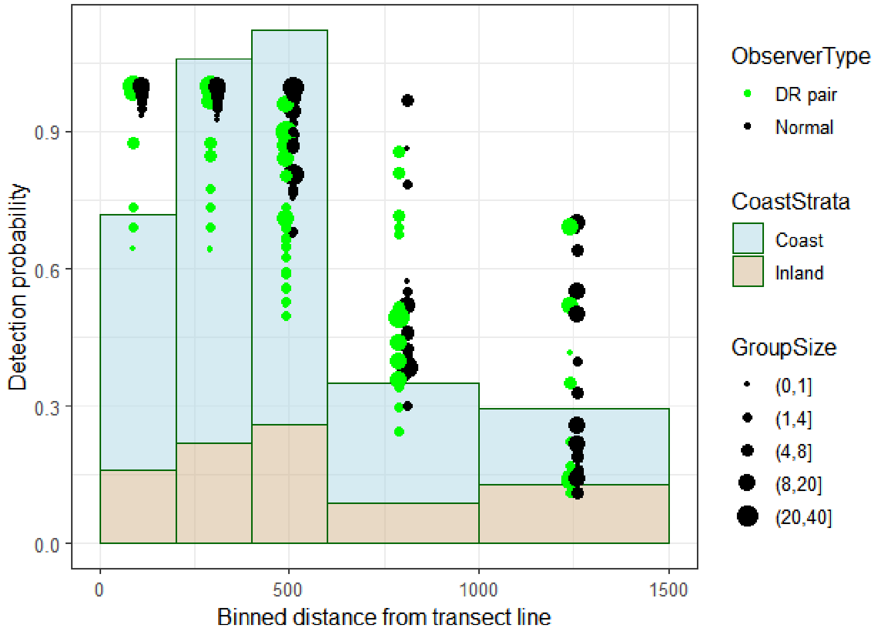

Figure 17. Fitted detection function showing coastal (HD and VHD strata) and inland (MD and LD) strata frequencies and observer type predictions.

4.4 Sensitivity Analysis

Sensitivity analyses were conducted to evaluate and estimate sensitivity to model selection uncertainty, fit of models to the detection function, inclusion of data recorder observers, and use of distance sampling and/or double observer data sets (**Table 11** and **Figure 18**). Estimates were contrasted against the estimate of the model 1 (3,815 caribou CI=2930-4966). In terms of model selection uncertainly, the three most supported models (models 1, 2, and 3) displayed similar estimates with an increase in estimates when log-size was not included in the detection function. This was likely due to the influence of larger group sizes, which will display higher sightability, at further distances. Given the evidence of group size sightability, the inclusion of group size was justified.

Model 1 was then run with observations from the primary (front) and secondary (rear) observers pooled for the 3 pairs that had data recorder assistance. Therefore, a group was only measured as a miss if both observers missed the caribou that the data recorder observed. This scenario basically assumed that the data recorder had the same sighting probability as the two observers combined (which was less likely). The resulting estimate was 3,694 which was 121 caribou less than model 1 (that treated the data recorder as an additional 2nd observer). Model 1 was also run with the data recorder observations removed, resulting in an estimate of 3,373. This reduction was presumably due to a loss of observations in the higher density strata where many of the data recorder observations occurred. The actual estimate was lower than the strip transect estimate (without a double observer) which is unlikely.

Model 1 was then run with the right bin (1000 to 1500 meters) removed to test for the effects of outlier observations in further bins. This increased the estimate to 4,072 caribou which was potentially because of outlier observations inflating estimates of sightability and therefore reducing abundance estimates. Left truncation of the left bin (0 to 200 meters), which would remove the effect of lower sightability near the plane, had less influence on the estimate but did reduce precision. Left and right truncation further reduced the estimate

presumably due to a loss of data (the number of caribou sighted was reduced from 1,330 to 844 when both bins were removed).

Distance sampling only, which assumes sightability of 1 (100%) at the line, also showed a reduced estimate even when the 0 to 200 meter bin was truncated. This result was not surprising given that sightability on the line was estimated at 0.9 by the MRDS model. Strip transect sampling with a double observer model for sightability (*DRpair+size*) resulted in a similar estimate to model 1 but with lower precision. If the double observer model was removed, and sightability was assumed to be 1 (100%) then the estimate was reduced to 3,599. The strip transect estimate without a double observer can be considered the most conservative estimate, given that sightability is assumed to be 1 (100%), which is unlikely, with no further modelling of sightability. As shown in **Figure 18**, all the estimates from the sensitivity analysis fall in the general range of each other with an average estimate of 3,729 caribou. As discussed later, the best estimate is from model 1 given that it uses all the data sources available and accounts for most sources of variation. Likely differences between estimates all fall within the main range of confidence limits of all the estimators. Similarity between model 1 and the double observer strip transect estimate, which is used for most caribou surveys, is reassuring.

Table 9. Sensitivity analysis of the fall 2020 modeled estimates of Dolphin and Union herd abundance (Victoria Island and Mainland) using various model formulations and data sources. Model numbers refer to the models listed in Table 10.

Analysis	Caribou counted	Abundance N	SE	Conf. Limit		CV
Model selection uncertainty (MR models DRobs + size)						
model 1 (DS model: coast+logsize)	1330	3,815	513.7	2,930	4,966	0.13
model 2 (DS model: coast+cloud+logsize)	1330	3,770	495.6	2,914	4,877	0.13
model 3 (DS model: :coast+cloud)	1330	4,078	553.6	3,126	5,321	0.14
model 4 (DS model: :recobs+coast+logsize)	1330	3,794	503.4	2,926	4,920	0.13
Data recorder observations						
model 1: pool observers 1 and 2	1330	3,694	468.4	2,881	4,736	0.13
model 1: data recorder observations excluded	1226	3,373	510.5	2,509	4,536	0.15
Left and right truncation (model 1)						
Right truncate at 1000m	1079	4,072	538.9	3,138	5,285	0.13
Left truncate at 200m	1095	3,711	808.1	2,428	5,669	0.22
Both right and left truncate	844	3,542	521.4	2,650	4,734	0.15
Distance sampling only (DS model: coast+logsize)						
Left truncate at 200m	1095	3,445	540.7	2,534	4,683	0.16
Strip transect sampling (0-400 m)						
double observer (MR model: DRpair+size)	519	3,861	646.6	2,782	5,359	0.17
No double observer	519	3,599	533.0	2,689	4,818	0.15

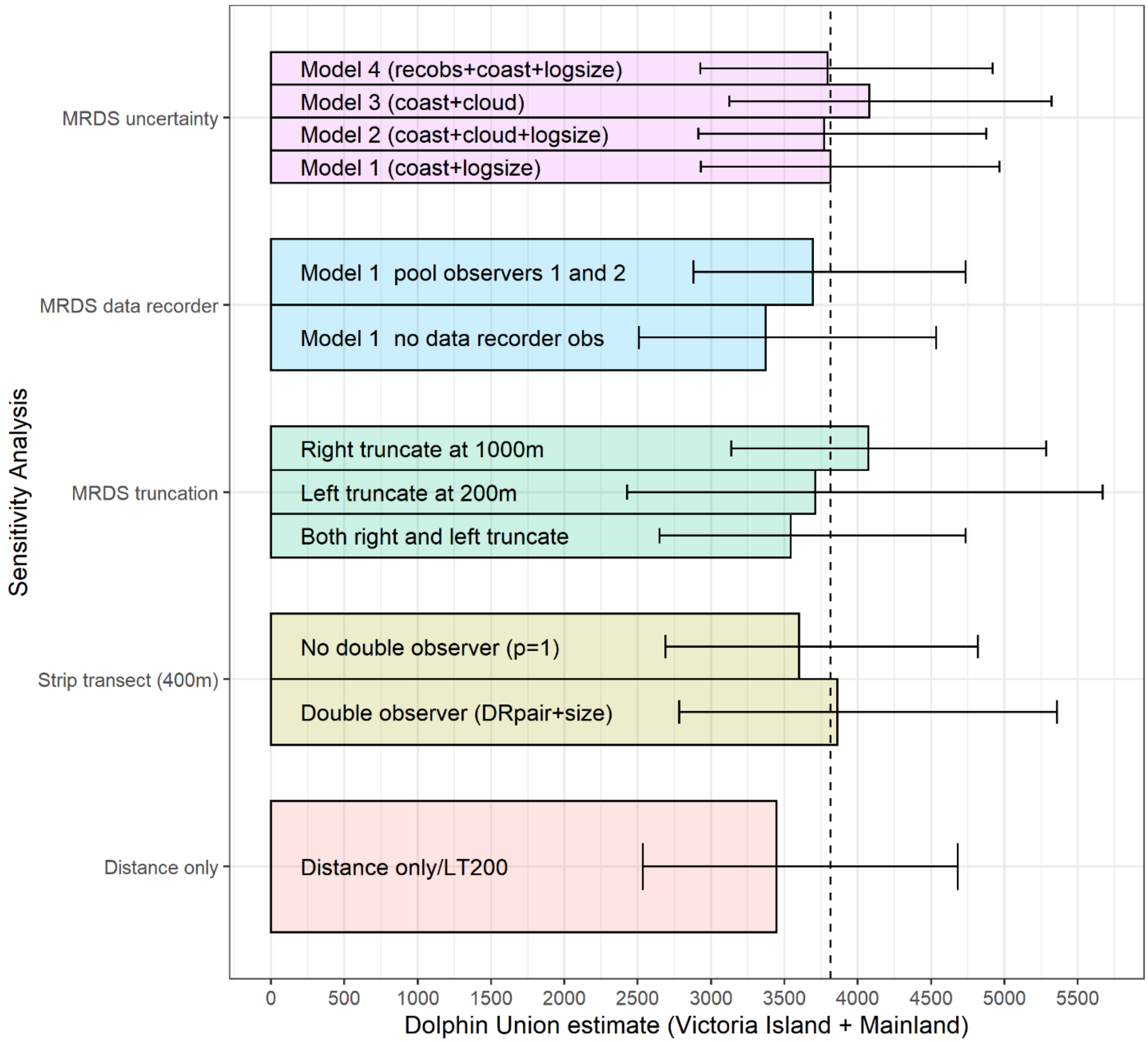

Figure 18. Graphical representation of sensitivity analysis estimates listed in Table 11. The estimate from model 1, used for full island estimates, is delineated by a dashed line for comparison purposes.

4.5 Estimates and Trend Analysis

4.5.1 Estimates

Estimates for strata from model 1 (**Table 10**) demonstrate that the highest densities of caribou were found in the Very High-Density East and High-Density West coastline strata, with moderate densities in the Medium West A (MDWa) stratum. Most other stratum had lower densities of caribou, resulting in lower estimates of abundance (**Table 12**). Two groups of caribou were sighted on the Kent Peninsula on the mainland (LDKP) resulting in an estimate of 236 caribou for all mainland strata. The inclusion of the mainland strata produces a total abundance estimate of is 3,815 (CI=2,930-4,966) caribou. If only the Victoria Island caribou are used, then the estimate is 3,579 (CI=2,758-4,644).

Table 10. Estimates for each strata from the most supported MRDS model (DS: CoastStrata+logsize, MR:DRobs+size, Table 10). The number of caribou counted on transect is given for each strata along with abundance estimates. Density is the abundance estimate divided by strata area X 100.

Strata	Strata_Name	Caribou counted	Abundance (N)	SE	Confidence Interval		CV	Density
Victoria Island strata								
VHDE	High_Density_East	665	1,487	275.3	1,034	2,139	0.19	18.82
HDW	High_Density_West	262	821	164.4	554	1,217	0.20	9.62
MDEa	Medium_Density_East_A	1	5	5.9	1	33	1.08	0.07
MDEb	Medium_Density_East_B	22	130	48.7	58	290	0.37	6.04
MDWa	Medium_Density_West_A	150	470	121.3	281	784	0.26	5.40
MDWb	Medium_Density_West_B	26	89	37.3	38	207	0.42	1.47
LDC	Low_Density_Central	124	511	140.5	297	879	0.27	1.27
LDE	Low_Density_East	14	65	41.5	19	225	0.63	0.59
LDWC	Low_Density_West_Central	0	0				0.00	0.00
LDEC	Low_Density_East_Central	0	0				0.00	0.00
	Total	**1,264**	**3,579**	**476.5**	**2,758**	**4,644**	**0.13**	**2.72**
Mainland strata								
LDKP	Low_Density_Kent_Penninsula	66	236	174.9	57	980	0.74	4.13
LDSK	Low_Density_South_Kent	0	0				0.00	0.00
LDSW	Low_Density_South_West	0	0				0.00	0.00
Victoria Island + Mainland								
Total	Victoria Island + Mainland	**1,330**	**3,815**	**513.7**	**2,930**	**4,966**	**0.13**	**2.79**

4.5.2 Trend Analysis

To determine the trend in Dolphin and Union herd abundance, we compared herd estimates from the fall 2018 and fall 2020 abundance surveys. We conducted this comparison for both the Victoria Island + mainland estimate, and Victoria Island only estimate, from the fall 2020 survey (mainland transects were not flown in fall 2018). While the Victoria Island + mainland estimate may be the best representation of the Dolphin Union herd, previous surveys only surveyed Victoria Island and therefore, it could be argued that the best comparison for trend is the Victoria Island estimate. In both cases, the difference between 2018 and 2020 estimates are not significant (**Table 13**). The ratio of estimates between 2018 and 2020 suggests an overall reduction in herd size of 7 to 13%, which amounts to yearly changes of 4 to 7% using the two estimates of herd size for the Dolphin union herd (**Table 14**). In all cases the confidence limits overlapped and therefore the change is not statistically significant, yielding no quantitative conclusions that herd numbers had significantly changed between 2018 and 2020.

A regression analysis of the data set suggests that a model with a trend term that corresponds to the fall 2007-2015 survey estimates, and the fall 2018-2020 survey estimates, with a single reduction from 2015-2018 estimates, describes the data adequately (**Table 15**). The slope term for year can be exponentiated to estimate a mean λ of 0.97. The year (2018) term describes the overall decrease in caribou abundance from fall 2015 to fall 2018 (23%) as also indicated in **Table 14**, where it is estimated as a 22% decline (**Figure 19**). This model suggests that the population may have declined between 2018 and 2020 at a rate similar to observed declines occurring prior to 2015. Similar results occurred using only the Victoria Island 2020 estimate for the trend analysis.

Table 11. Abundance estimates of the Dolphin and Union herd from fall 1997, 2007, 2015, 2018, and 2020. Both the Victoria Island + mainland (VI + Mainland) and Victoria Island only (VI only) are listed for the 2020 estimates.

Year	N	SE	Conf. Int		CV	df	t-test	df	p-value
1997	34,558	4283.0	27,757	41,359	0.12	38			
2007	27,787	3613.0	20,250	35,324	0.13	21	-1.21	58.09	0.2318
2015	18,413	3133.8	11,644	25,182	0.17	55	-1.96	53.02	0.0553
2018	4,105	694.8	2,931	5,750	0.17	54	-4.46	60.39	0.0000
2020 (VI + Mainland)	3,815	513.7	2,930	4,966	0.13	326	-0.34	123.08	0.7377
2020 (VI only)	3,579	476.5	2,758	4,644	0.13	379	-0.62	113.18	0.5337

Table 12. Estimates of overall change and yearly change (λ) in Dolphin Union estimates.

Year	Overall change	SE	Conf. Int.		Yearly change (λ)	SE	Conf. Int.	
2007	0.80	0.15	0.57	1.14	0.98	0.02	0.94	1.01
2015	0.66	0.14	0.43	1.00	0.95	0.03	0.90	1.00
2018	0.22	0.06	0.14	0.36	0.61	0.05	0.52	0.71
2020 (VI + Mainland)	0.93	0.21	0.61	1.42	0.96	0.10	0.78	1.19
2020 (VI only)	0.87	0.19	0.58	1.33	0.93	0.10	0.76	1.15

Table 13. Regression trend analysis using log-linear regression methods. Results are given for analyses using the 2020 Victoria Island + Mainland estimate, and the Victoria Island only estimate.

Regression terms					**Estimates of change**			**Significance**	
Term (β)	**β**	**SE**	**Conf. Int**		**change**	**Conf. Int**		**statistic**	**p-value**
2020 Victoria Island +mainland estimate									
(Intercept)	10.49	0.07	10.35	10.63				148.09	0.0000
year	-0.03	0.01	-0.05	-0.02	0.97	0.95	1.01	-5.88	0.0278
Year (2018)	-1.45	0.09	-1.62	-1.27	0.23[1]	0.20	1.10	-15.92	0.0039
2020 Victoria Island only estimate									
(Intercept)	10.51	0.10	10.31	10.70				105.30	0.0001
year	-0.04	0.01	-0.05	-0.02	0.96	0.01	0.95	-4.39	0.0482
Year (2018)	-1.46	0.13	-1.71	-1.20	0.23	0.13	0.18	-11.25	0.0078

[1]this is an estimate of overall change from 2015-2018

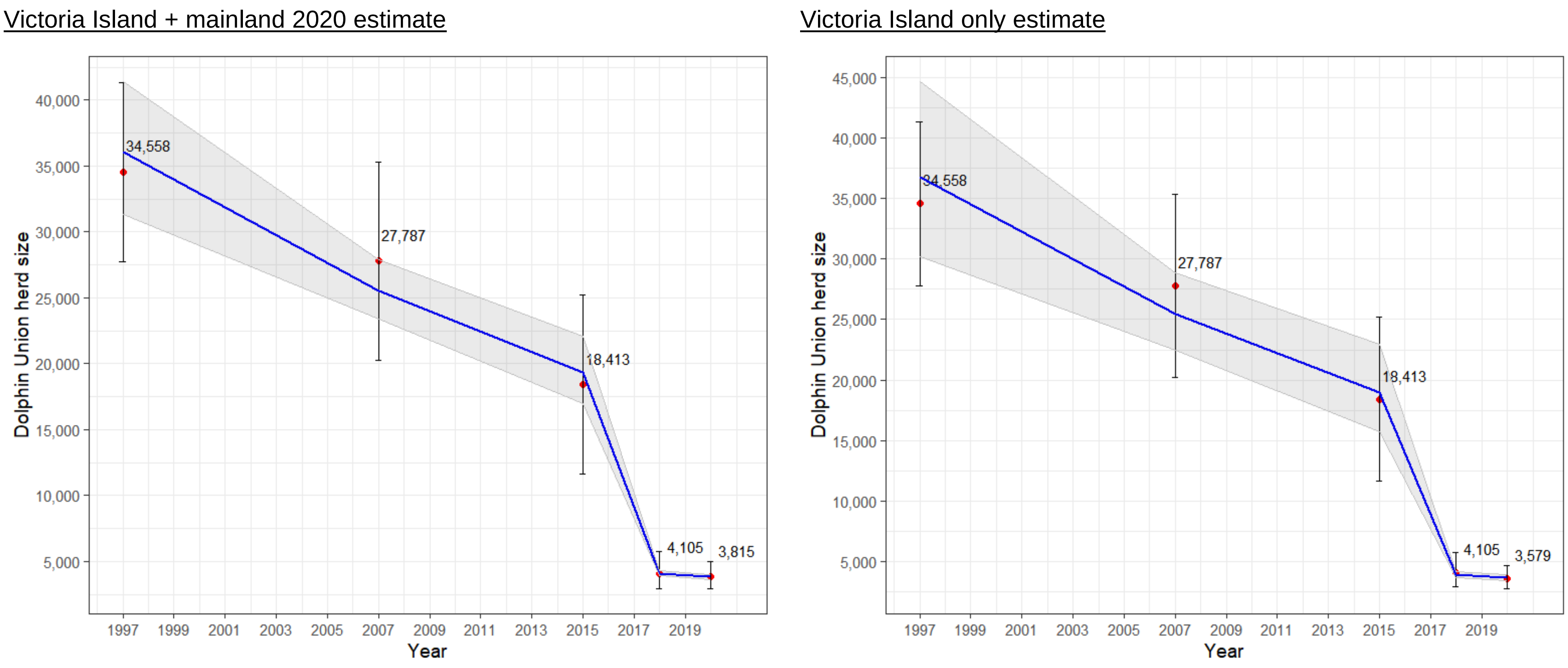

Figure 19. Population estimates and estimated trends for the Dolphin Union caribou herd using the 2020 Victoria Island + mainland estimate (left) and the Victoria Island only estimate (right).

5.0 DISCUSSION

5.1 Population Demography & Threats

The results from this survey validate the decline concluded from the 2018 Dolphin and Union survey and support the conclusion that the population declined substantially between 2015 and 2018. Although this survey used a different methodology without reliance on collared caribou, it arrived at a similar estimate, suggesting that the overall estimate is robust to methodologies employed. The implications of this decline are serious as the herd is of significant importance for Inuit subsistence and cultural needs for several communities in the western Kitikmeot and in the northeastern extent of the Beaufort Delta.

Similar declining trends have been observed in other caribou herds in Northern Canada and Alaska. For example, Bathurst herd has declined from an estimated 470,000 animals in the 1980s to an estimated 8,210 animals in 2018 (Adamczewski et al. 2019), and the Bluenose East herd has declined from an estimated 121,000 to 123,000 in 2010 to an estimated 19,160 in 2018 (Boulanger et al. 2019). Traditional Knowledge and scientific research indicate that caribou populations have historically experienced cycles of highs and lows, however, these widespread declines are concerning, particularly in the context of global change and local access to healthy country food.

Reasons for these declines are unclear but may be linked to natural and human factors, some of which may be exacerbated by climate change. Specifically, natural factors such as predators, hydrological shifts, insect harassment, stochastic weather events, changes in wildfire regime, and extreme temperature fluctuations, all represent threats to barren-ground caribou populations. Research conducted on the Bathurst and Bluenose East herd has indicated that very high drought and warble fly indices in 2014 resulted in low percentages of breeding females in June 2015

(Boulanger and Adamczewski 2017). Anthropogenic factors, including changes in harvesting practices, ice breaking practices, habitat fragmentation through landscape modification, and other effects of industrial activities, also have a detrimental impact on caribou movement and behavior (Dumond and Lee, 2013). Recent research conducted by Wilson et al. (2016) and Boulanger et al. (2020) has demonstrated the aversion of barren-ground caribou to road crossing. Additionally, these threats may be having cumulative effects, and may synergistically be having negative impacts on barren-ground caribou productivity and long-term viability.

Dolphin and Union caribou are facing many of the same threats as barren-ground caribou, as well as population specific threats. Due to their migration across the Coronation Gulf, the Dease Strait, and Queen Maud Gulf, to winter range on the mainland of Nunavut, Dolphin and Union face unique threats. Most notably, DU caribou are reliant on sea ice (Poole et al. 2010, COSEWIC 2017; Hanke and Kutz, 2020). Ice breaking practices and declining periods of ice cover, cause unpredictability in sea ice condition and connectivity for this species' unique sea ice migrations in the fall and spring. Due to the DU herds reliance on sea ice, climate change may also pose a serious threat to Dolphin and Union caribou (Poole et al. 2010, COSEWIC 2017). Another threat to the herds status is possible emigration events into neighboring barren-ground caribou herds on the Nunavut mainland. In recent years, traditional knowledge has reported that Dolphin and Union caribou are being seen with barren-ground caribou year-round, and outside of their known annual range extents. Additionally, small groups of DU caribou have been observed joining larger barren-ground caribou herds during fall migration. It is unclear how regularly this may occur, and if DU caribou are also joining barren-ground caribou on their rutting grounds, which if confirmed, suggest these emigrants are no longer reproductive members of the DU herd, but rather of the Barren-ground caribou herd within which they are mixing. Traditional Knowledge also indicates that during previous population lows, the herd ceased migration, an observation consistent with both recent reports, and current population declines. It is unclear how any, or all of these possible behavioral shifts could impact the health or survival of individuals into

the future. The factors driving the current declines in Dolphin and Union caribou need further investigation to effectively quantify decline mechanisms to model and manage the population effectively into the future.

5.2 Survey Methods and Challenges

One challenge with this analysis was the higher proportion of data recorder observations. These observations do not fall into the usual double observer model framework and therefore had to be further considered. We addressed this issue by pooling the second recorder and data recorder observations into a single observer for the pairs that had substantial data recorder observations. We then modeled the double observer probabilities for the pairs of observers that had data recorder assistance separately, then modeled the other observers (without data recorder assistance) using the DRobs covariate. This allowed the inclusion of the substantial data recorder observations in the analysis, where and when they occurred. We further tested the sensitivity of treating the data recorder as a third observer by running a sensitivity analysis where observations from the front and rear observers were pooled as a single session, and the data recorder observations treated as a second observer/session. The resulting change in the estimate was minimal (121 caribou) suggesting that the analysis was robust to how observations from the data recorder were treated. We note that if these observations are not used, then the estimate of abundance from the MRDS model is less than that from strip transects (that are likely biased low due to low sightability near the plane). It would be possible to model data recorder observations more directly as a third observer; however, this capability is not included in the MRDS package. To develop a new triple observer estimator for a third data recorder observer, would require substantial programming likely using a Bayesian MCMC approach (Kery and Schaub, 2012) and is beyond the scope of the current effort. It is likely that the amount of change in estimates due to differences in how data recorder observations are modelled, would not be substantial in the context of the overall range of estimates produced by the sensitivity analysis (**Figure 18**).

The dependent double observer pair method assumes equal sightability between observers as well as reasonably high individual sighting probabilities, to be effective as an estimator of sightability. If individual sighting probabilities become too low so that a substantial proportion of caribou are missed, it is likely that the double observer estimator will be biased low due to inefficiencies of the removal estimator used for modelling dependent observers. An independent observer method (where the two observers do not communicate) is more effective and efficient but more difficult to implement (Buckland et al. 2010) when observer probabilities are variable and lower (Laake et al. 1997, Laake et al. 2008a, Laake et al., 2008b). We suggest that in future surveys, observer pairs who have many data recorder observations, are moved or separated throughout the survey to avoid the additional assumptions of inclusion of data recorder observations in the analysis. If this is not possible, then independent observer methods, which are more robust to these issues, should be implemented if the wildlife being observed is of a low enough density as to provide consistently independent groupings geographically.

Distance sampling allowed the inclusion of observations that were further from the usual 400-meter strip width. This was advantageous for some strata (Kent Peninsula and low density east) where all the observations were beyond 400 meters and therefore, the estimate for these strata using strip transects was 0. However, the challenge of distance sampling is ensuring that data is collected to meet the general assumptions of the method. The main assumption is that observer attention is focused on bins closest to the plane so that detection in these bins is close to 100%. The shape of the detection function suggested that observers were not adequately sighting caribou in the first survey bin at 0 to 200 meters, which would bias the distance sampling analyses. One potential reason for lower detections near the plane could have been the lower survey altitude (300 feet) that reduced the size of the front to back survey window and subsequent time that surveyors had to spot caribou closer to the plane. Other distance sampling surveys on Southampton Island (Campbell et al., 2020) and Baffin Island (Campbell et al., 2015) that flew at the usual higher survey altitude (400 feet) did not have reduced observations in the closer survey bin with

higher (>0.95) estimated sighting probabilities in the first (0 to 200 meters) bin. The double observer method helped account for this issue by estimating the probability of sighting caribou in the 0 to 200 meter bin at 0.86. Comparison of the standard strip transect estimate (assuming sightability of 1) of 3,599 compared to the strip transect double observer estimate of 3,861 (**Table 10** and **Figure 19**) indexes the relative sensitivity of estimates to sightability near the plane. Flying at the lower survey altitude for the Dolphin Union survey had the advantage of being less affected by cloud cover and therefore it was an advantageous method. However, we suggest that if this method is employed again, a double observer method is used to estimate sightability to account for lower sighting probabilities in areas closer to the plane.

The other potential issue was caribou in the further bin being called as on transect when they were off-transect, due to difficulties of calling caribou at the furthest, narrowest (by way of observer perspective) bin. If this occurred, then the estimate might show a negative bias of a few hundred caribou as indicated when the furthest bin is reduced. Because fixed-wing distance sampling data is typically binned, it is not possible to trim off smaller amounts of data at further distances such as in usual distance sampling analyses, that records all observations, and then measures all observations from the transect line to the observation or group. We suggest that if distance sampling is to be used in fixed wing platforms that do not measure group distances from the transect, it should be, as in the present work, accompanied by double observer methods to allow estimation of sightability on the transect.

The 2020 survey did not use satellite collared caribou to identify areas of high aggregation and instead conducted an extensive survey of all areas that were likely to have caribou. The similarity of estimates between the fall 2018 and fall 2020 surveys suggests that the coastal survey method, when in concert with a collaring program of between 25 and 50 collars, was and remains a robust survey method. However, evidence of caribou outside of the coastal strips typically used during the coastal surveys, were reported by local hunters from the communities of Cambridge Bay, Kugluktuk, and Ulukhaktok, and verified by the fall 2020 survey effort, suggesting that future coastal survey efforts should ensure that more inland strata are sampled,

regardless of collar distribution. During the fall 2020 survey effort, inland strata and associated transects, including areas that have never been sampled using the coastal survey method, made up an estimated 30% of all on transect observations of caribou (403 caribou). Though there were only 4 active collars during the 2020 survey effort, only one was outside of high-density survey strata.

5.3 Recommendations

Future research on the Dolphin and Union herd should be focused on identifying mechanisms for the observed trends so that the causal factors can be addressed to aid in the effective management of the herd. Population abundance should be carefully monitored, and the frequency of surveys should remain high when the population is in the declining phase. Additionally, obtaining accurate predator and human harvest rates and other forms of anthropogenic mortality, will be key to the effective modelling of herd specific mortality and its effects on abundance trends (Boulanger et al. 2019). This information will be necessary to confirm the effectiveness of current management actions.

The collaring of animals is also a key requirement to effective abundance survey stratification, as well as the monitoring of possible changes in movement related behavior and seasonal range use. Future surveys should also be expanded beyond the historically conducted coastal survey to, at minimum, include both inland and mainland strata. Although not statistically significant, the inclusion of the mainland strata in the 2020 survey effort did find caribou aggregations on the mainland consistent with community observations, suggesting that this could be something more pervasive in the future and for this reason alone, should be monitored. Additionally, given the number of observations made further inland, future surveys should at minimum consider areas 50 to 100 km inland from the south central and south western coast of Victoria Island, and/or as collars indicate.

5.4 Public Confidence

During the September and October stakeholder consultations, it became evident that community-based wildlife management organizations were unsatisfied with efforts to include IQ into caribou research planning and deployment. This is an issue that has challenged biologists, managers, and Inuit Organizations alike across the Territory. Though we are all working hard to come together to find a way of improving this situation, much work remains to be done. The DU caribou fall 2020 survey findings confirmed that HTO concerns that DU caribou fall distributions went beyond the constraints of the previously surveyed narrow coastal strata characteristic of the telemetry driven coastal survey method, were valid. Additionally, considering the history of the DU caribou Herd having halted their mainland migration from Victoria Island during times of low abundance in the 1970s, we suggest that hunter observations of overwintering DU caribou on Victoria Island coupled with the current declines estimated in recent years is consistent with this possible change in migratory behavior, and should be considered in any future research planning (Roberto-Charron, 2020; Hanke and Kutz, 2020). These observations can have far reaching implications to the effectiveness of research programs. DU caribou overwintering on Victoria Island would have important implications for effective and representative collar deployment. A split in collar deployment between the mainland and Victoria Island would provide better overall representation of the herds contemporary use of its range, and therefore should be factored into any future collaring program. Furthermore, hunter observations of DU caribou in the Contwoyto Lake area, well outside of their known annual range, also raises concerns that the DU herd may be in flux. These extralimital observations could explain possible mechanisms governing the dramatic decline observed between 2015 and 2018 and should be explored further. We suggest that future research in Nunavut would greatly benefit from a more shared approach to the development of research programs through a more effective and meaningful inclusion of IQ in research planning. In the case of the fall 2020 DU caribou abundance survey, the inclusion of IQ into the survey plans was pivotal in the

successful completion of the survey. Working together to better understand the complex relationships between caribou and their environment will lead to better research results, and more effective management of this species. Through collaborative work, we can improve the scientific, political, and public confidence in research results, and in turn, the effectiveness and acceptance of the management actions developed, by all stakeholders.

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8.0 APPENDIX

8.1 Consultation Maps

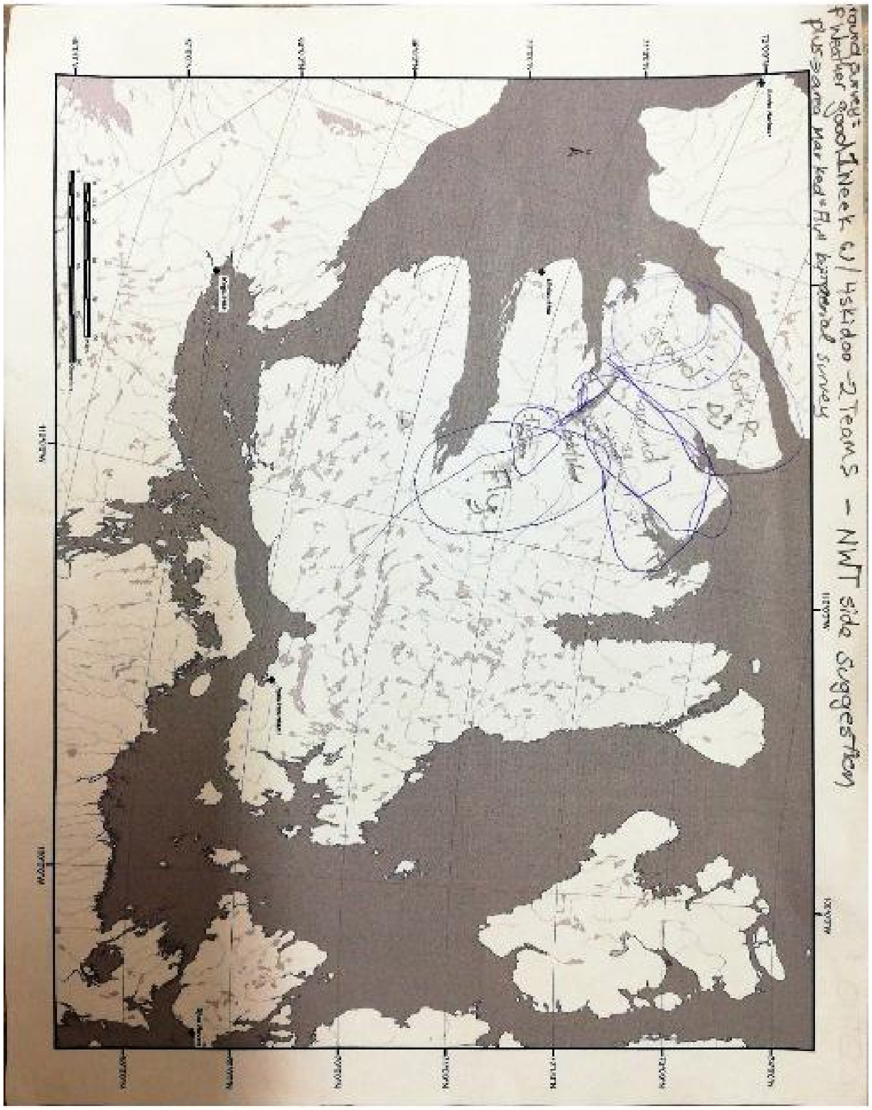
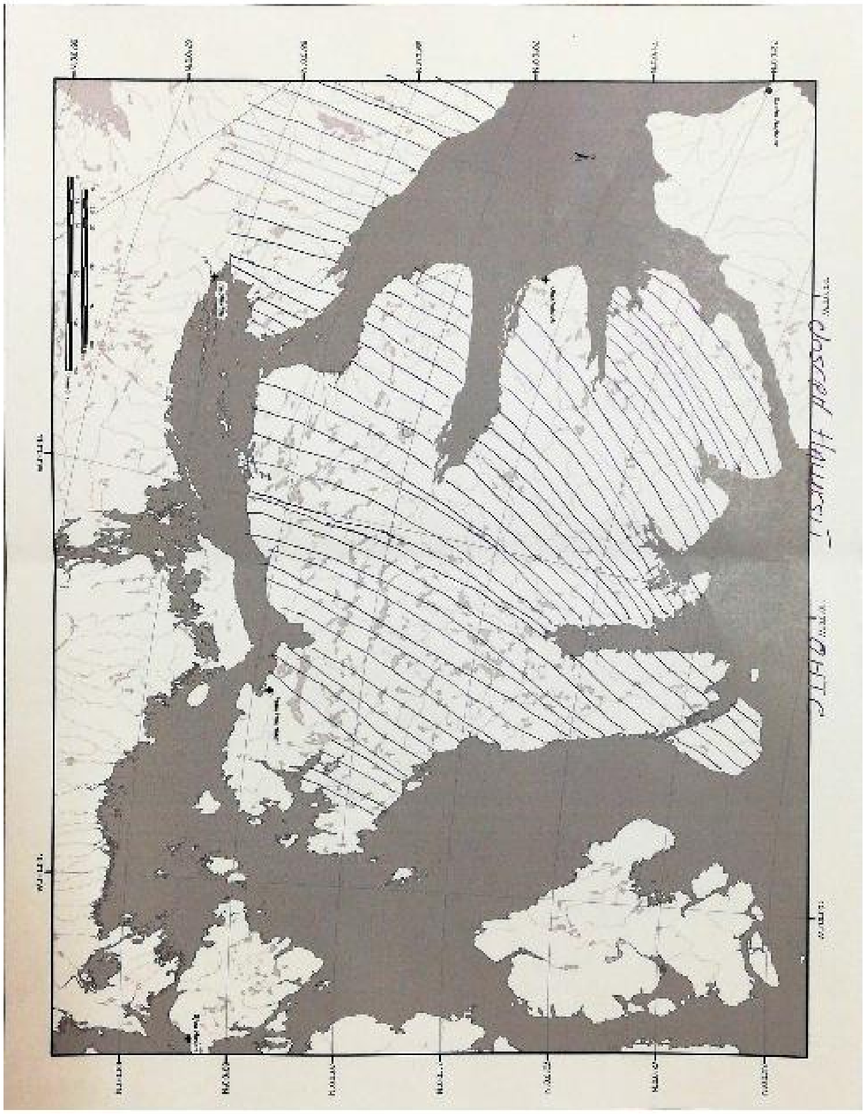


Figure 20. A map of the 2020 fall DU caribou survey area and probable caribou distributions based on submissions from Ulukhaktok, NWT.



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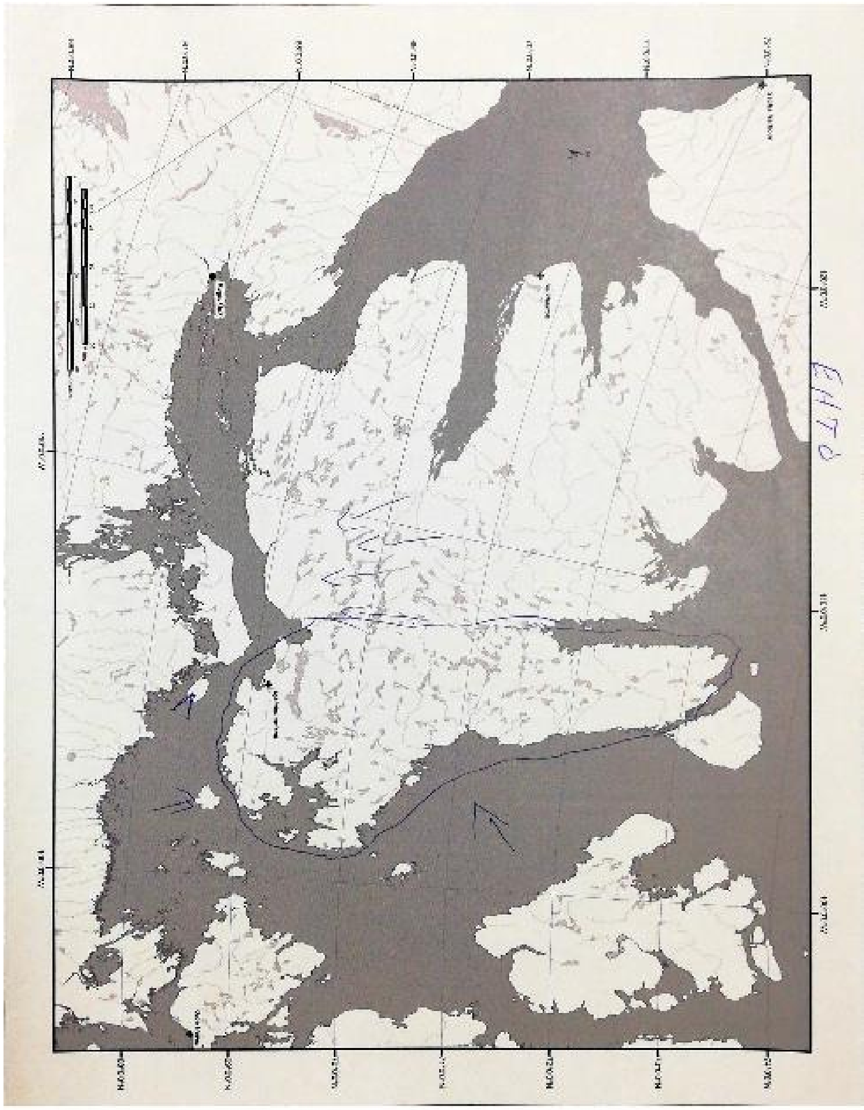


Figure 22. A map of the 2020 fall DU caribou survey area and probable caribou distributions based on submissions from Cambridge Bay and the Ekaluktutialik HTO, NU.

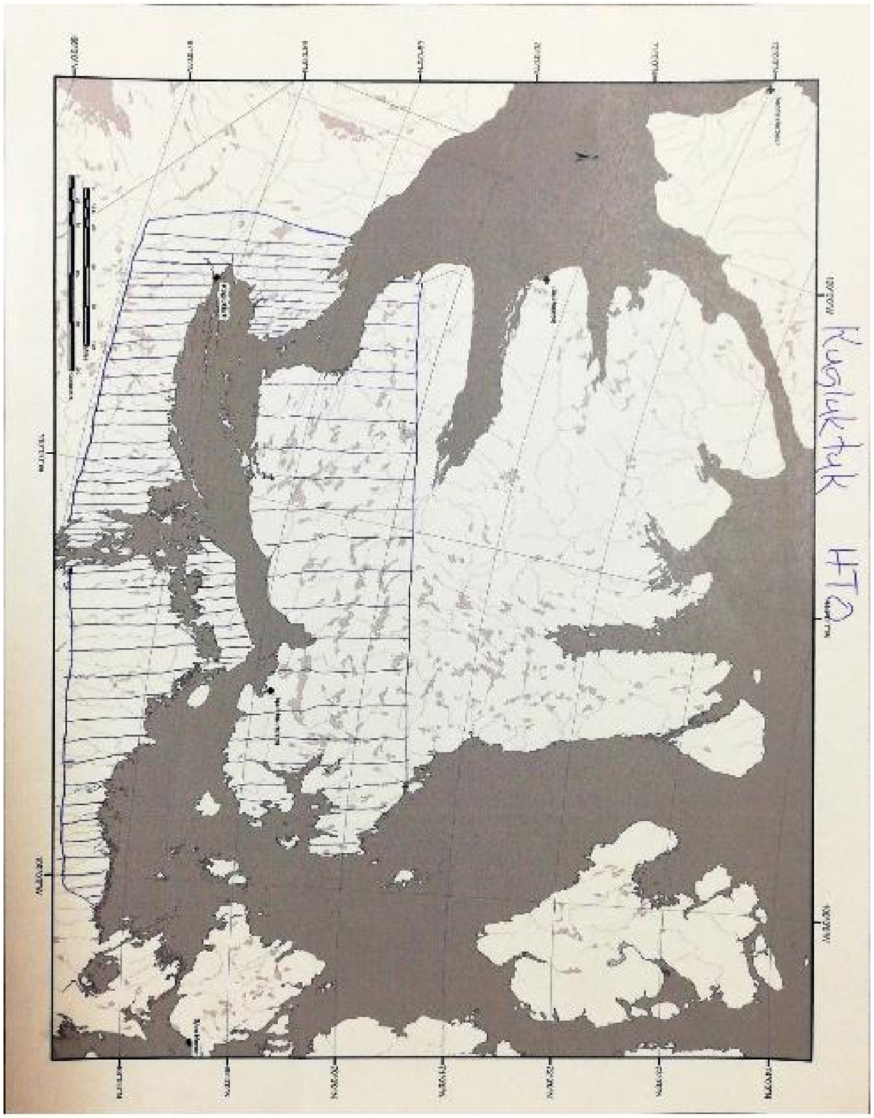
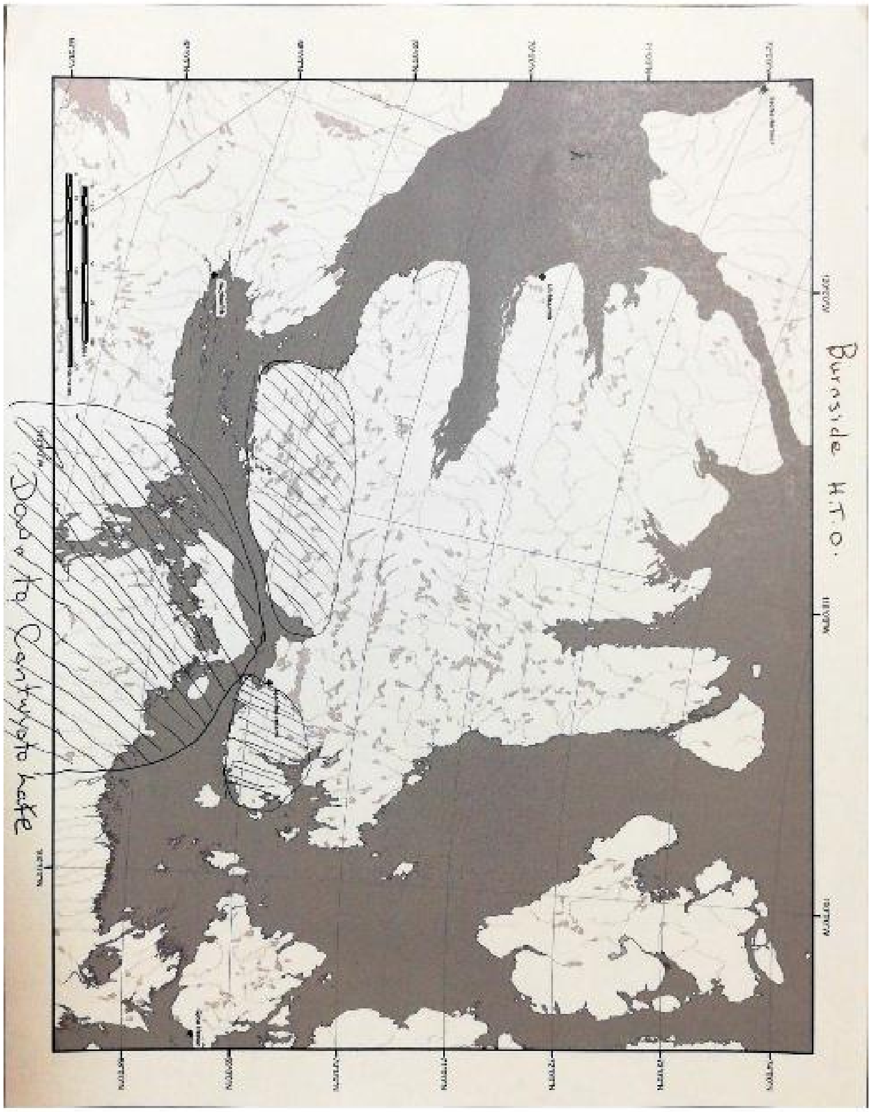


Figure 23. A map of the 2020 fall DU caribou survey area and probable caribou distributions based on submissions from Kugluktuk, NU.



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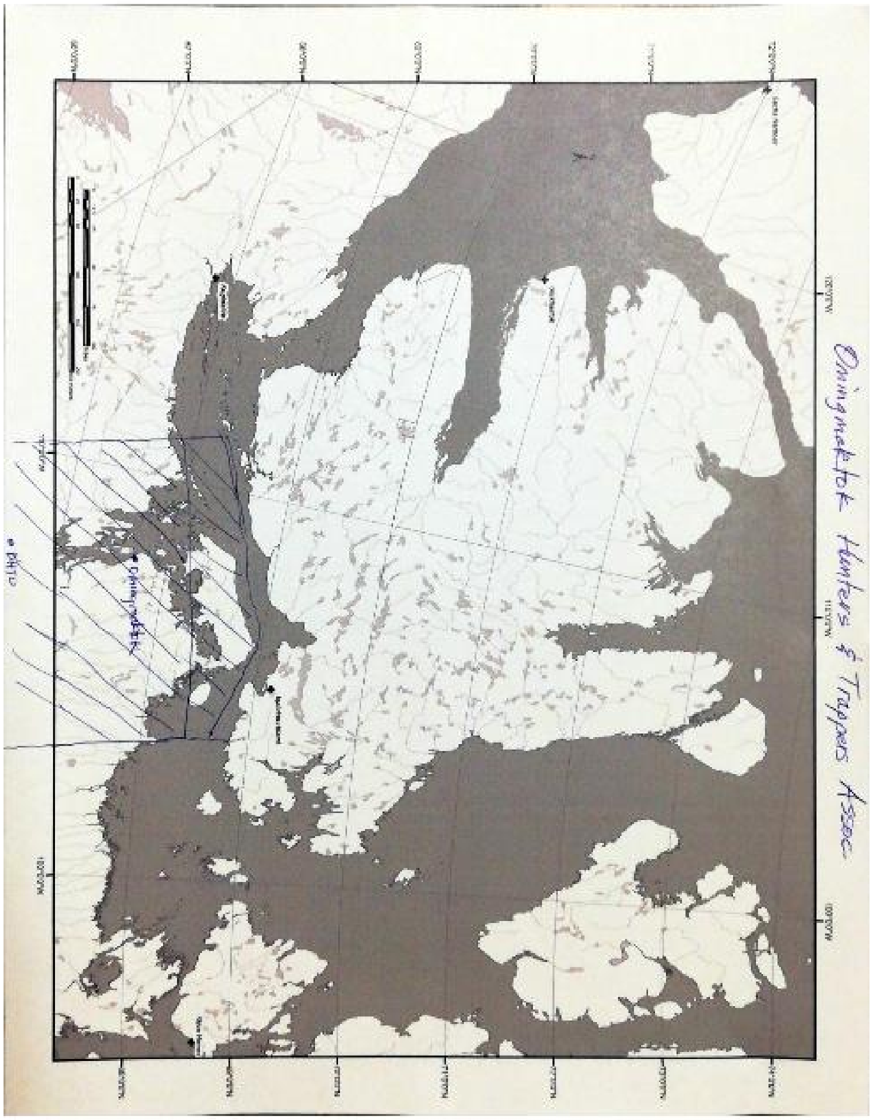

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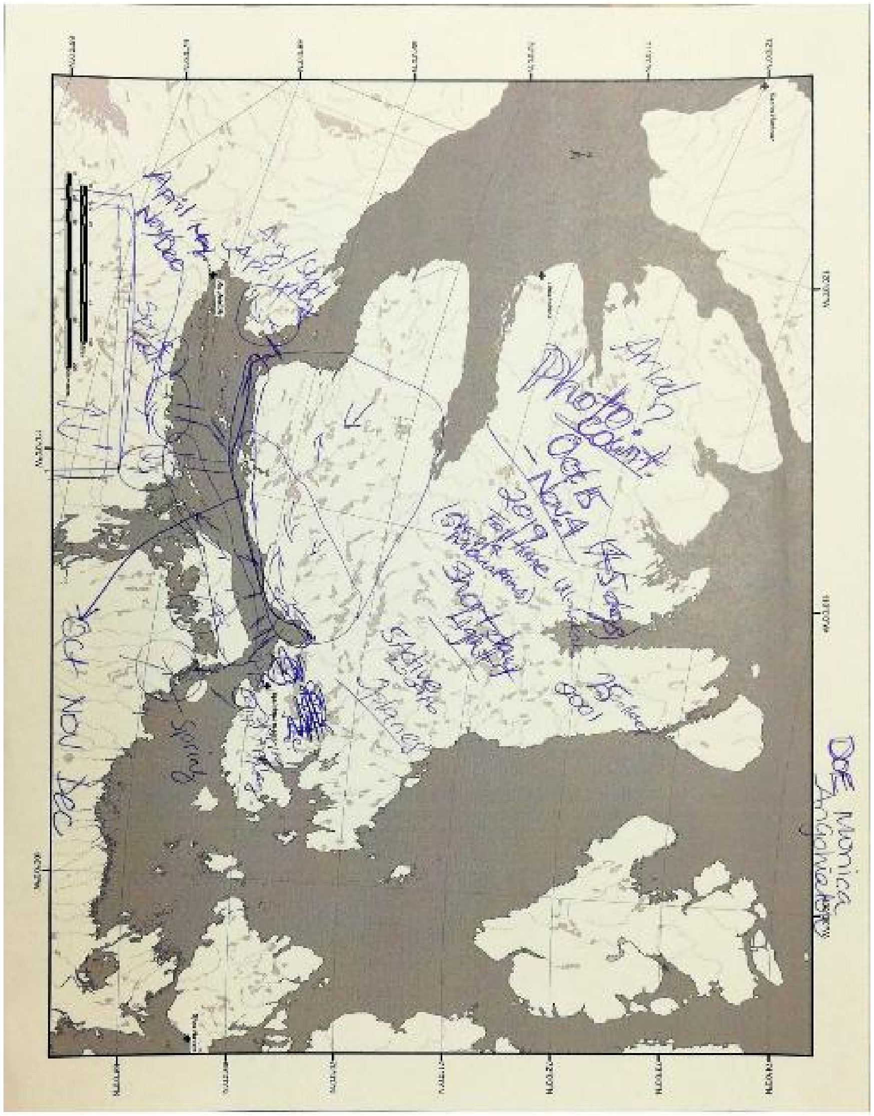

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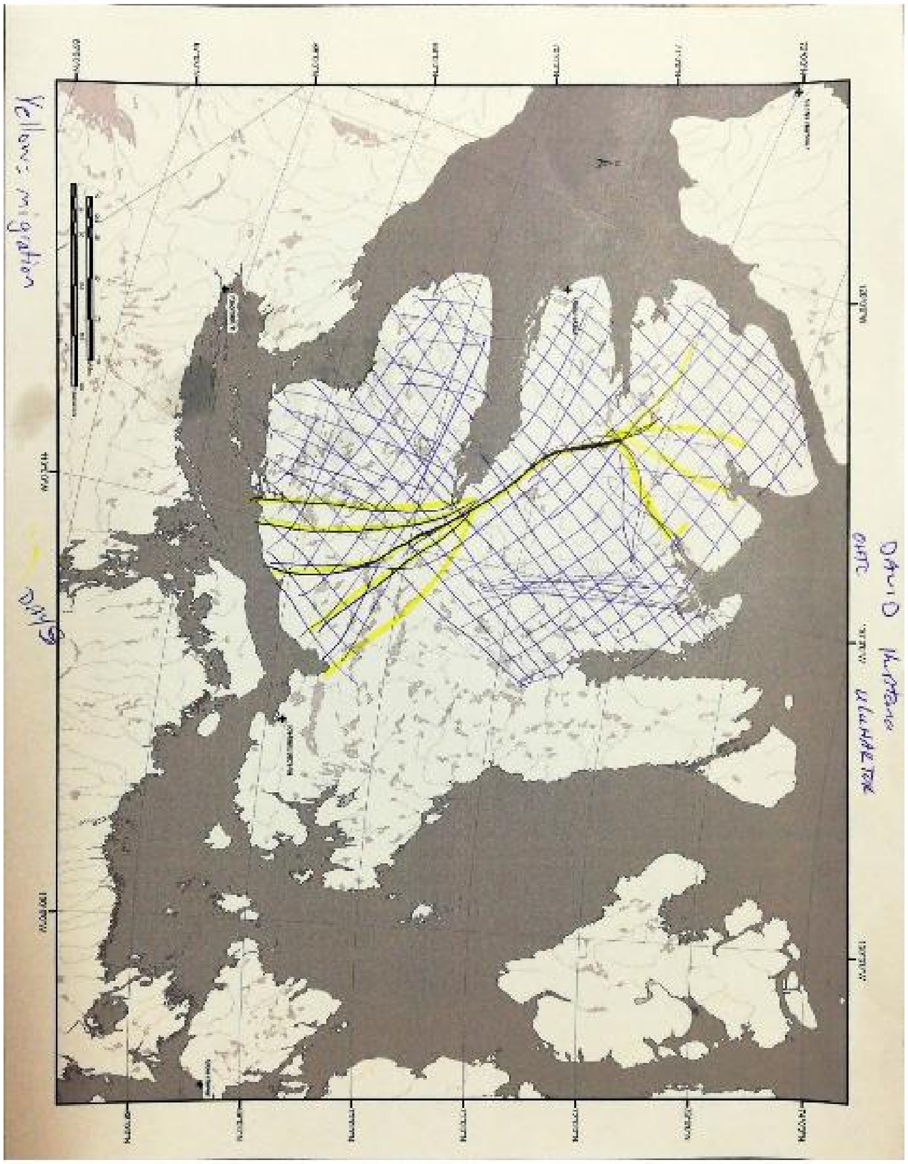

Figure 27. A map of the 2020 fall DU caribou survey area and probable caribou distributions based on submissions from Ulukhaktok, NWT.

8.2 Dolphin and Union Caribou Herd Landscape Stratification Analysis – Methods and Results Summary.

Dolphin and Union Caribou Herd Landscape Stratification Analysis – Methods and Results Summary

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1.0 DATA AND METHODS.

The following sections describe the data incorporated into the landscape stratification analysis along with the methods applied.

1.1 Caribou Telemetry Data

Telemetry points were collected from three telemetry programs, the first deployed between 1987 and 1989 maintaining a mean of 6 collars annually, the second between 1996 and 2006 maintaining a mean of 11 collars annually, and the third between 2015 and 2020, maintaining a mean of 27 collars annually (Table 1). The GPS locations from these programs were imported into an Access database, normalized into a common data structure, and attributed based on previously developed seasonal range date extents (Campbell et al., 2014) for the analysis. All pre-deployment and post-mortality locations were removed from the data, along with any collars deployed on non-Dolphin and Union caribou (determined through genetic analysis of captured caribou).

1.2 Annual Range Analysis Methods

Data were split into two groups for the annual range analysis: telemetry locations collected between 1996 and 2006 and current telemetry locations collected between 2015 and 2020. Data from 1987-1989 were excluded from the annual range analysis as sample sizes of collared caribou were relatively low. The annual range for 1996 to 2006 pooled data across years and used kernel density estimation (KDE) to generate a utilization distribution characterizing annual range use for that period. The bandwidth applied in the KDE (i.e., 29 km) was estimated using reference bandwidth (*href*) approach and the range boundary defined as the 95% utilization distribution contour (Calenge 2011).
The annual range boundaries for the current telemetry data, were defined on a year-to-year basis rather than as a pooled dataset due to the large sample sizes available.

Utilization distributions were generated for each year using KDE and the 95% contour used to define the range boundaries. The bandwidth used to generate the utilization distributions (i.e., 28 km) was calculated by averaging the *href* estimated for each year.

To generate an annual range boundary that captured both historical and current range use, the 95% utilization distribution polygons for each period (i.e., 1996-2006, 2015, 2016, 2017, 2018, 2019, and 2020) were merged and any overlapping boundaries dissolved.

1.3 Seasonal Range Analysis Methods

Seasonal range boundaries were generated for both low movement and high movement seasons using a similar approach to the annual ranges. Telemetry locations for all years were attributed with the seasonal date ranges defined by Nagy 2011. For each low movement season, data were pooled across years and a utilization distribution was generated using KDE with a seasonally specific bandwidth estimated using the *href* method (Table 2). The seasonal range boundaries were defined as the 95% utilization distribution contour.

For the high movement seasons, yearly migration corridors were derived from transect kernel densities for each of the migration seasons. The bandwidth for the corridor analysis was 20 kilometers. To bring the individual migration density layers to a common scale, they were reclassified into the utilization distribution classes 50%, 80%, 90%, 95%, and 100%. The reclassified corridor layers were weighted according to the number of collars for each year giving more weight to years with more collars. The layers were added together to identify consistently high use areas year to year. These consistently used areas were used to define the extent of the migration corridors.

Table 14. Summary of telemetry data available for the annual and seasonal range analyses.

Year	Number of Collars
1987	6
1988	7
1989	5
1996	3
1997	1
1998	1
1999	19
2000	20
2001	18
2002	12
2003	20
2004	14
2005	9
2006	3
2015	17
2016	29
2017	16
2018	44
2019	33
2020	20

Table 15. Estimated bandwidth radii for low movement seasons.

Season	Bandwidth Radius (km)
Calving	24
Post- Calving	28
Summer	25
Late Summer	29
Rut	22
Winter	17

1.4 Landscape Stratification Methods

A land cover classification for Victoria Island was completed to support survey planning for the Dolphin and Union subpopulation. The classification was based on a fused 20 metre Landsat and Sentinel 2 best pixel composite satellite image generated from imagery collected between July 1 to August 31, 2017 to 2020 (Figure 1). The classification was performed using a supervised classification method based on visual interpretation. Training sites were collected for ten classes based on a previous ecological landcover classifications completed for the Kivalliq region: water, wet graminoid, graminoid heath tundra, heath upland, rock/heath upland, sand/gravel, boulder, rock, and snow/ice (Campbell et al. 2012). The resulting classification was intersected with caribou telemetry locations collected between 2015 and 2020 to investigate seasonal land cover use patterns demonstrated by caribou on Victoria Island.

Additionally, a topographic position index (TPI) surface was generated using the Arctic HRDEM (20 metres) obtained from Natural Resources Canada. TPI is calculated by comparing the elevation for a given cell in a DEM to the mean elevation calculated over a specified spatial neighbourhood (Weiss 2001). As TPI is scale dependent, we calculated surfaces for three spatial neighbourhoods: 500 metres, 1500 metres, and 3000 metres. Smaller neighbourhoods highlight extreme terrain changes (e.g., narrow ridge lines and narrow valley bottoms) while larger spatial neighbourhoods provide a more generalized characterization of landform features. Dolphin and Union telemetry locations were intersected with the TPI results and summarized by season to explore terrain feature use patterns for caribou on Victoria Island.

Figure 28. Landsat and Sentinel 2 Fused Satellite image covering Victoria island.

2.0 RESULTS AND DISCUSSION

The following sections describe the results of the landscape stratification analysis in relation to the survey strata, telemetry locations and caribou observations from the survey.

2.1 Annual Range

The annual range boundaries generated for this project closely resemble those proposed by Nagy 2011. The Dolphin and Union annual range boundaries encompass the majority of Victoria Island and extend south to the mainland covering the areas around Bathurst Inlet, Umingmaktok, and the Kent Peninsula (Figure 2).

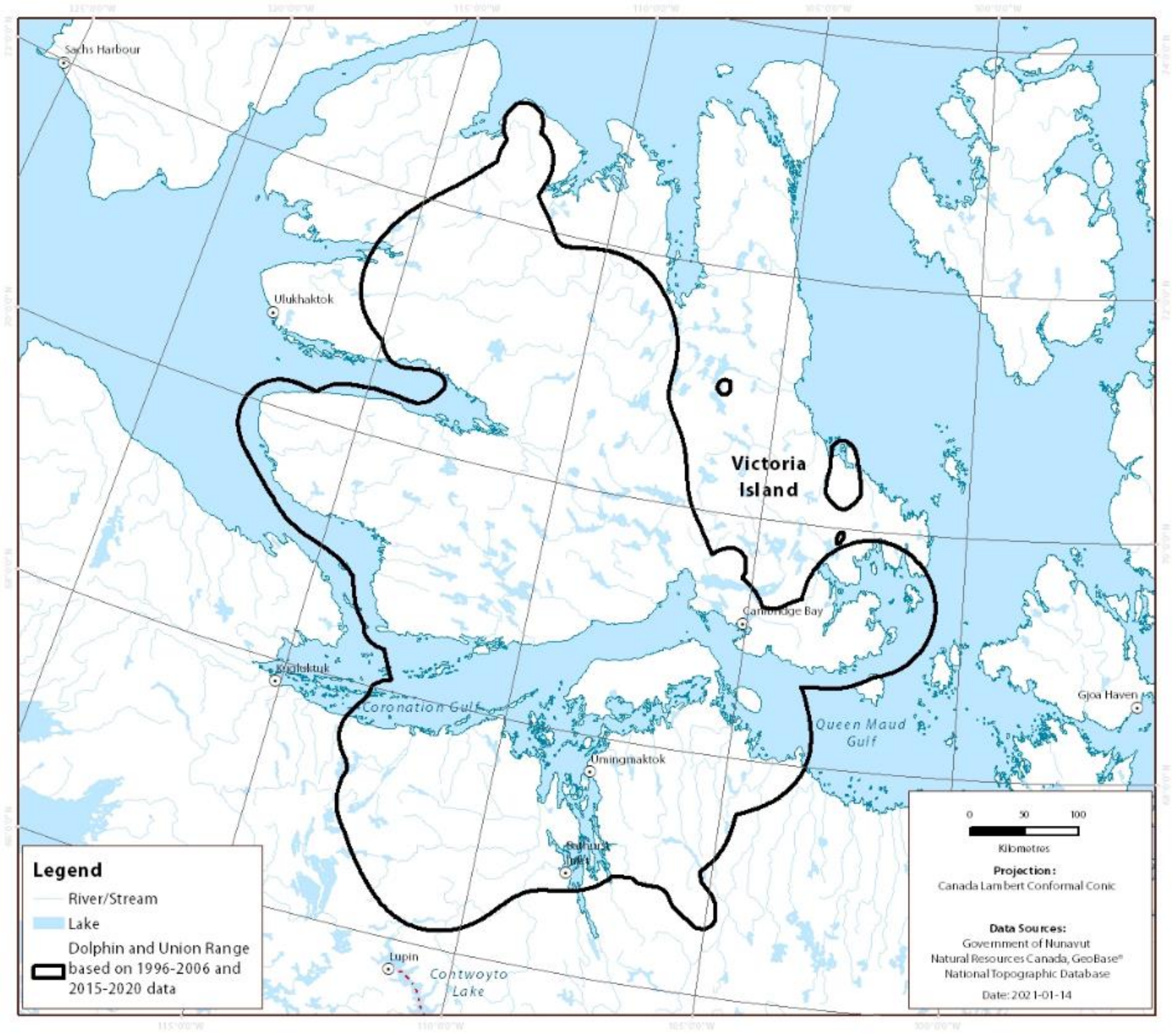

Figure 29. The Dolphin and Union (DU) annual range.

2.2 Seasonal Ranges

The seasonal range boundaries generated for Dolphin and Union reflect the variation in habitat use driven by annual biological and ecological cycles. Spring migration corridors are located between the mainland coast and Victoria Island with the highest use areas falling across the Kent Peninsula and to the West of Bathurst Inlet. The location of these corridors capture the movement of the caribou from their winter ranges on the mainland to the calving and summer ranges located on Victoria Island (Figure 3).

The calving, post-calving, summer and late summer ranges all occur primarily on Victoria island with the highest use areas located in the southwest and south-central portions of the island (Figure 4– Figure 7). Scattered pockets of high use also occur in the north-central region of the island, around Cambridge Bay, and on the Kent Peninsula. There is a slight shift north by Dolphin and Union caribou throughout the snow free months resulting in no range use occurring on the mainland or Kent Peninsula for collared DU caribou after the calving season has finished.

Movement corridors associated with the pre-breeding period of the fall migration reflect the movement of caribou towards the southern coastline of Victoria Island (Figure 8).

The rut occurs primarily along the southern coast of Victoria Island, as the caribou wait for suitable ice conditions to return to the mainland for the winter (Figure 9).

The post-breeding fall migration corridors are located between Victoria Island and the mainland coast with the highest use areas falling across the Kent Peninsula, mouth of Bathurst Inlet, and in the region west of the Inlet. The location of these corridors reflects the timing of caribou movements from Victoria Island across the sea ice to their winter ranges on the mainland (Figure 10).

The Dolphin and Union winter range is located south of the Kent Peninsula, around Umingmaktok, and to the west of Bathurst Inlet. High use areas occur primarily in the region between Kikerk Lake and Bathurst Inlet (Figure 11).

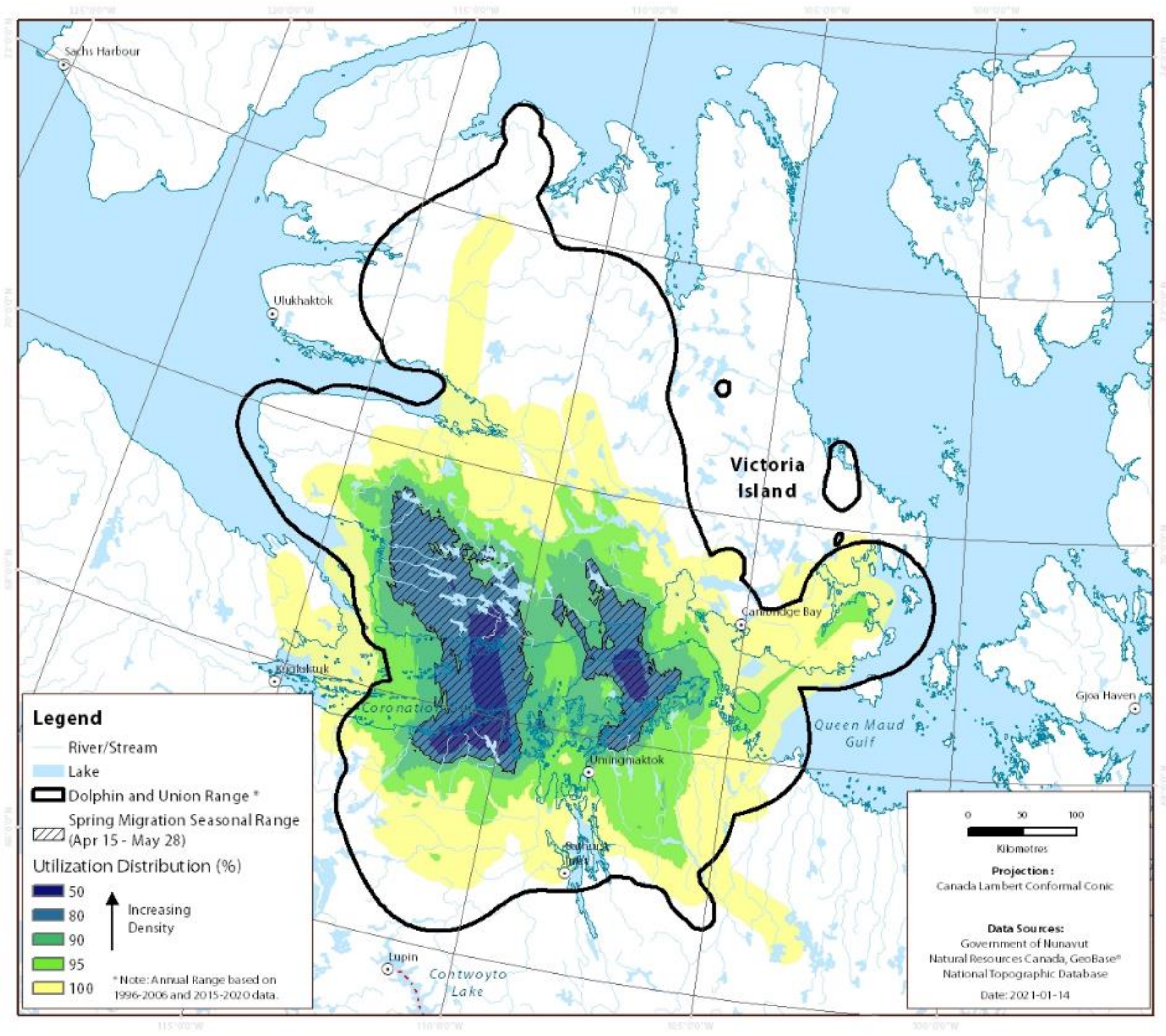

Figure 30. The Dolphin and Union (DU) annual range and spring migration seasonal range.

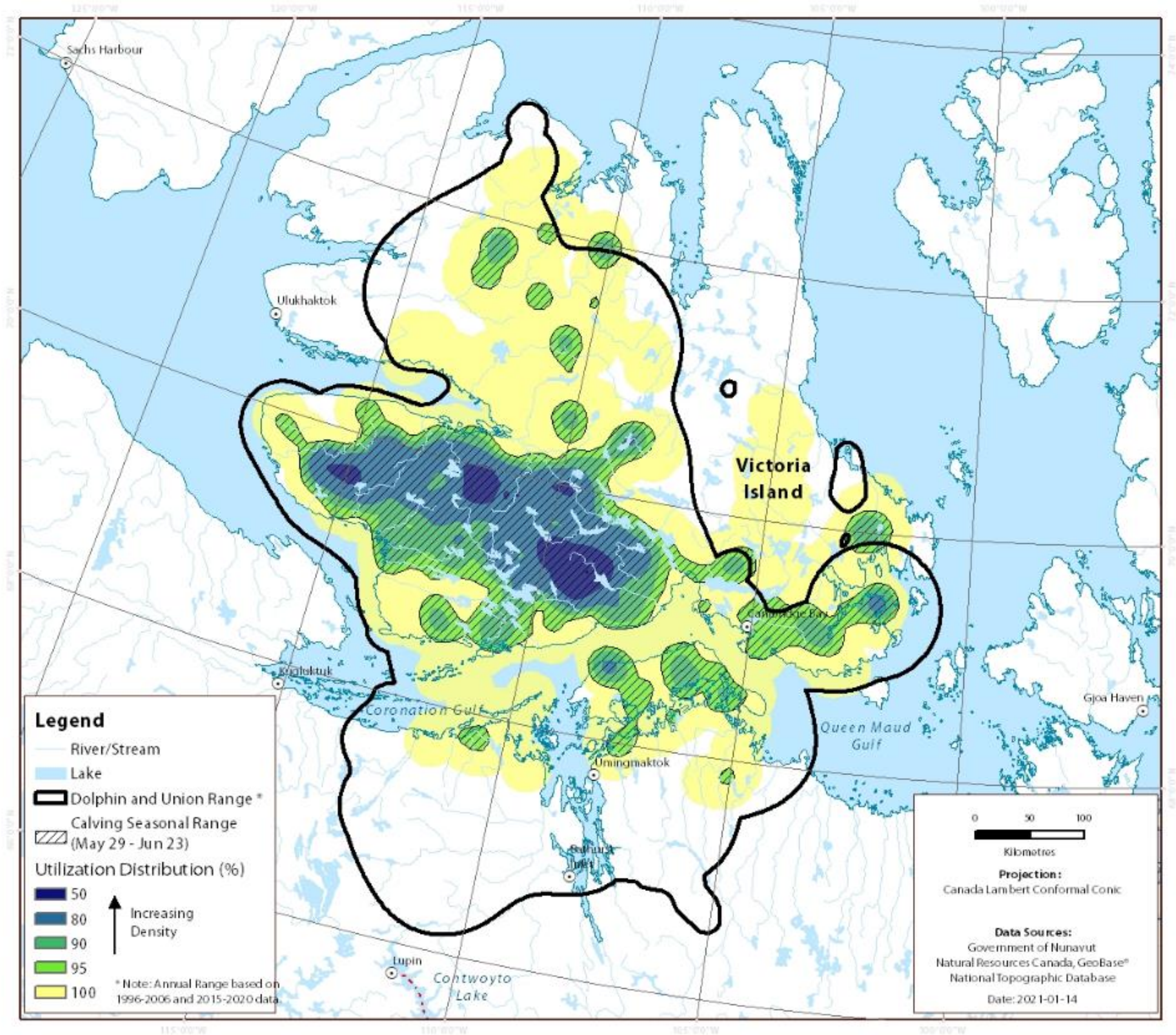

Figure 31. The Dolphin and Union (DU) annual range and calving seasonal range.

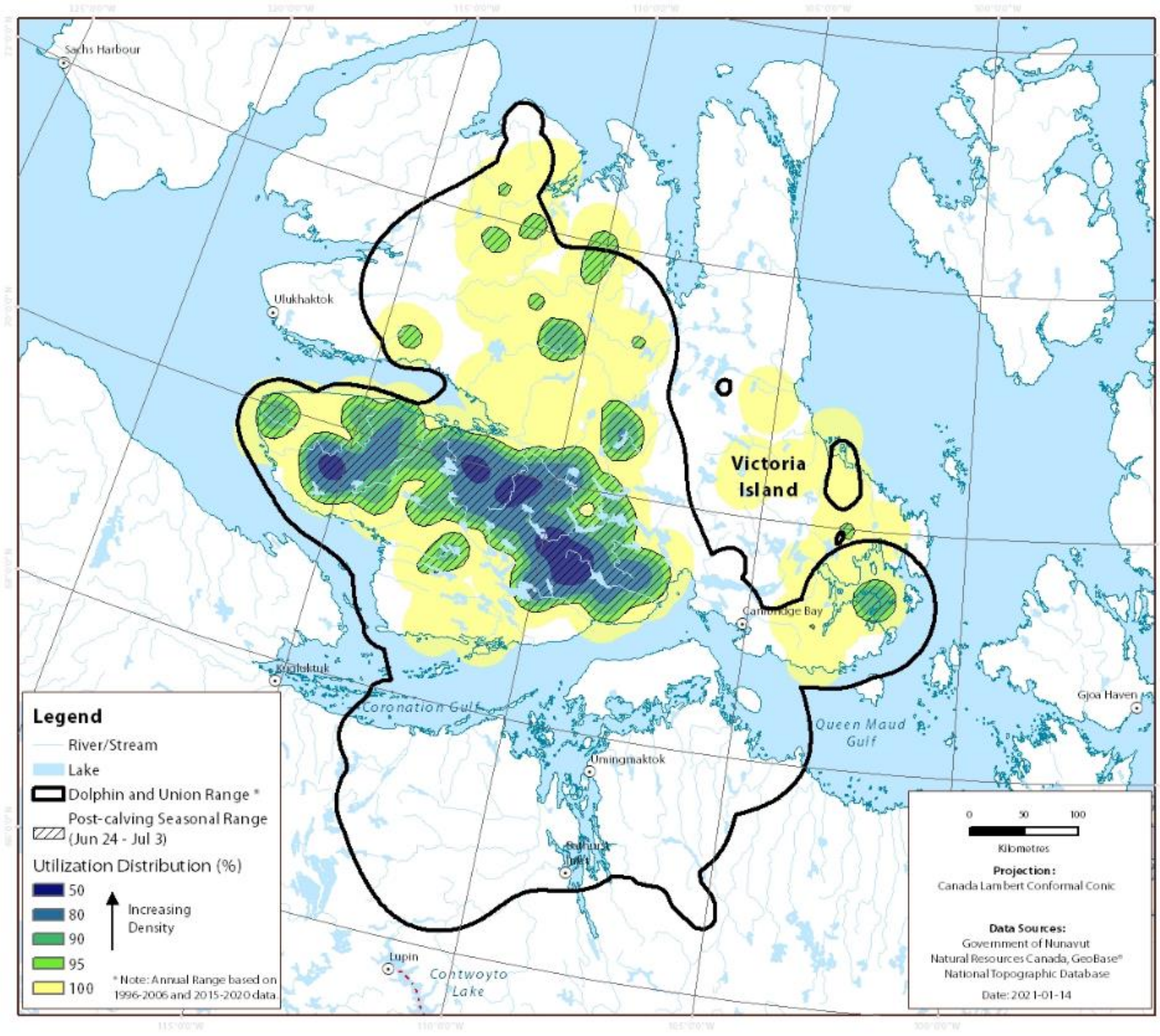

Figure 32. The Dolphin and Union (DU) annual range and post-calving seasonal range.

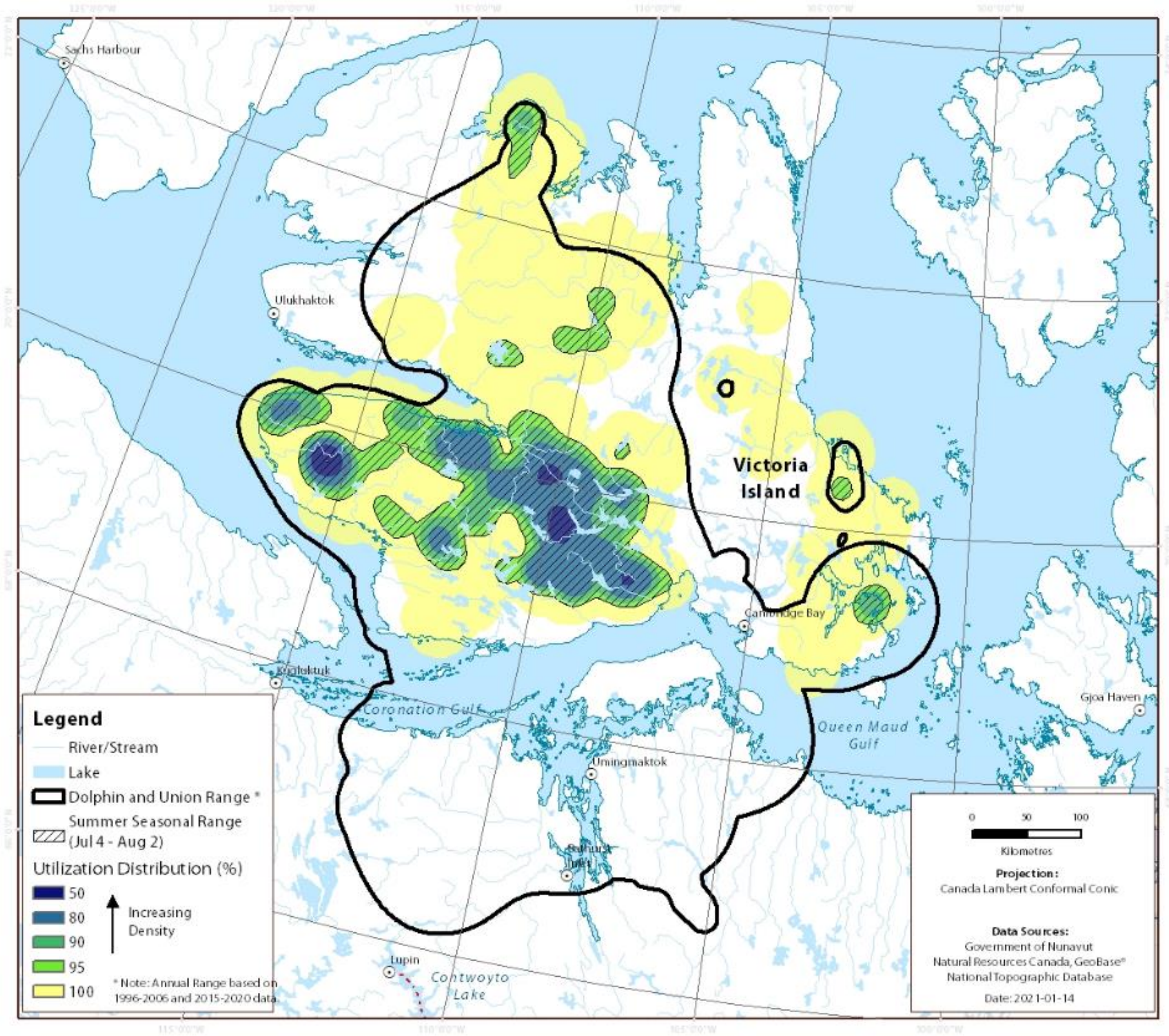

Figure 33. The Dolphin and Union (DU) annual range and summer seasonal range.

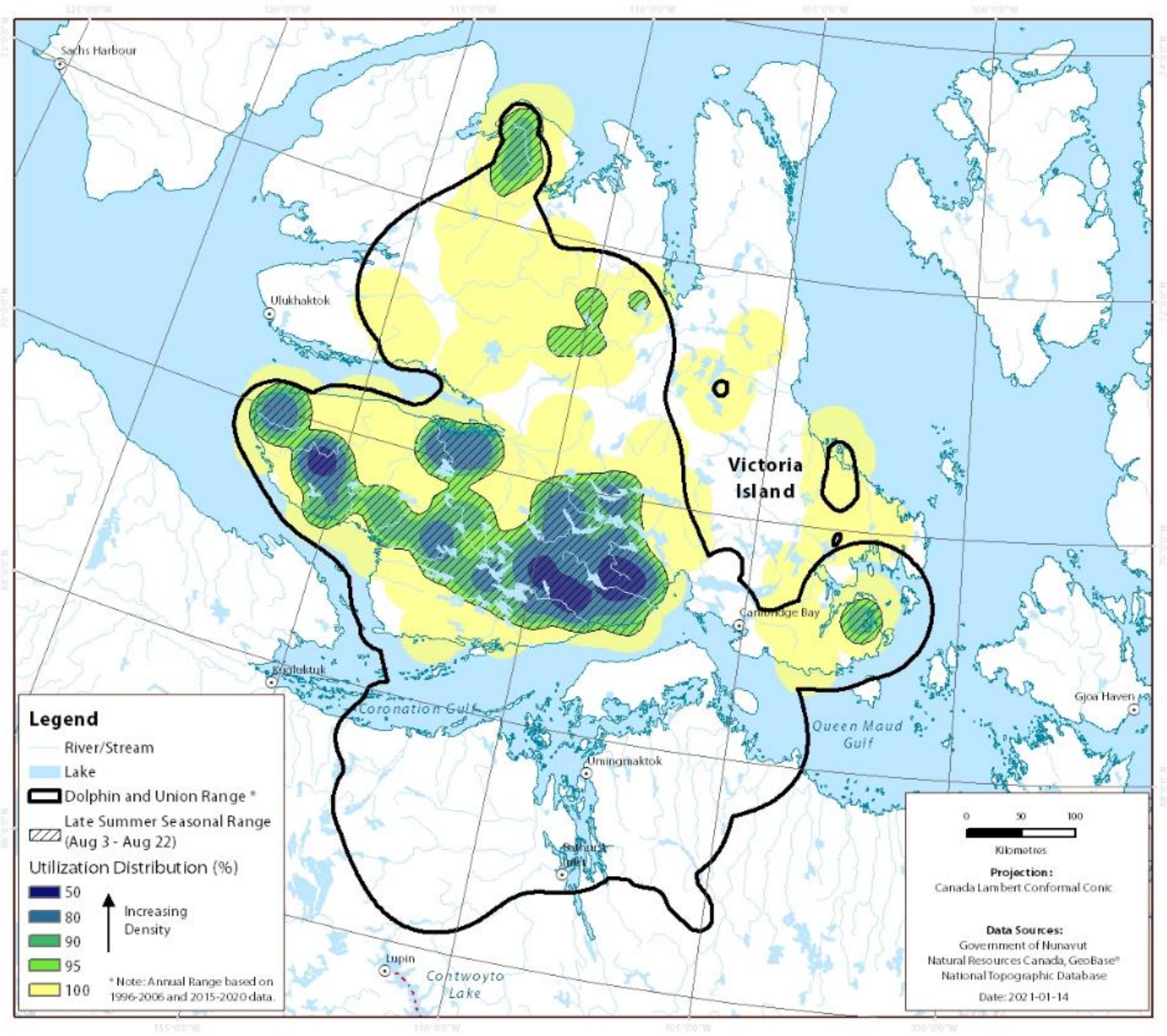

Figure 34. The Dolphin and Union (DU) annual range and late summer seasonal range.

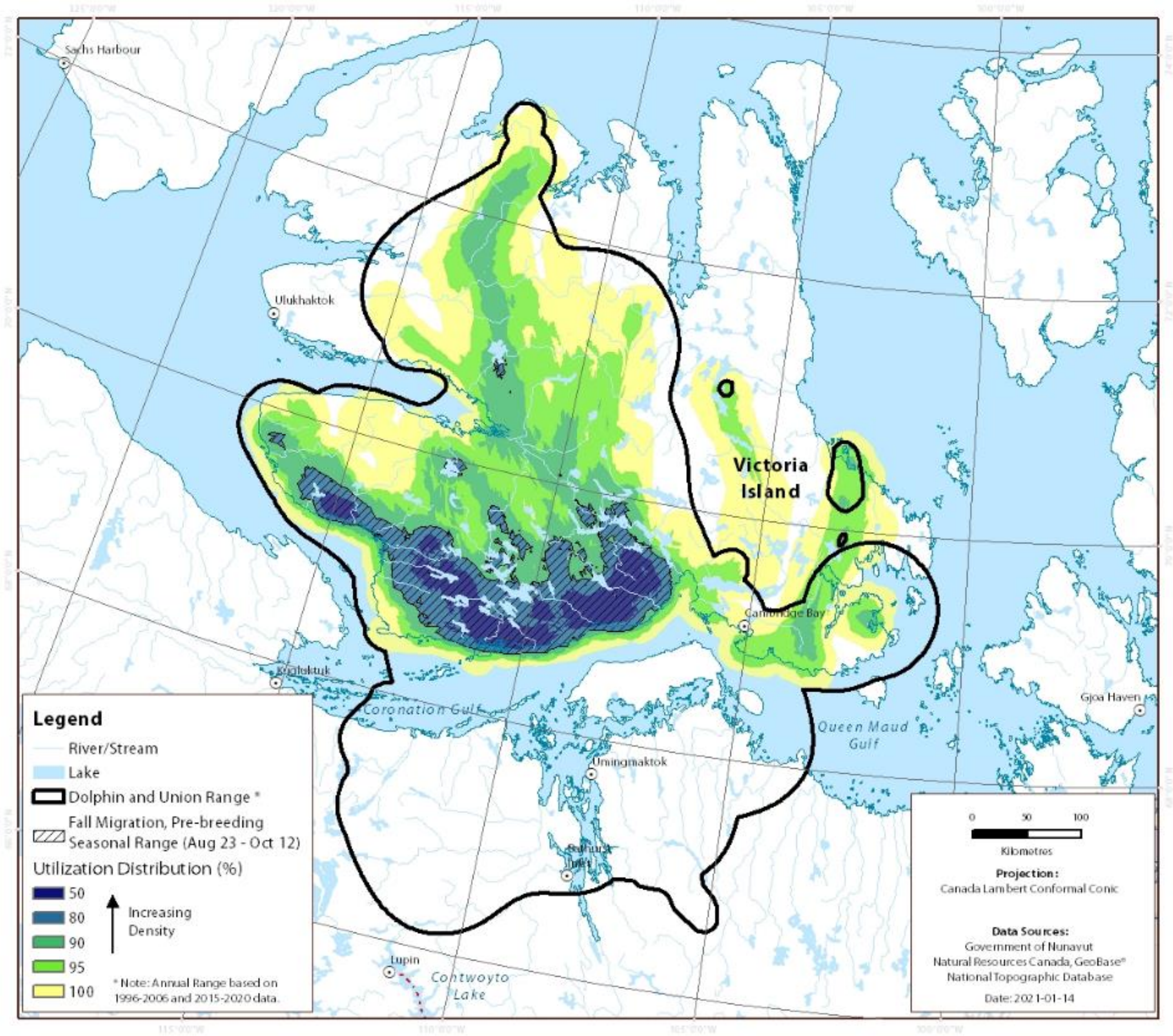

Figure 35. The Dolphin and Union (DU) annual range and fall migration, pre-breeding seasonal range.

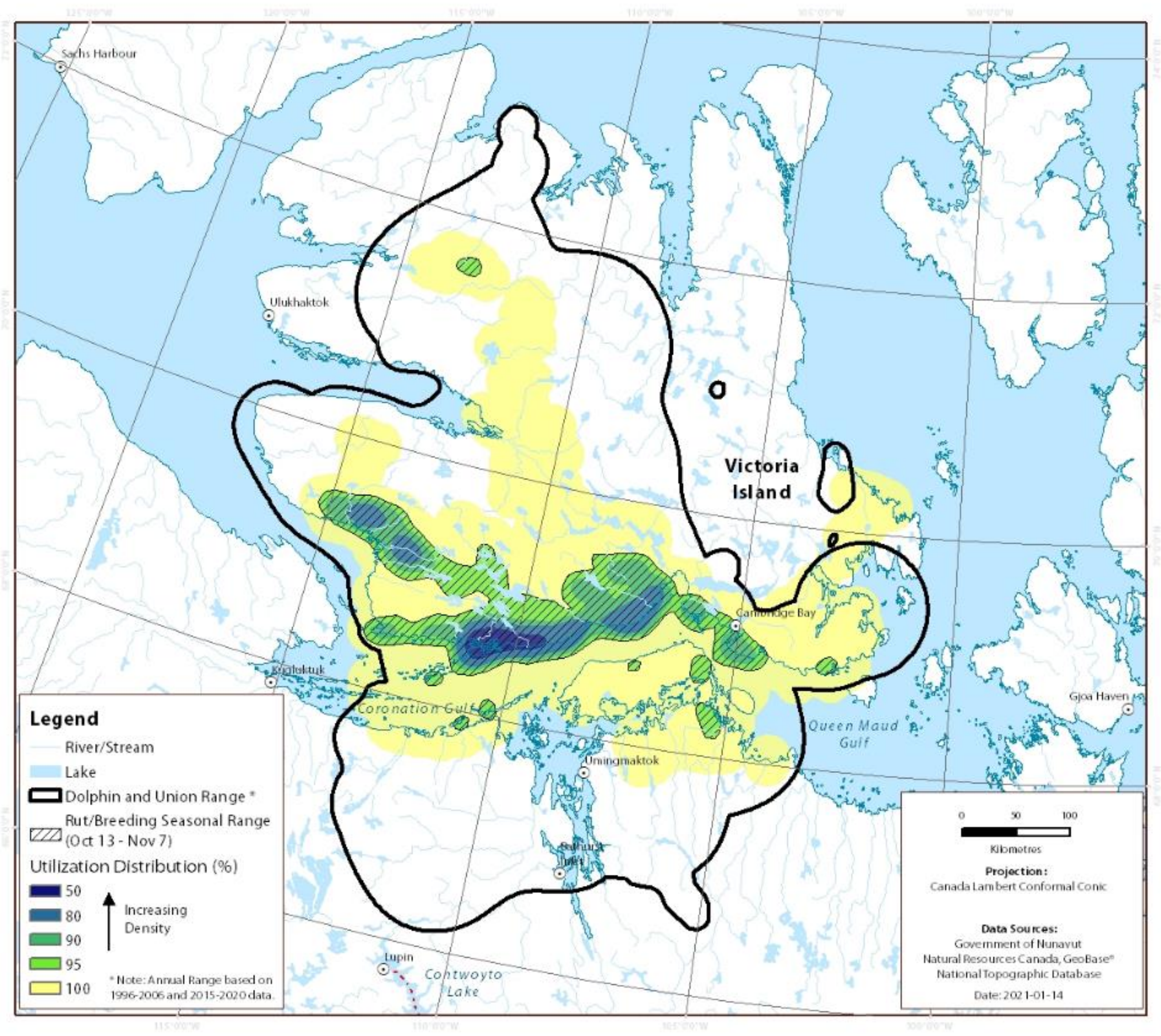

Figure 36. The Dolphin and Union (DU) annual range and rut/breeding seasonal range.

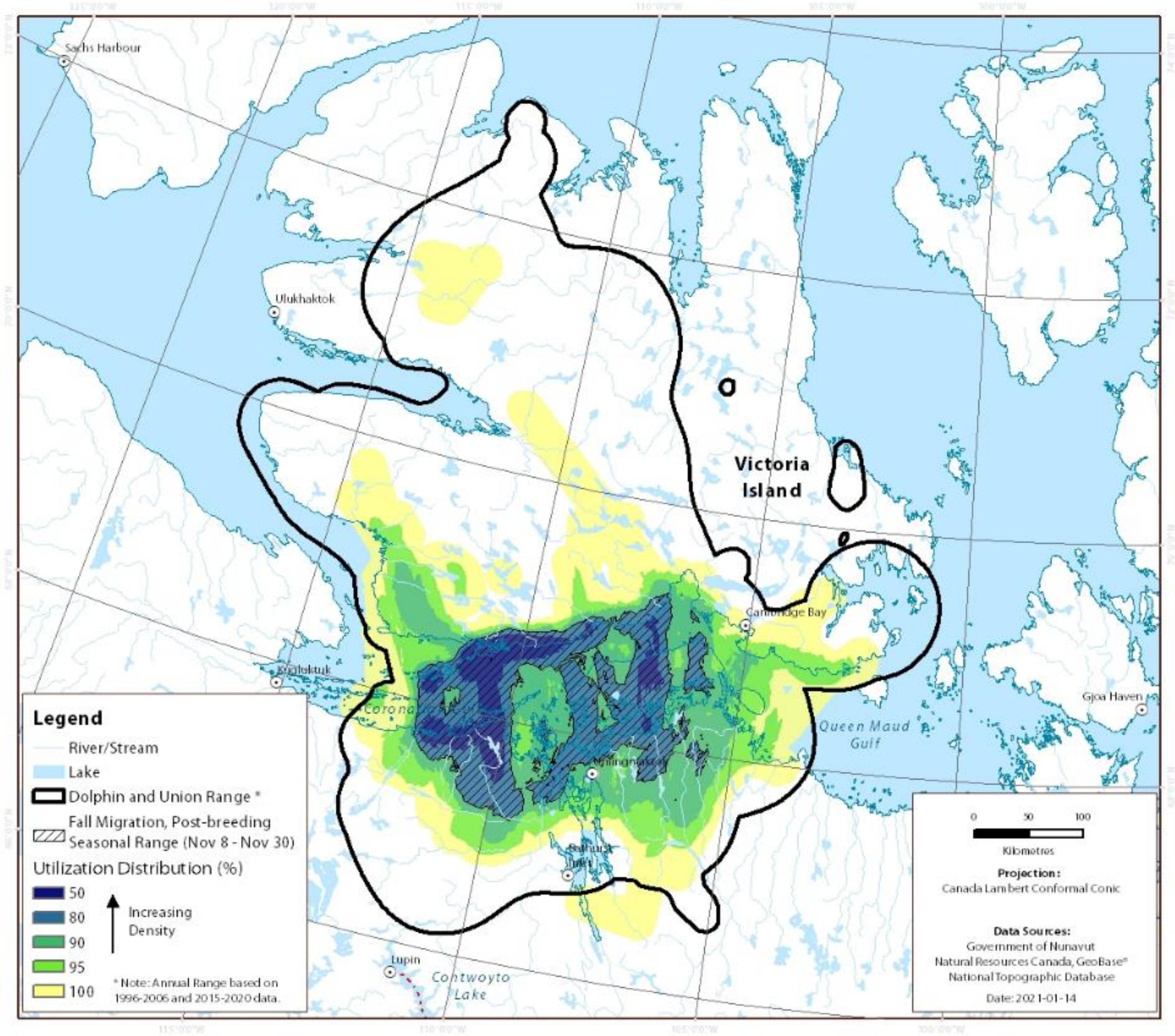

Figure 37. The Dolphin and Union (DU) annual range and fall migration, post-breeding seasonal range.

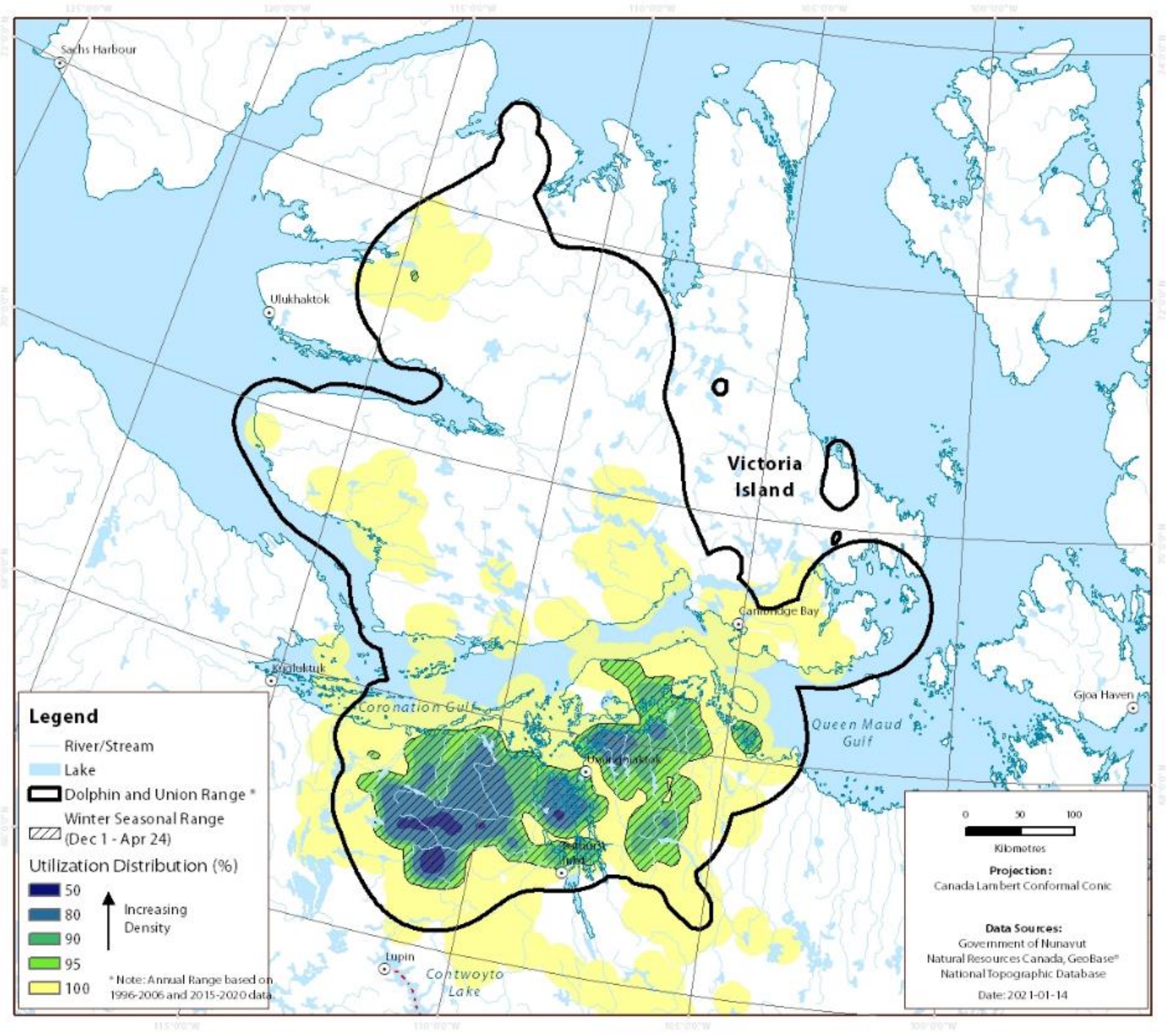

Figure 38. The Dolphin and Union (DU) annual range and winter seasonal range.

2.3 Land Cover

Since Dolphin and Union caribou spend much of the snow free months located on Victoria Island, the land cover classification was focused mainly on Victoria Island (Figure 12). As such, the survey strata located on the mainland do not have complete coverage and are not included in the summary of results.

When considered as a whole, the principal land cover types present on Victoria Island are heath tundra and heath upland with graminoid, wet graminoid, and water making up a much smaller proportion of the total (Table 3). However, the results of the classification show considerable north-south variation in land cover types with less variation east to west. The southern coastline of the island is dominated by the graminoid class and lakes with smaller areas of both the heath tundra and upland classes. Heath upland becomes the dominant land cover type in the central region, while the graminoid and heath tundra classes are present but only in small discrete patches. The central area also has large sandy regions and many lakes. The northern portion of the island is characterized by the presence of large rocky areas of heath upland with some patches of wet graminoid and graminoid classes occurring in the northwest. Unlike the other two regions of the island, the northern portion has only a small number of lakes.

The land cover composition for the individual stratum mirror the north-south variation observed. Strata along the southern coastline have a large graminoid content, but as the strata get further from the coast, they become increasingly dominated by heath upland and heath tundra classes (Table 3). As such, the very high density and high density strata are characterized by high levels of the graminoid classes (Figure 13) and medium and low density strata by lower levels of graminoids and increasing levels of heath tundra and upland cover types (Figure 14 – Figure 15). The areas of Victoria Island not covered by strata are similarly composed of high levels of heath tundra and heath upland classes along with a higher proportion of rock, sand, and gravel than evident within stratified areas (Figure 16).

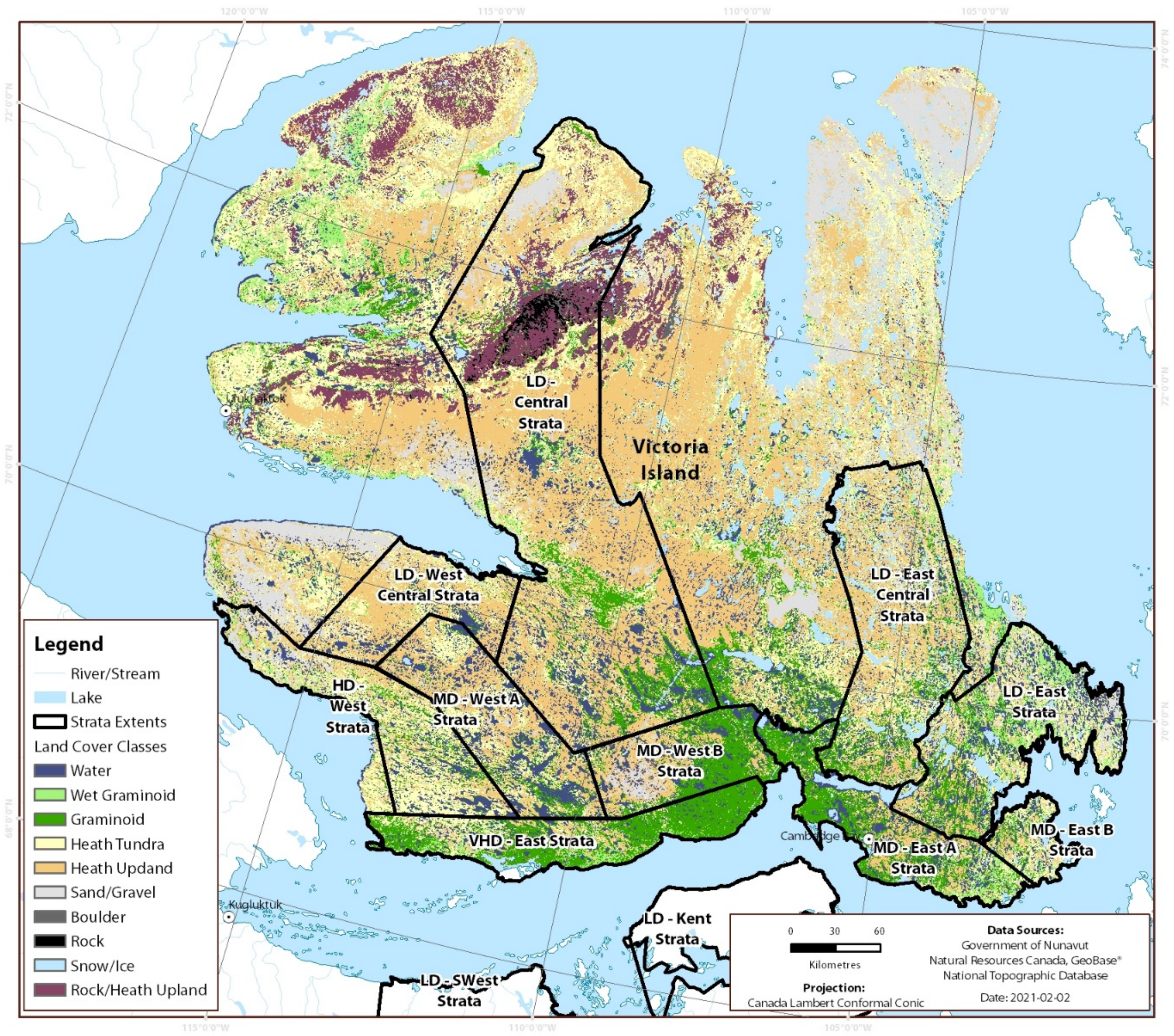

Figure 39. Land cover classification for Victoria Island.

Table 16. Land cover summary for Victoria Island and survey strata.

Strata Name	Water	Wet Graminoid	Graminoid	Heath Tundra	Heath Upland	Rock/Heath Upland	Boulder	Rock	Sand/Gravel	Snow/Ice
Victoria Island - Outside Strata	6.5%	7.4%	6.9%	25.1%	28.1%	8.3%	0.8%	0.6%	10.4%	5.8%
VHD East	13.9%	15.6%	41.1%	15.1%	10.1%	1.6%	0.3%	0.3%	1.4%	0.6%
HD West	14.6%	10.7%	12.4%	30.0%	21.9%	1.7%	0.0%	0.2%	8.1%	0.5%
MD East A	19.4%	12.4%	29.2%	15.0%	13.7%	1.8%	0.4%	0.4%	0.9%	6.8%
MD East B	16.2%	15.1%	14.4%	26.4%	17.4%	4.6%	0.1%	0.5%	2.4%	3.0%
MD West A	23.7%	7.7%	12.3%	22.7%	27.7%	2.9%	0.0%	0.2%	2.3%	0.5%
MD West B	18.4%	7.7%	29.3%	12.8%	21.1%	3.3%	0.1%	0.5%	6.3%	0.7%
LD Central	10.5%	5.3%	9.2%	21.4%	33.9%	9.6%	1.4%	2.0%	5.0%	1.7%
LD East Central	13.1%	9.0%	12.3%	23.0%	26.6%	2.9%	0.0%	0.3%	2.1%	10.8%
LD East	18.8%	16.7%	13.8%	21.2%	15.0%	2.9%	0.0%	0.3%	4.7%	6.5%
LD West Central	13.4%	5.2%	6.7%	25.9%	39.5%	2.3%	0.0%	0.2%	6.5%	0.3%

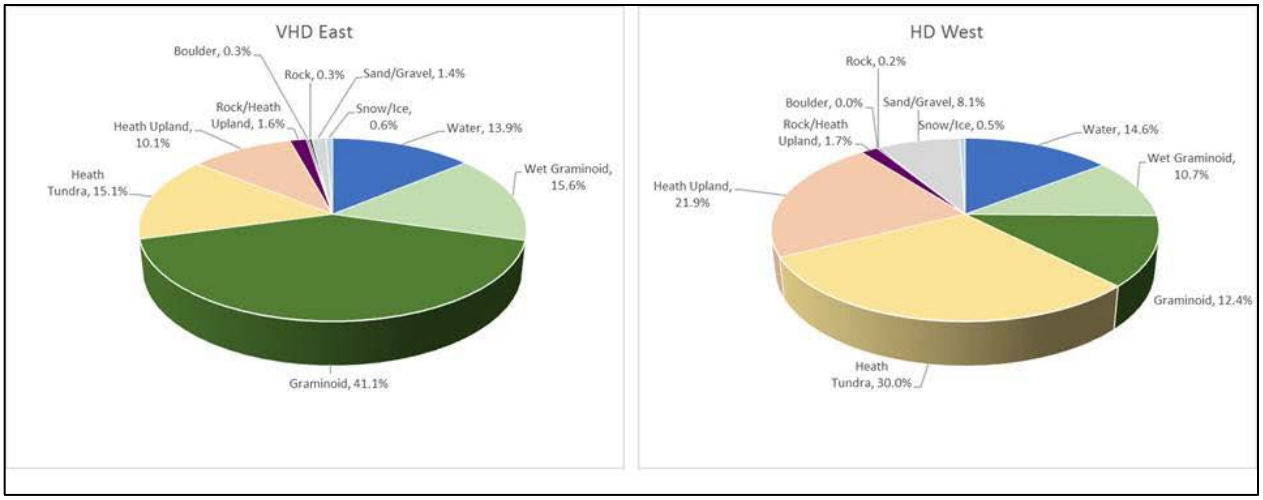

Figure 40. Land cover class percentages for very high and high density strata

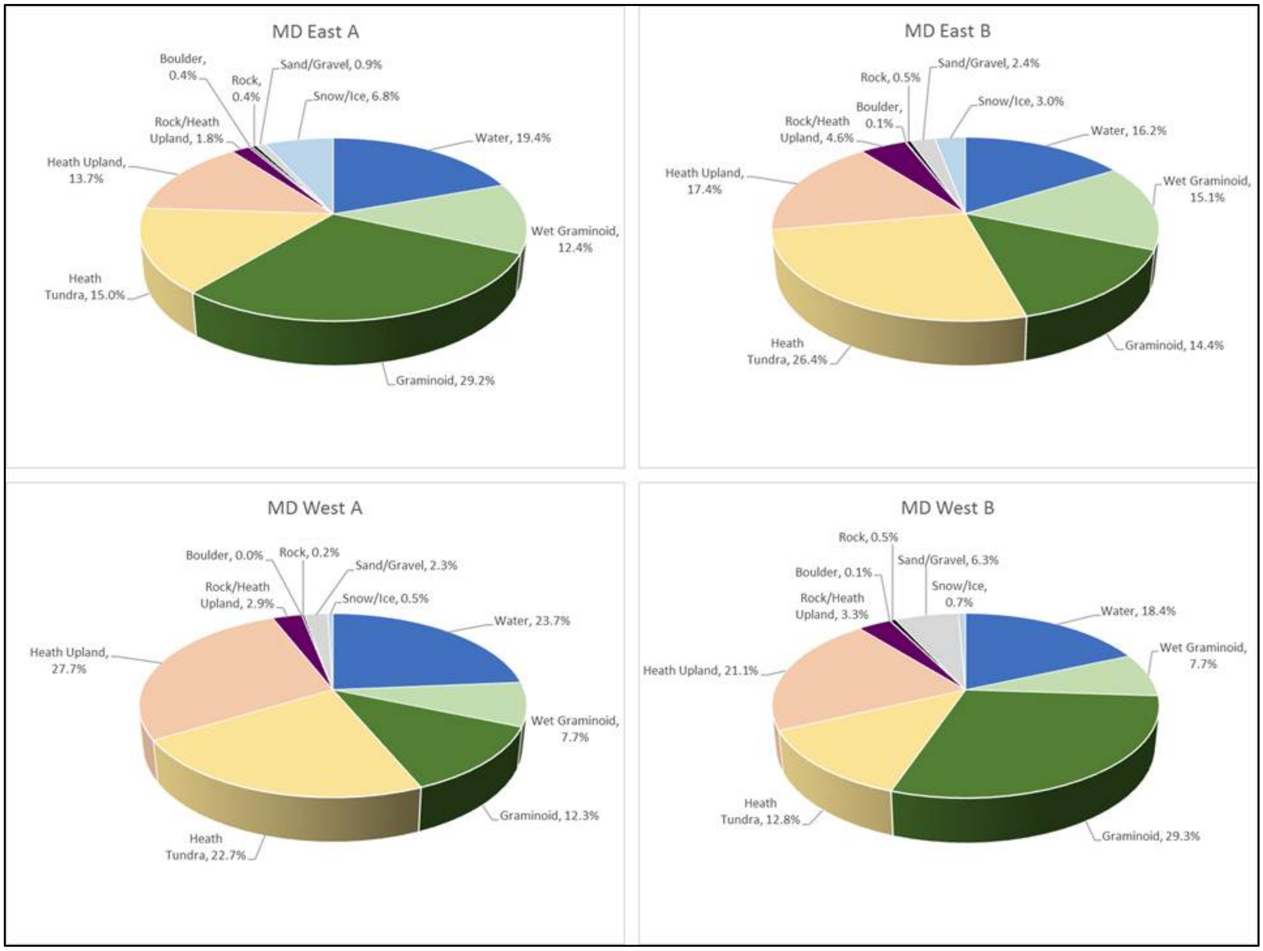

Figure 41. Land cover class percentages for the medium density strata

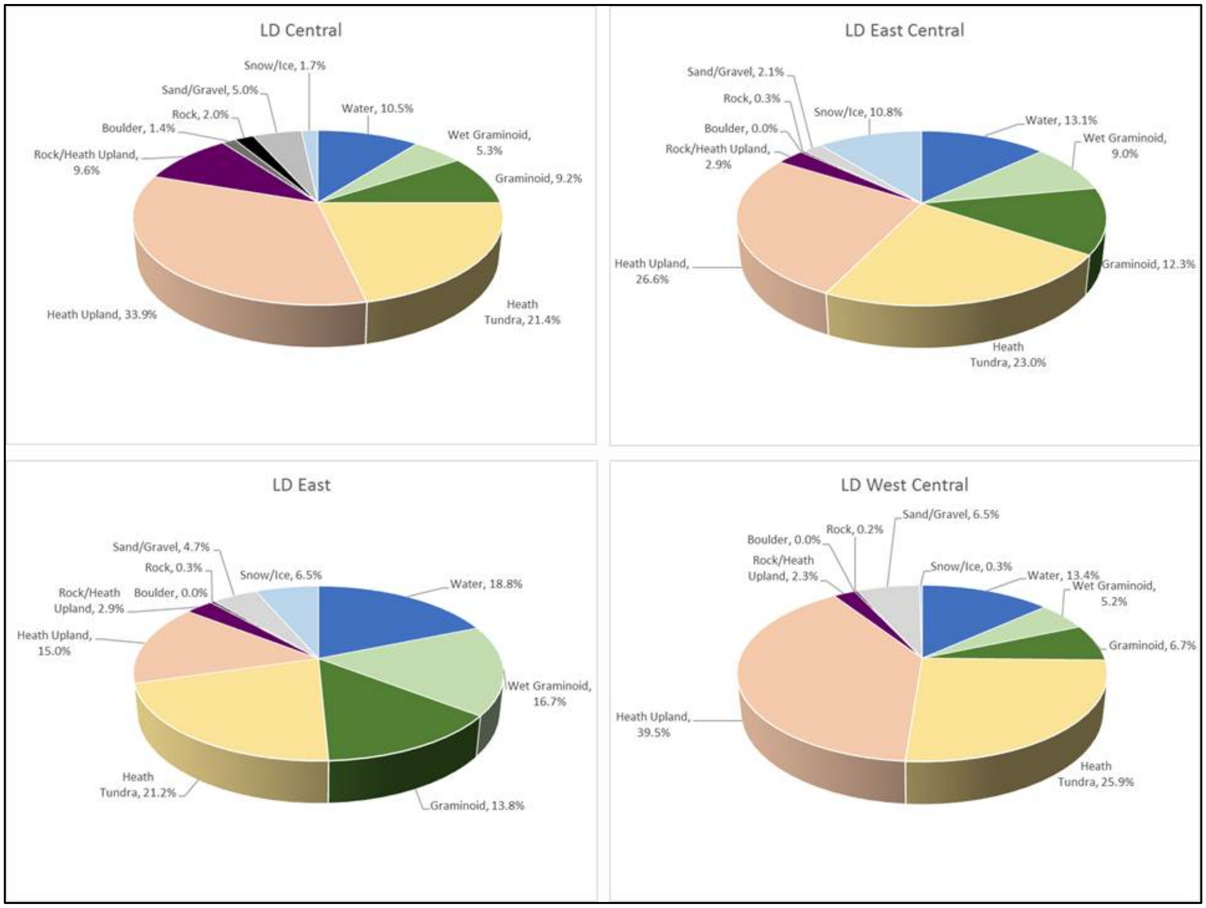

Figure 42. Land cover class percentages for low density strata

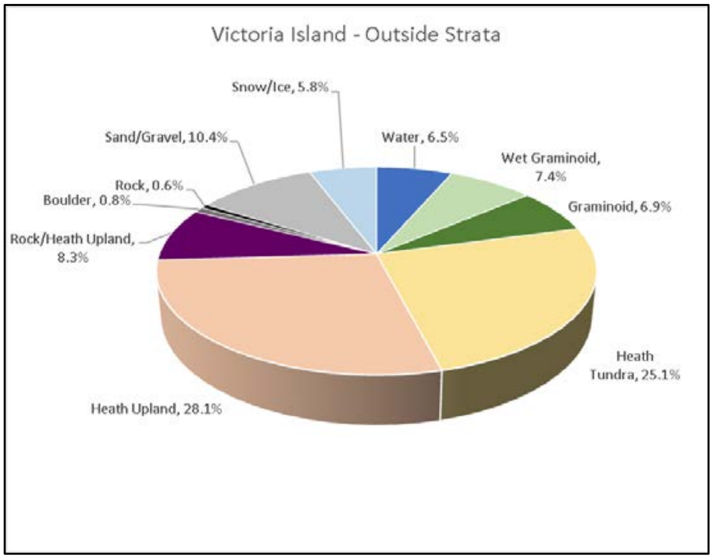

Figure 43. Land cover class percentages for areas of Victoria Island not covered by the strata

2.4 Topographic Position Index (TPI)

Generally, there exists very little variation in terrain on Victoria Island with the majority of the region being flat with rolling hills. However, similar to land cover, there appears to be a change in terrain type as you move north across the island. The south and central portions of the island are characterized by relatively flat terrain with occasional areas of higher elevation; while the north, has a distinct band of rough terrain and higher elevation that separates it from the rest of the island (Figure 17).

The TPI results highlight these trends by classifying terrain types into four general classes: ridges, slopes, valleys, and flat areas. Changing the scale of the TPI analysis did not change the spatial patterns present in the results, but did generalize terrain features as the spatial neighbourhood size increased (Figure 18). Across all analysis scales, large ridges and valleys were far more prevalent on the northern part of the island than in the central or southern areas; while the central and south were characterized by large flat areas interspersed with smaller ridge and valley features (Table 4).

The terrain for the individual strata is fairly consistent between survey areas with the flatland class being dominant across all three density designations (Figure 19 – Figure 21). The percentages for the four terrain classes were much more balanced for the areas of Victoria Island outside the survey strata, as these were generally located in the north where there exists much more natural terrain variation (Figure 22).

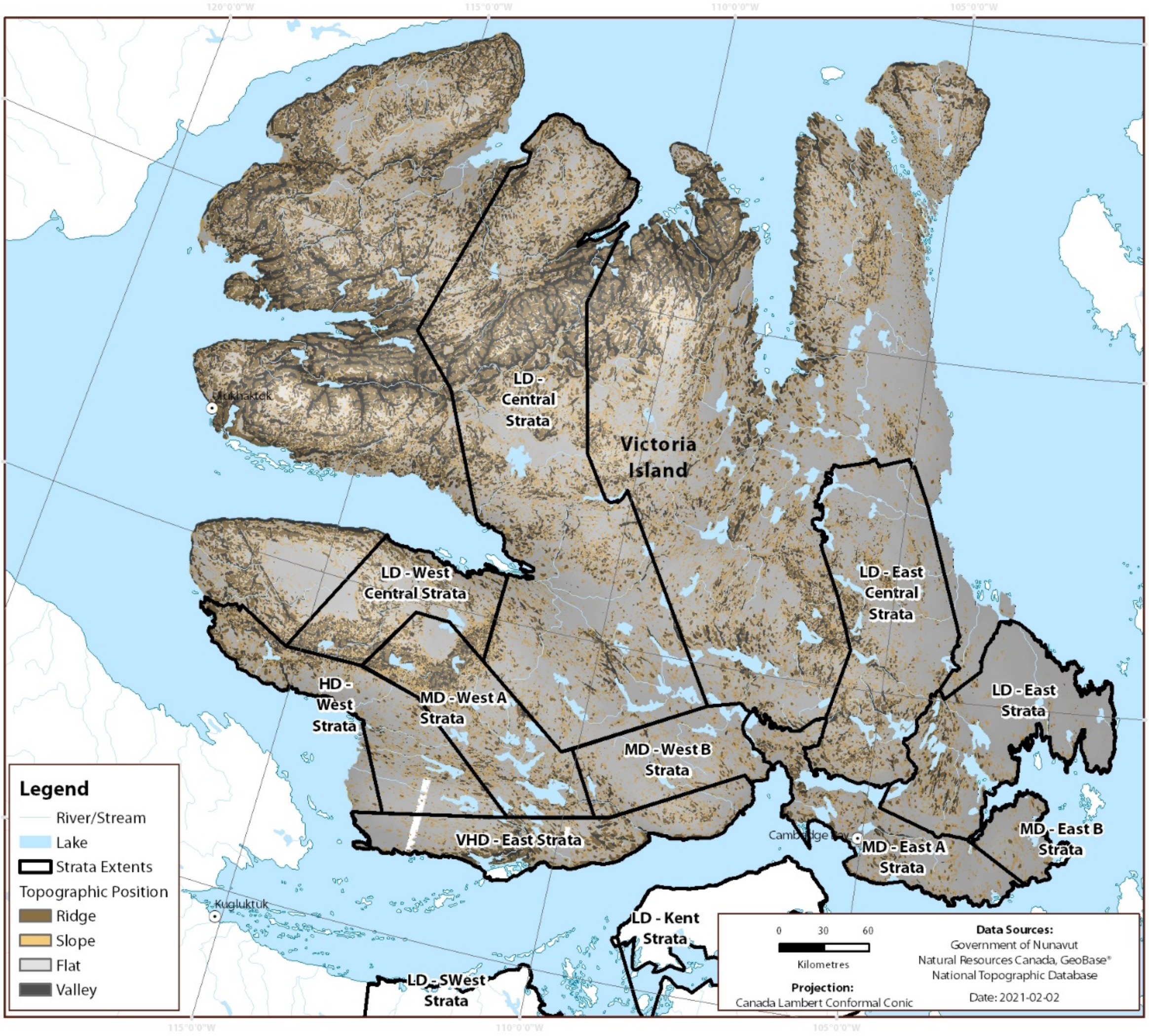

Figure 44. TPI for Victoria Island

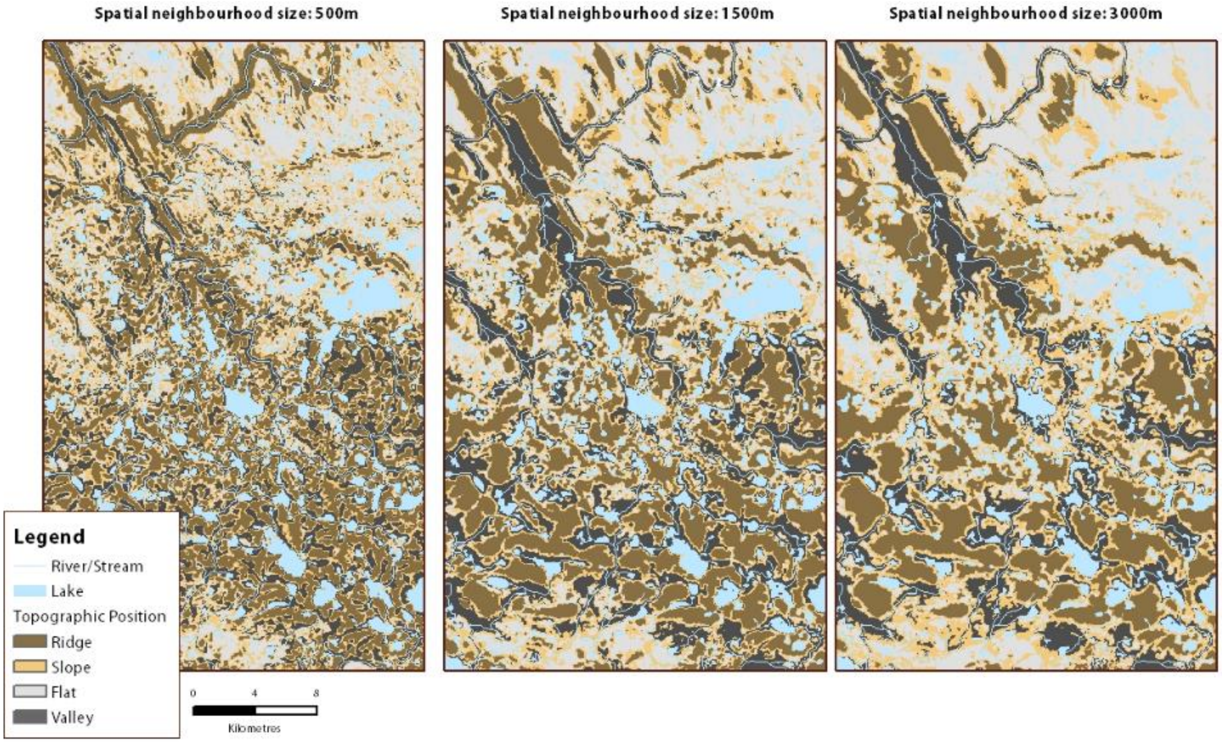

Figure 45. TPI results at the three analysis scales: 500m, 1500m and 3000m

Table 17. TPI summary for Victoria Island and survey strata

Strata Name	Flat	Ridge	Slope	Valley
Victoria Island - Outside Strata	43.3%	17.1%	23.5%	16.2%
VHD East	54.2%	12.0%	23.1%	10.7%
HD West	58.7%	8.5%	25.8%	7.0%
MD East A	67.4%	6.6%	21.9%	4.1%
MD East B	82.9%	2.2%	14.7%	0.2%
MD West A	50.4%	11.8%	27.4%	10.4%
MD West B	71.3%	3.8%	21.9%	3.0%
LD Central	47.7%	14.2%	24.2%	13.9%
LD East Central	67.1%	6.8%	21.7%	4.4%
LD East	79.6%	4.1%	13.8%	2.5%
LD West Central	41.4%	16.5%	27.5%	14.7%

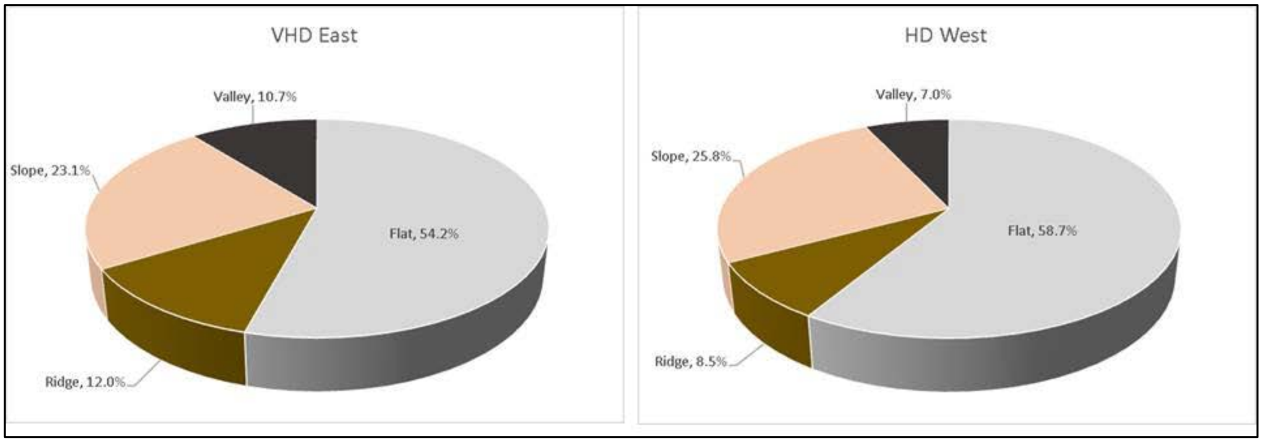

Figure 46. Terrain class percentages for the very high and high density strata

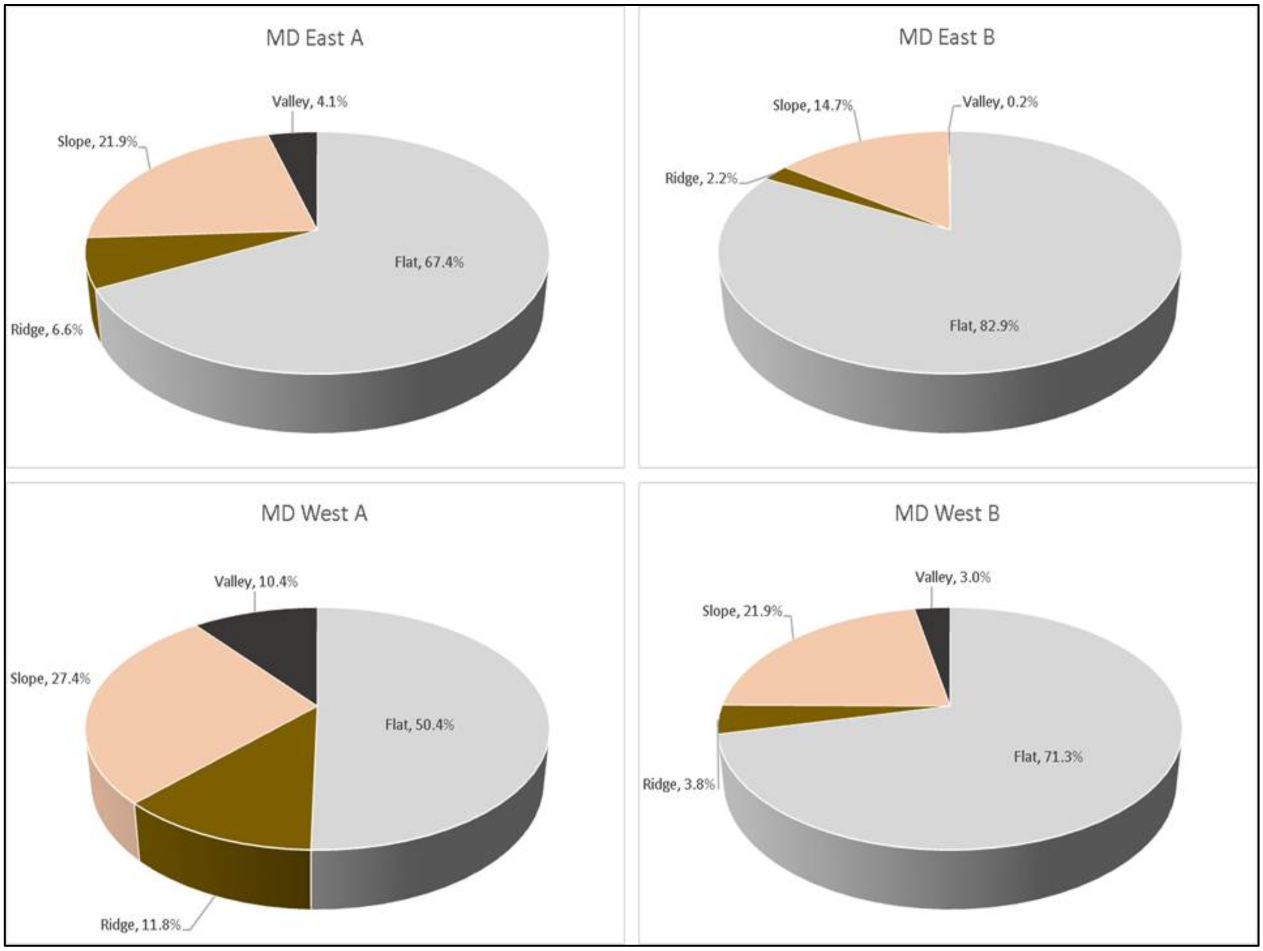

Figure 47. Terrain class percentages for the medium density strata

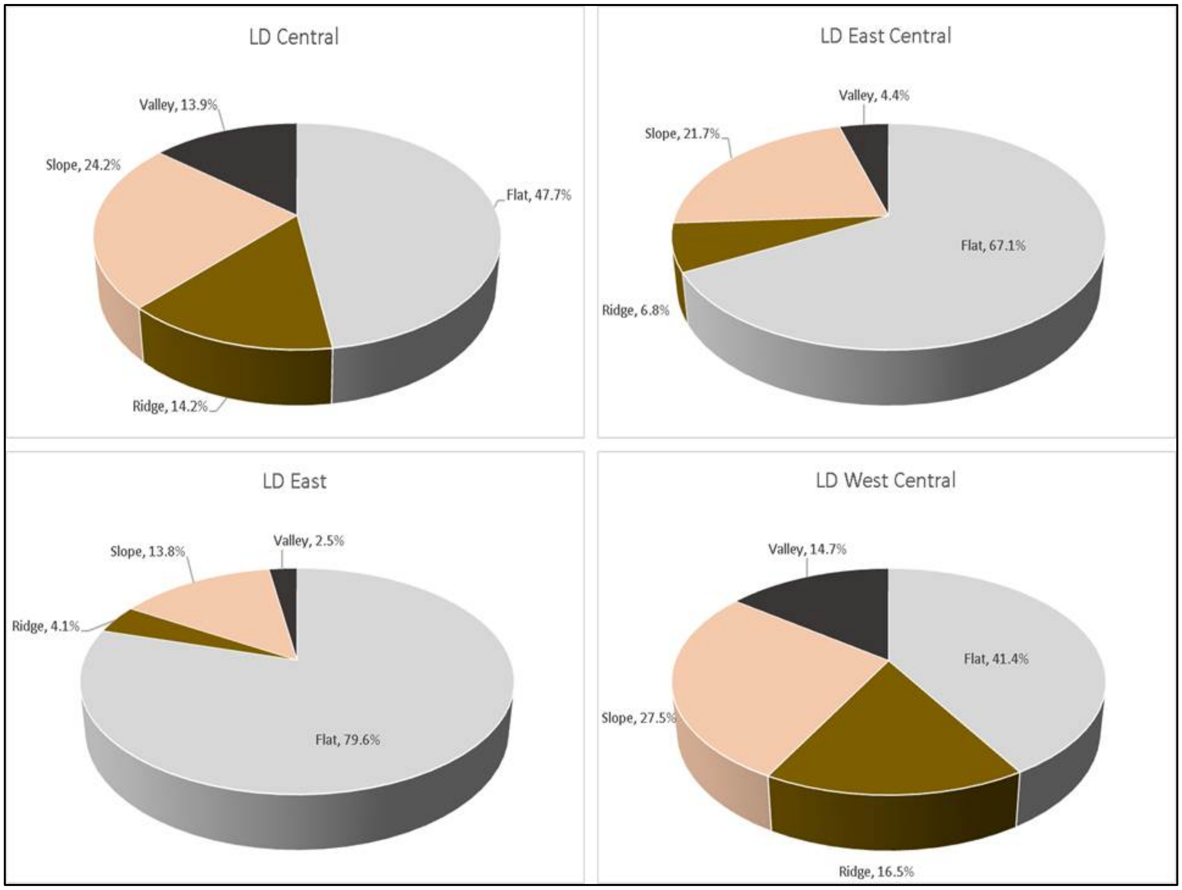

Figure 48. Terrain class percentages for the low density strata

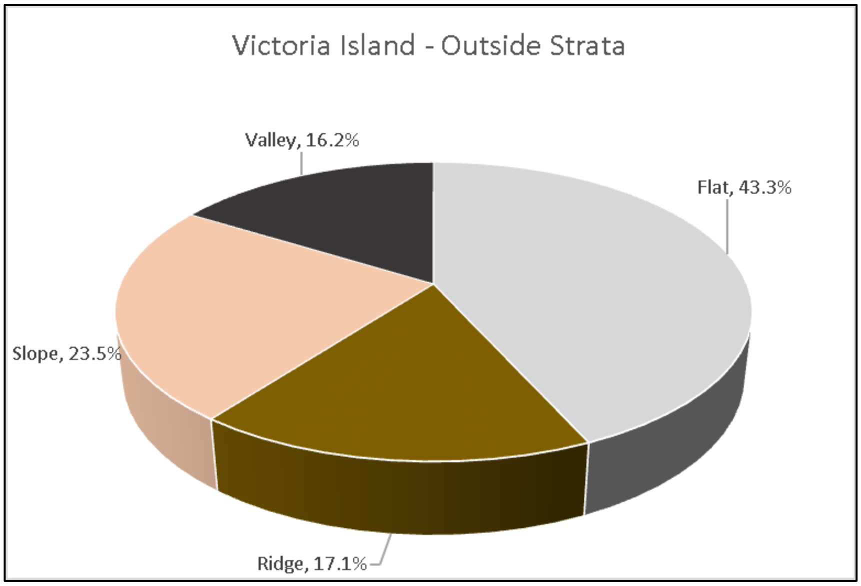

Figure 49. Terrain class percentages for areas of Victoria Island not covered by the strata

2.5 Land Cover Summaries for Telemetry Locations.

2.5.1 Vegetation

Intersecting the telemetry locations for Dolphin and Union caribou with the land cover classification revealed that the graminoid class appeared to be the preferred land cover class across all seasons, except for calving when the heath upland class was preferred (Figure 23). The heath tundra and heath upland were important classes during the spring and summer seasons (Figure 24); however, they became less important through the fall and winter (Figure 25). These results supported the density designations assigned to the breeding season survey strata as the high density areas were dominated by the preferred graminoid class; while low density areas were dominated by the less preferred heath tundra and upland classes.

The caribou observation data collected during the Fall 2020 survey were also intersected with the land cover classification to further validate the seasonal habitat preferences determined using the telemetry data. According to both data sources, the graminoid class was preferred during the breeding season while heath tundra and upland classes were less preferred (Figure 26). One notable difference is the apparent higher use of water indicated by the observation data. The increase in the water class could be due to a few factors: the resolution of the land cover classification versus the resolution of the GPS devices used to capture the field coordinates, or differences in lake ice conditions between the telemetry collection period (2015-2019) and the survey (2020).

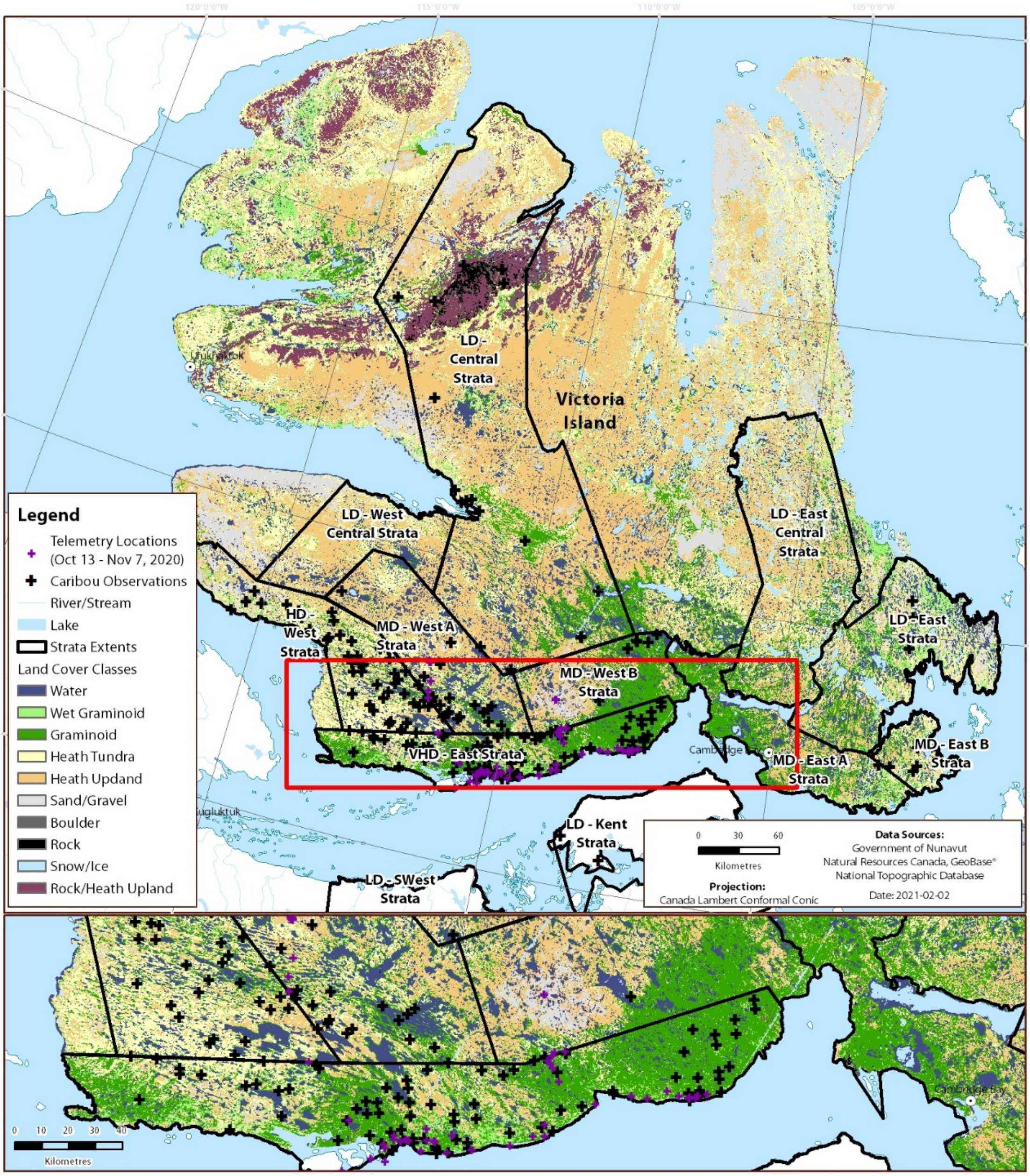

Figure 50. Landcover classification of the DU fall/rut range into 10 cover types. Telemetry data collected between 2015 and 2020 were used to assess habitat use. It is noteworthy that the survey extents cover much of the graminoid classification extent

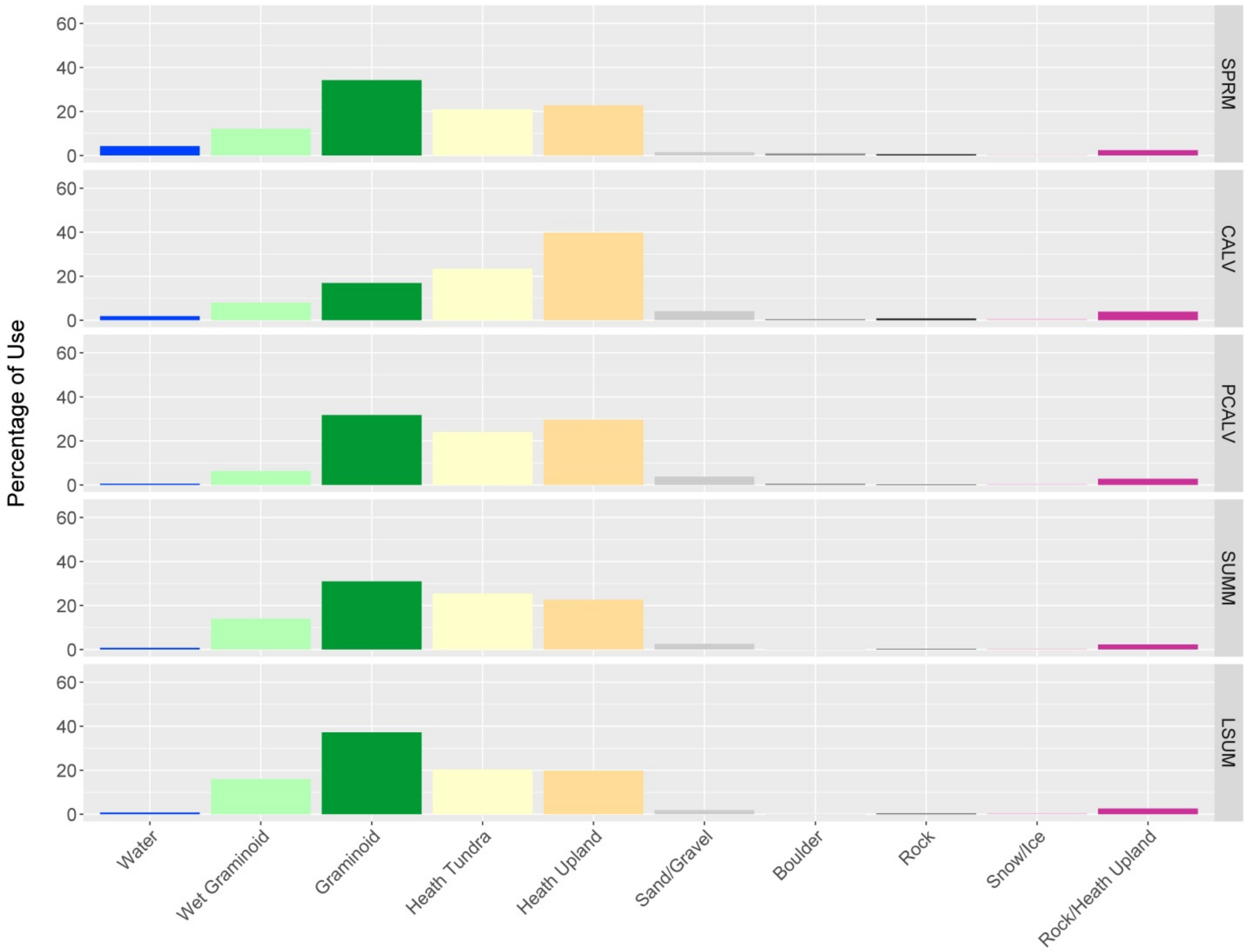

Figure 51. Land cover summaries by season for telemetry locations (Spring- Late Summer)

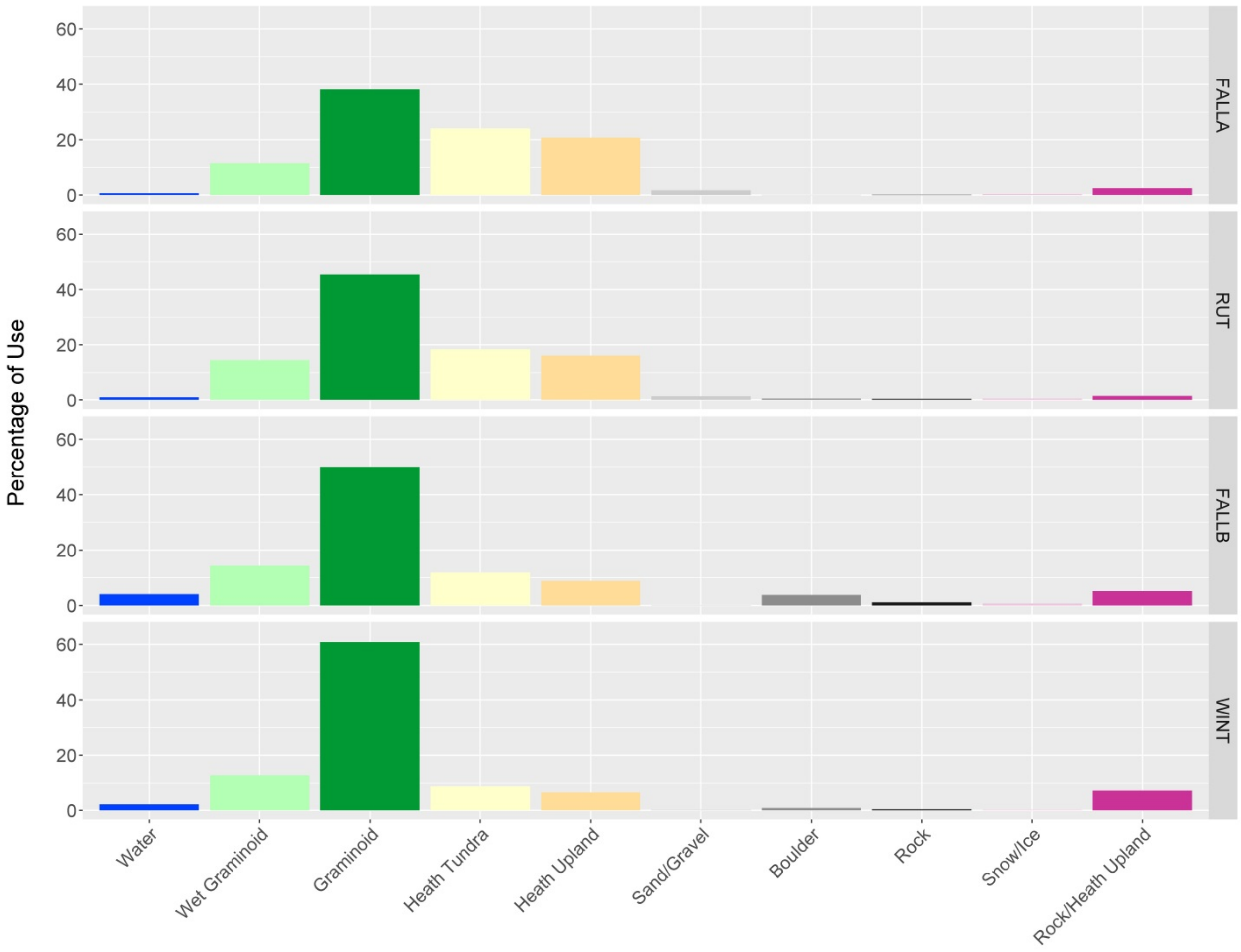

Figure 52. Land cover summaries by season for telemetry locations (FallA- Winter)

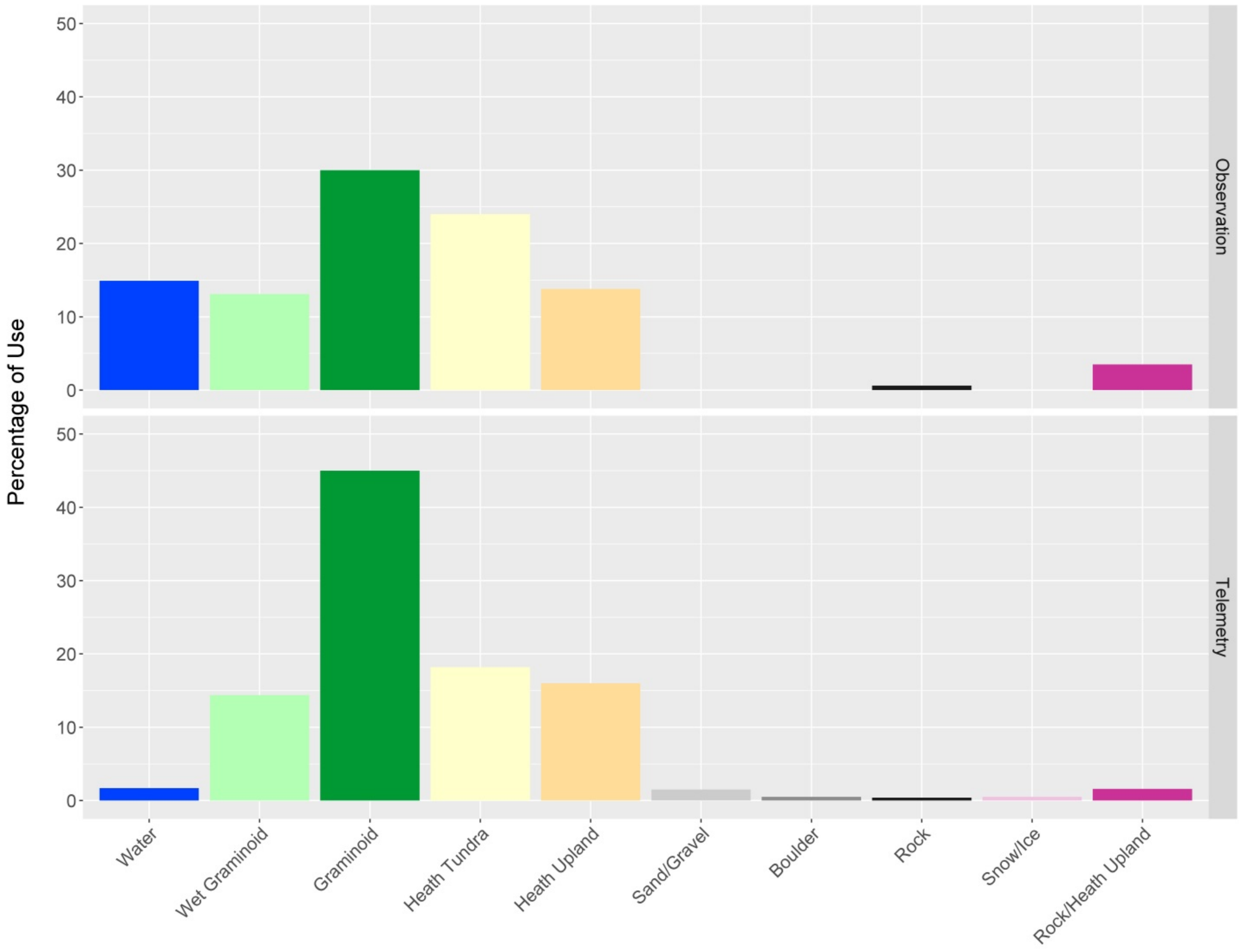

Figure 53. Comparison of land cover class use from telemetry and observation data.

2.5.2 Topography

Summarizing telemetry locations by TPI also revealed seasonal trends in terrain use with flatlands being preferred in all seasons (Figure 27). During the post-breeding fall migration and winter seasons, flatlands appeared to be preferred, however, not as strongly as in the other seasons (Figure 28 – Figure 29). This decrease in use may be related to differences in terrain types on the mainland, as Dolphin and Union caribou have returned or are returning to their wintering range during these time periods. The observation data also showed similar trends in terrain use to the telemetry data during the rut (Figure 30). According to both data types, flatlands are preferred followed by slopes.

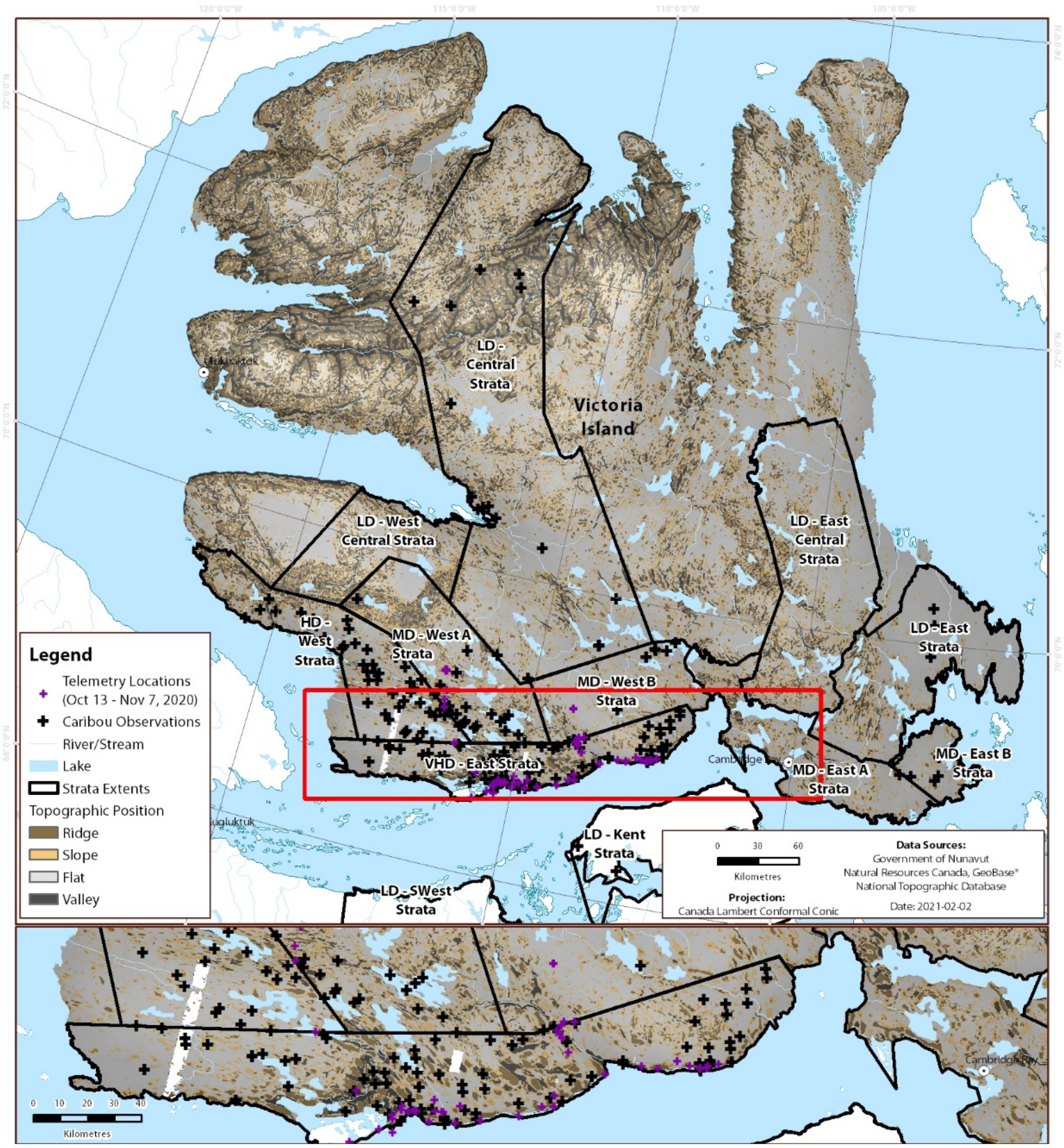

Figure 54. Topographic classification of the DU fall/rut range into 4 general topographic features characteristic of the range. Telemetry data collected between 2015 and 2020 were used to assess use of ridged, sloped, and flat topographic features as well as valleys.

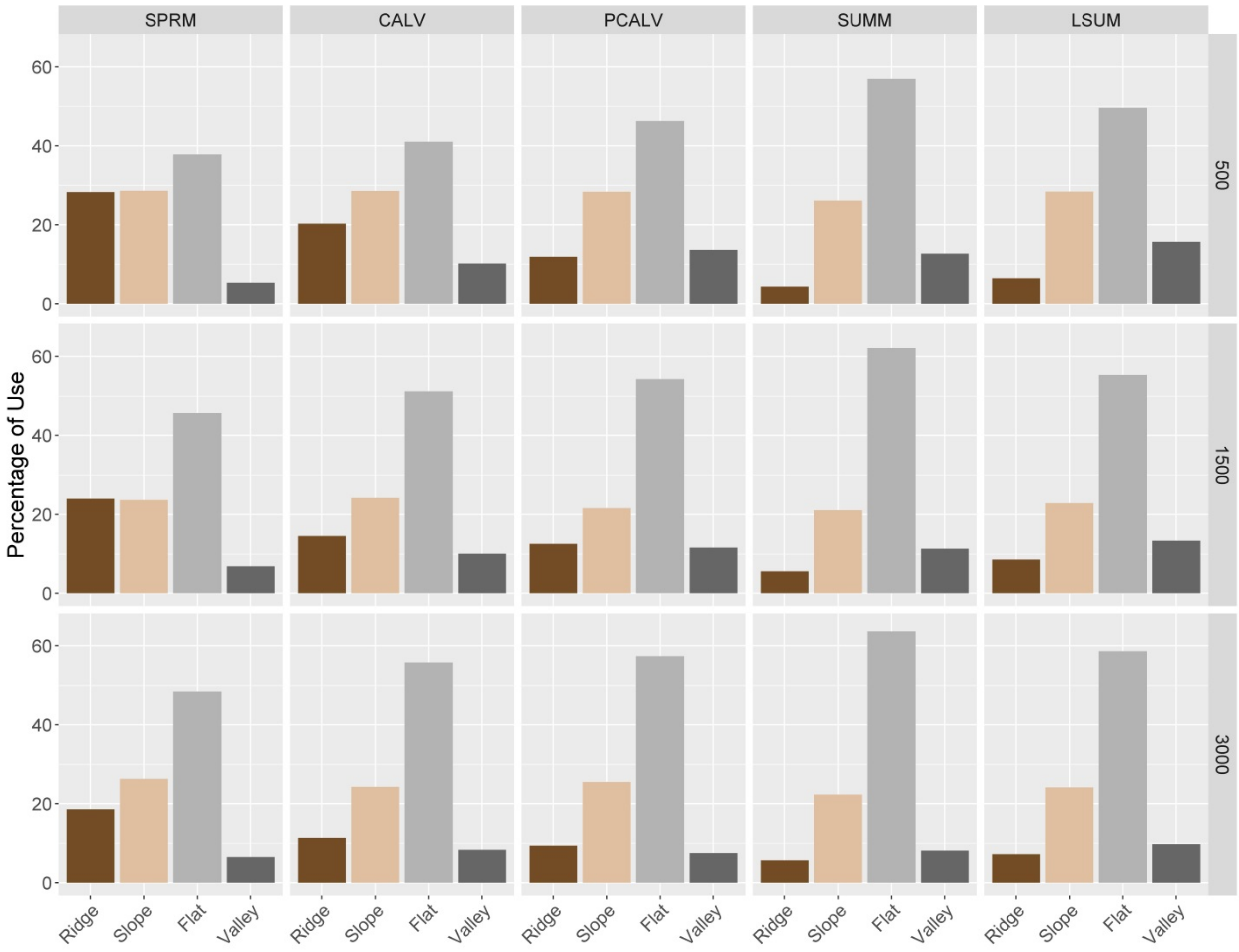

Figure 55. TPI summaries by season for telemetry locations (Spring- Late Summer)

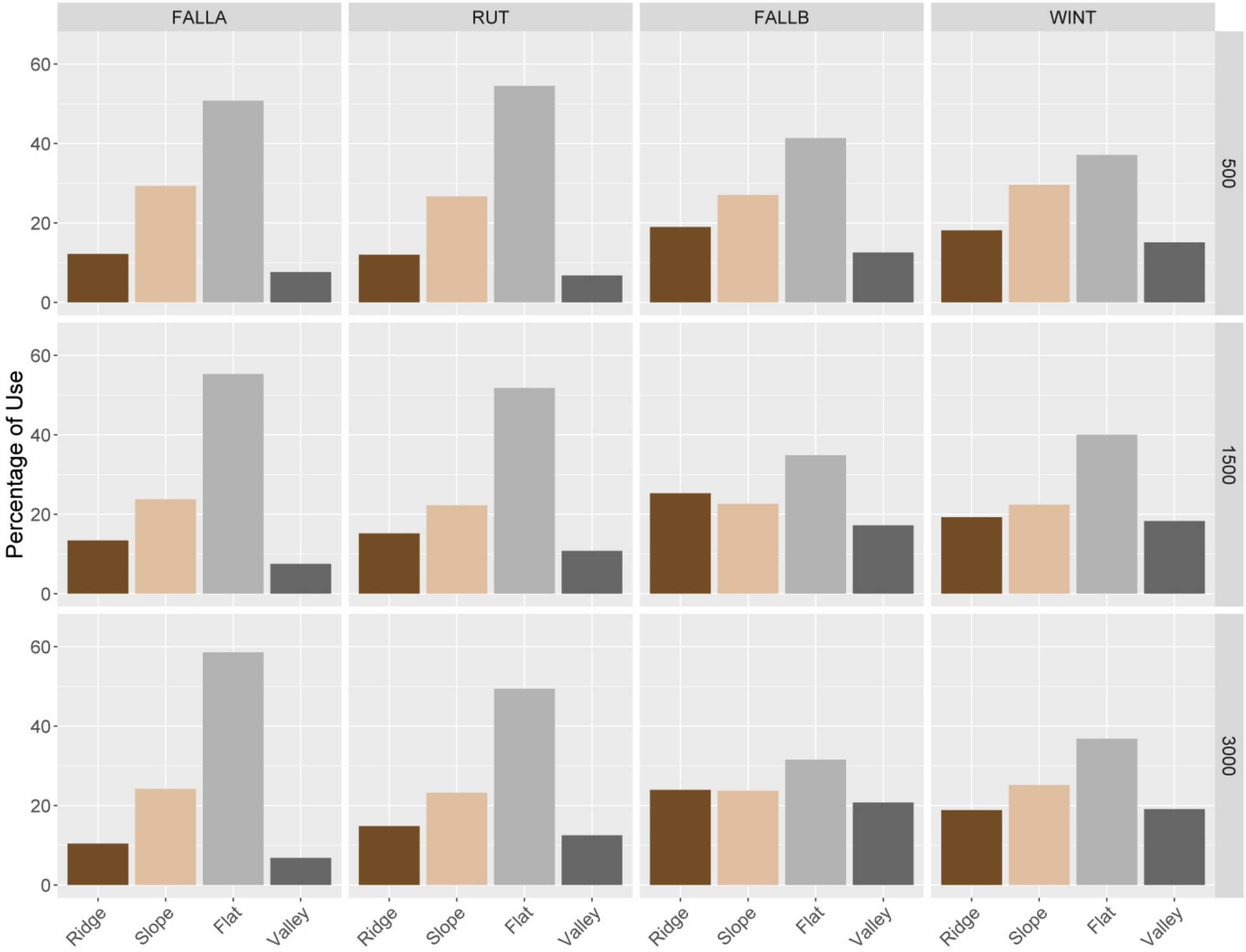

Figure 56. TPI summaries by season for telemetry locations (FallA- Winter)

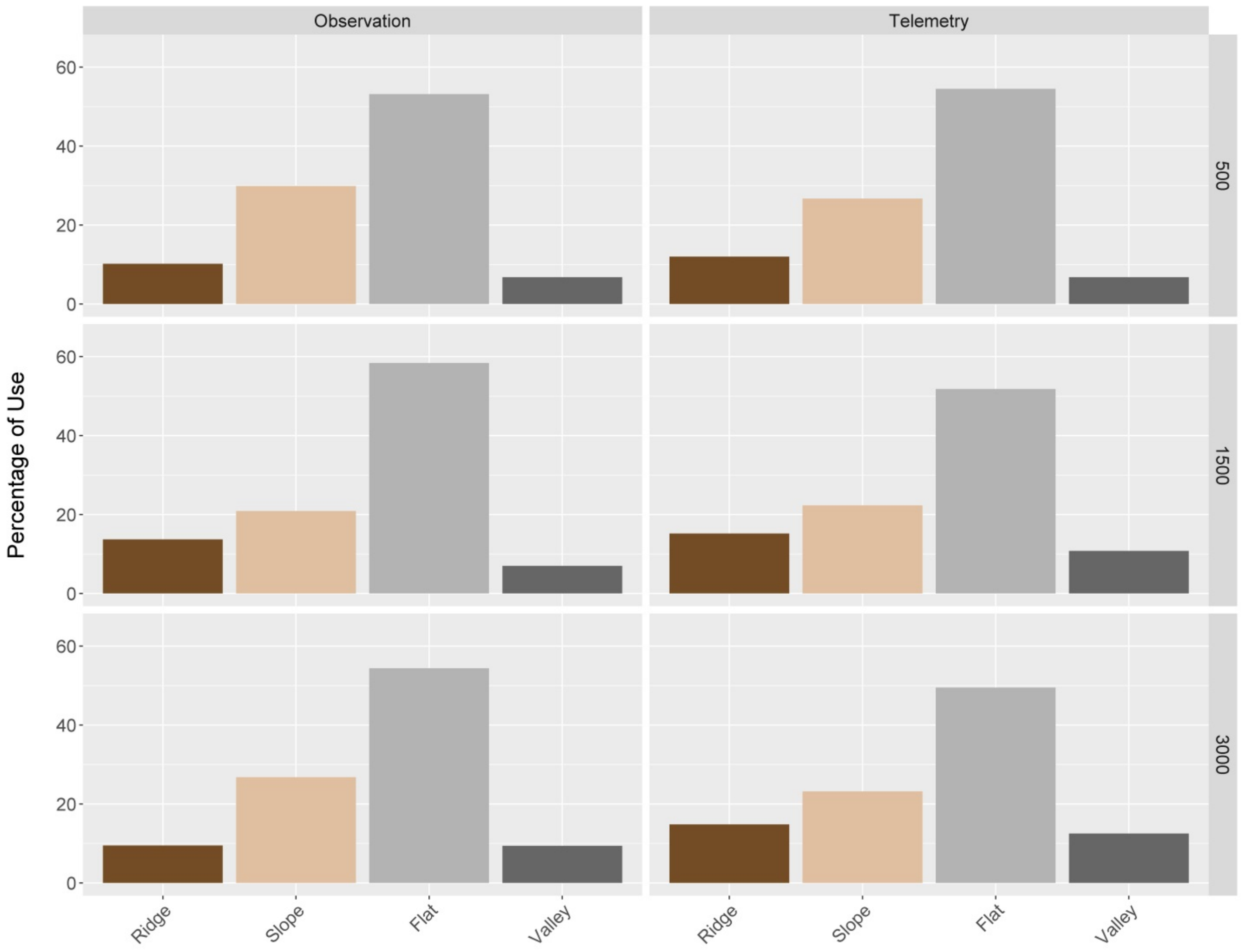

Figure 57. Comparison of terrain use from telemetry and observation data

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Dolphin and Union Caribou Population Status

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Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

Produced by: Mitch Campbell
Kivalliq Wildlife Biologist
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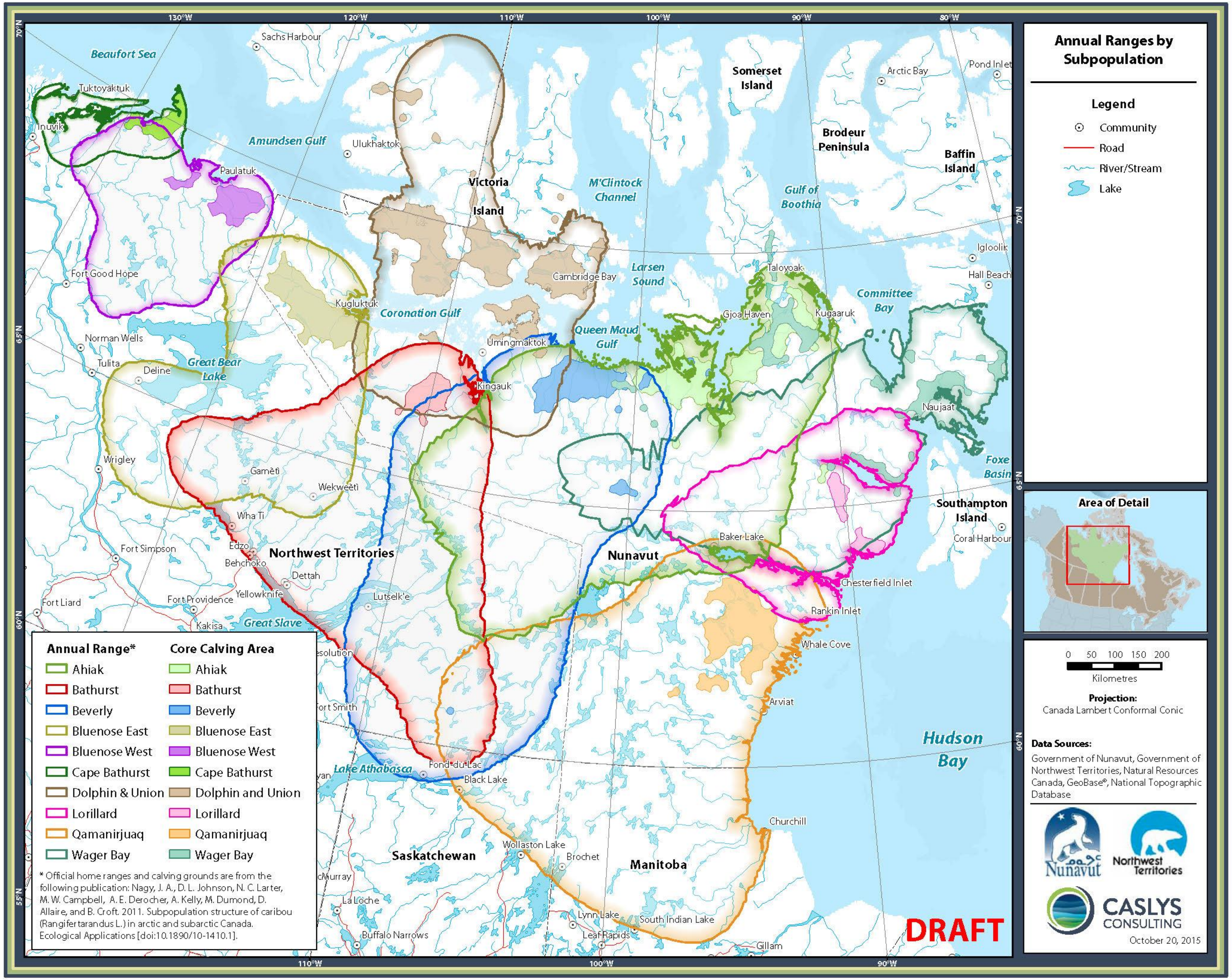
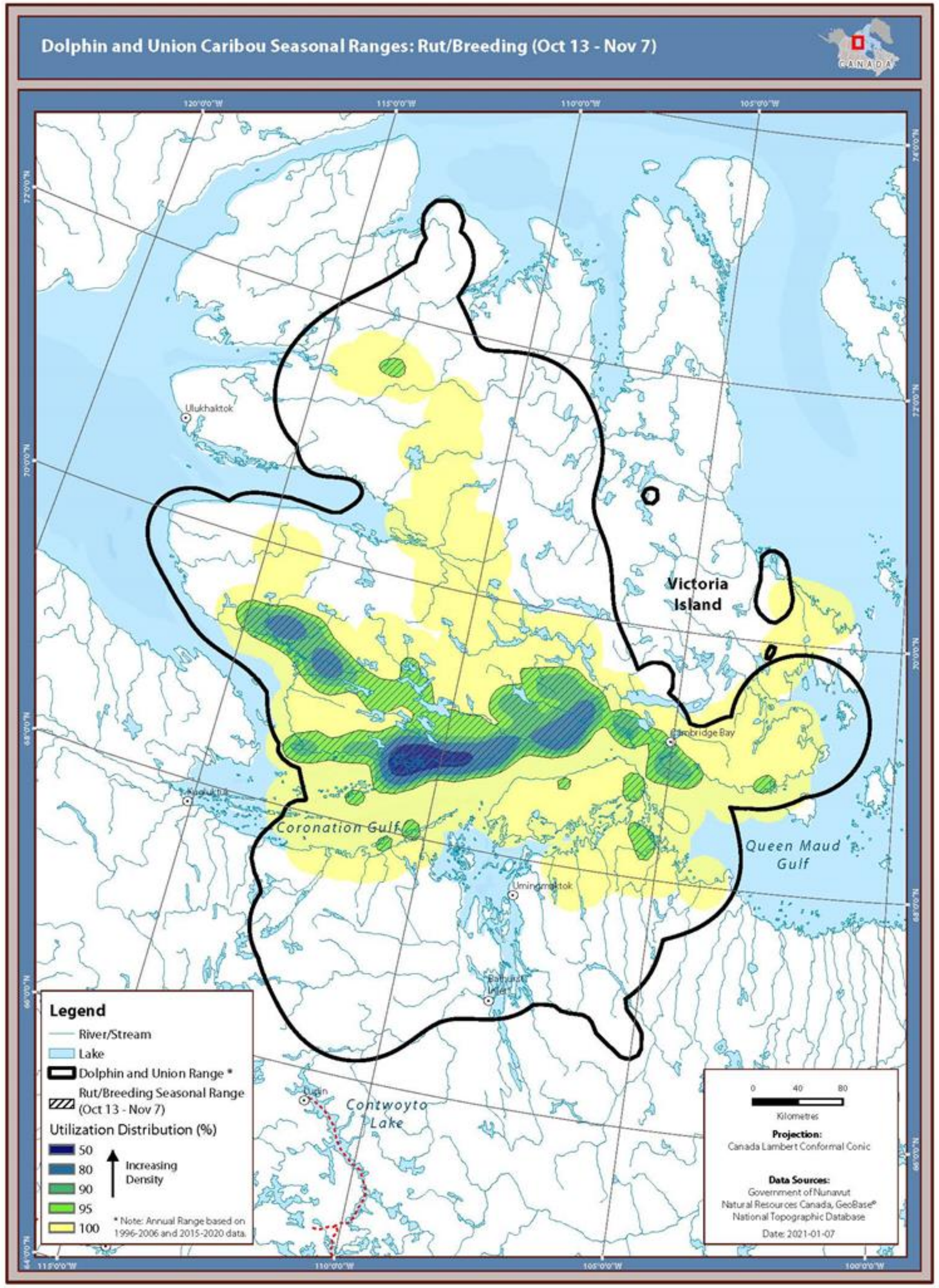
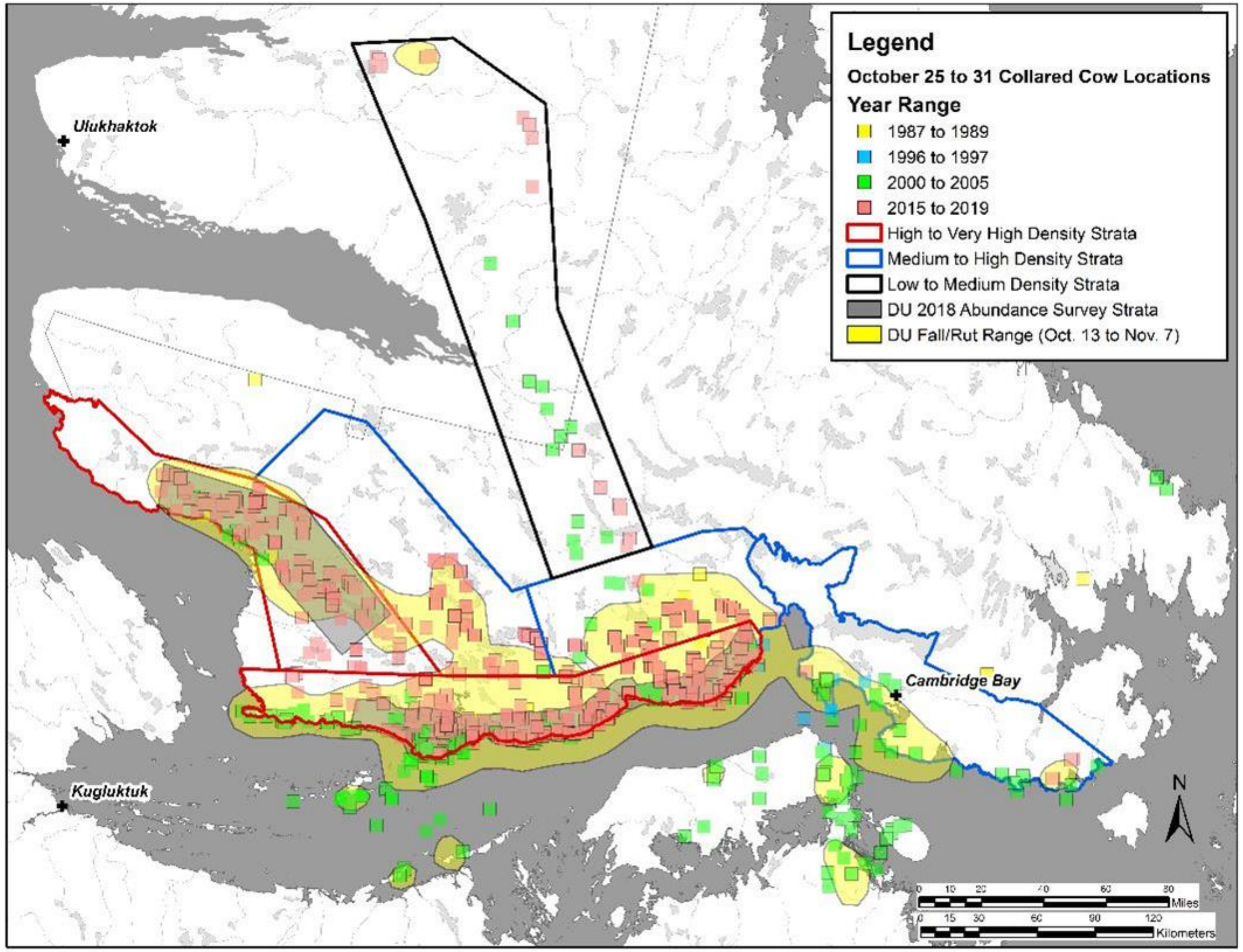

Annual Ranges by Subpopulation
Legend
Community
Road
River/Stream
Lake
Area of Detail
0 50 100 150 200
Kilometres
Projection:
Canada Lambert Conformal Conic
Data Sources:
Government of Nunavut, Government of Northwest Territories, Natural Resources Canada, GeoBase®, National Topographic Database
Nunavut
Northwest Territories
CASLYS CONSULTING
October 20, 2015
DRAFT
Annual Range*
Ahiak
Bathurst
Beverly
Bluenose East
Bluenose West
Cape Bathurst
Dolphin & Union
Lorillard
Qamanirjuaq
Wager Bay
Core Calving Area
Ahiak
Bathurst
Beverly
Bluenose East
Bluenose West
Cape Bathurst
Dolphin and Union
Lorillard
Qamanirjuaq
Wager Bay
* Official home ranges and calving grounds are from the following publication: Nagy, J. A., D. L. Johnson, N. C. Larter, M. W. Campbell, A. E. Derocher, A. Kelly, M. Dumond, D. Allaire, and B. Croft. 2011. Subpopulation structure of caribou (Rangifer tarandus L.) in arctic and subarctic Canada. Ecological Applications [doi:10.1890/10-1410.1].
Beaufort Sea
Amundsen Gulf
Coronation Gulf
M'Clintock Channel
Gulf of Boothia
Larsen Sound
Queen Maud Gulf
Committee Bay
Foxe Basin
Hudson Bay
Great Bear Lake
Great Slave
Lake Athabasca
Victoria Island
Somerset Island
Brodeur Peninsula
Baffin Island
Southampton Island
Northwest Territories
Nunavut
Saskatchewan
Manitoba
Sachs Harbour
Tuktoyaktuk
Inuvik
Paulatuk
Ulukhaktok
Fort Good Hope
Norman Wells
Tulita
Deline
Wrigley
Gamètì
Wekweètì
Whatì
Fort Simpson
Edzo
Behchoko
Dettah
Yellowknife
Fort Providence
Fort Liard
Kakisa
Lutselk'e
Fort Smith
Kugluktuk
Cambridge Bay
Umingmaktok
Kingauk
Gjoa Haven
Taloyoak
Kugaaruk
Arctic Bay
Pond Inlet
Igloolik
Hall Beach
Naujaat
Coral Harbour
Baker Lake
Chesterfield Inlet
Rankin Inlet
Whale Cove
Arviat
Churchill
Fond du Lac
Black Lake
Wollaston Lake
Brochet
Lynn Lake
South Indian Lake
Leaf Rapids
Gillam
La Loche
Buffalo Narrows
130°W
120°W
110°W
100°W
90°W
80°W
70°N
65°N
60°N
55°N

- The Dolphin and Union (DU) caribou annual and fall/rutting (Oct. 13 to Nov. 7) range; 1997-2006 and 2015-2020.

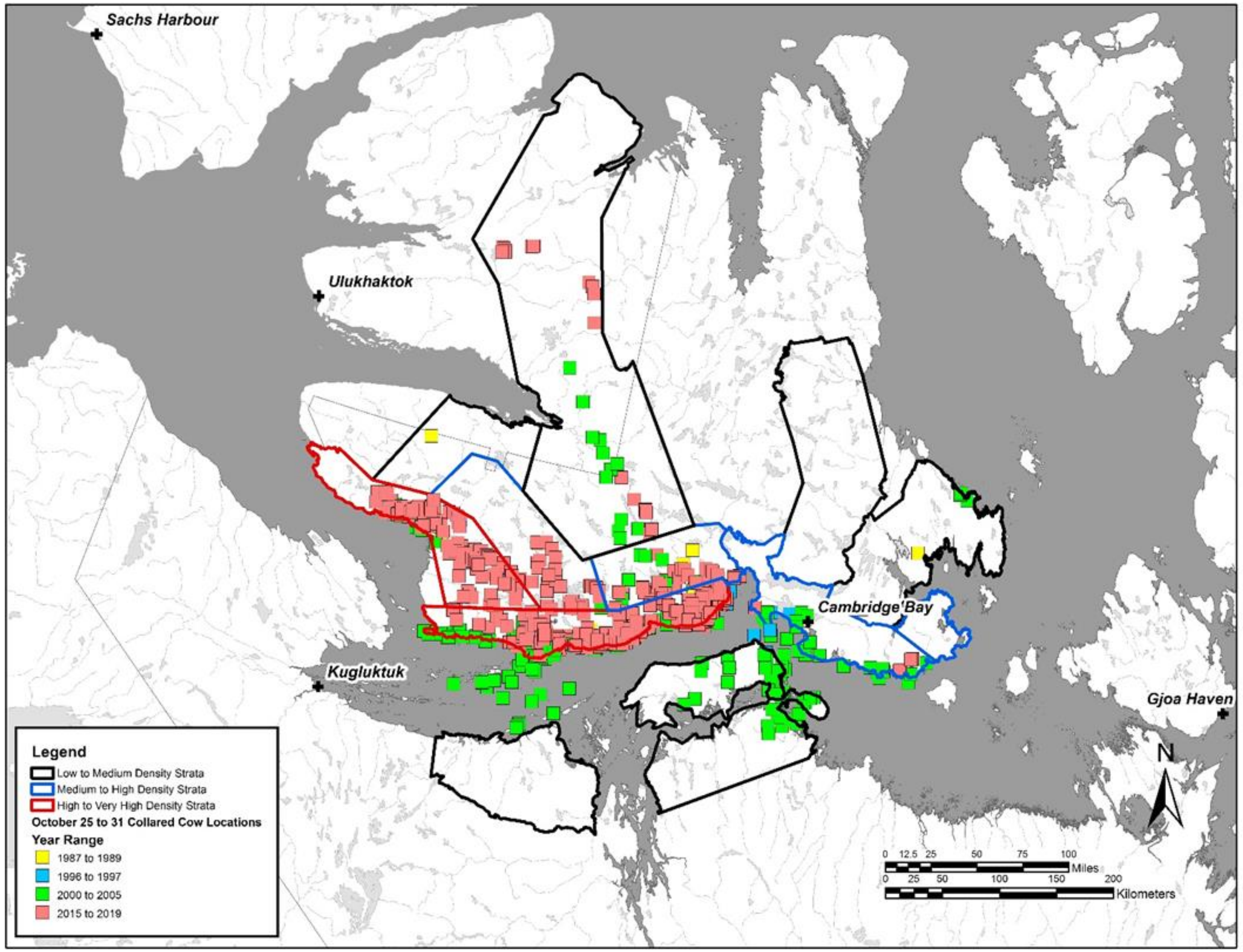


Methods

- The initial DU fall 2020 survey stratification based solely on DU caribou telemetry data and past DU abundance survey strata.

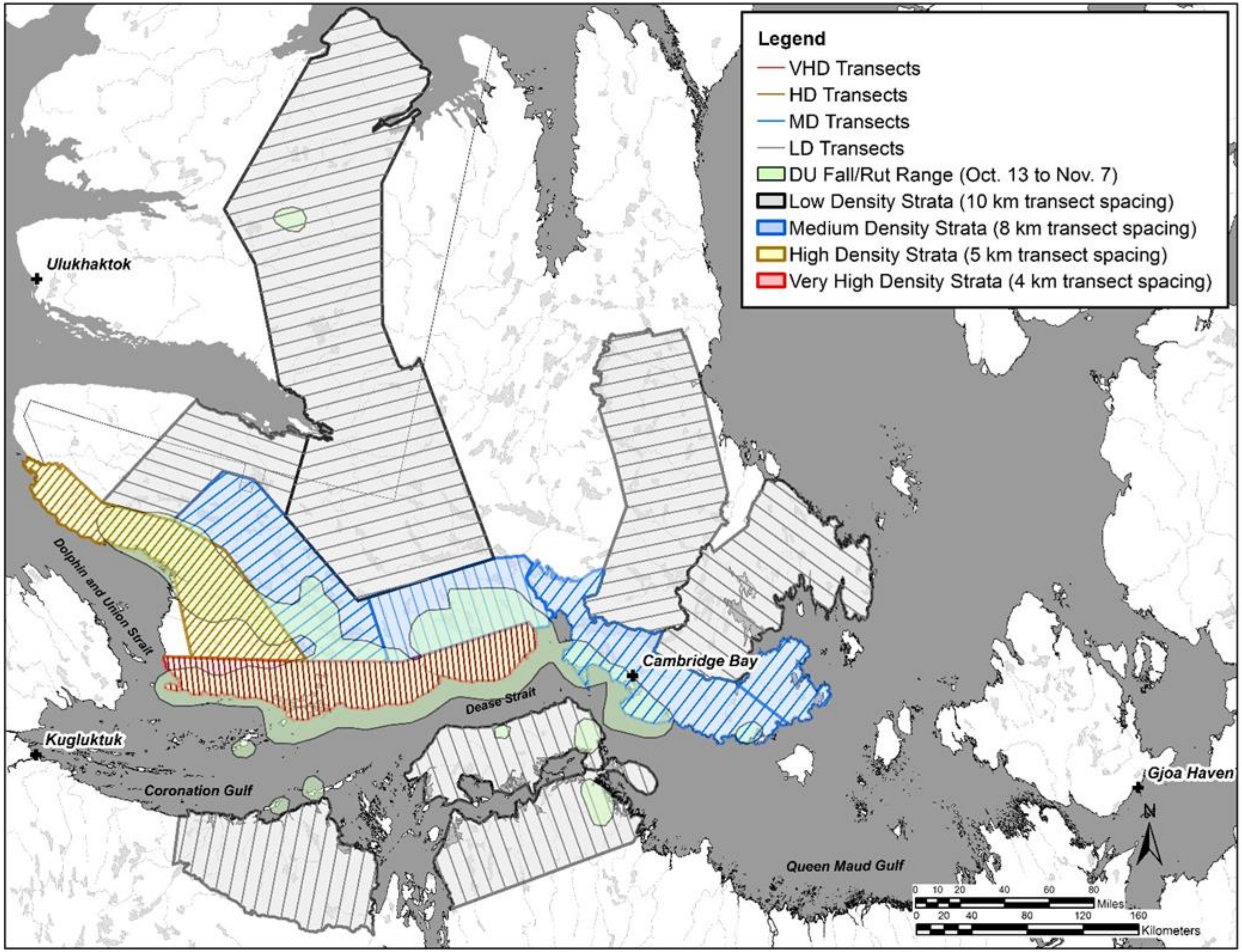


- Final strata selection with the inclusion of community-based IQ collected during the pre-survey consultation process.

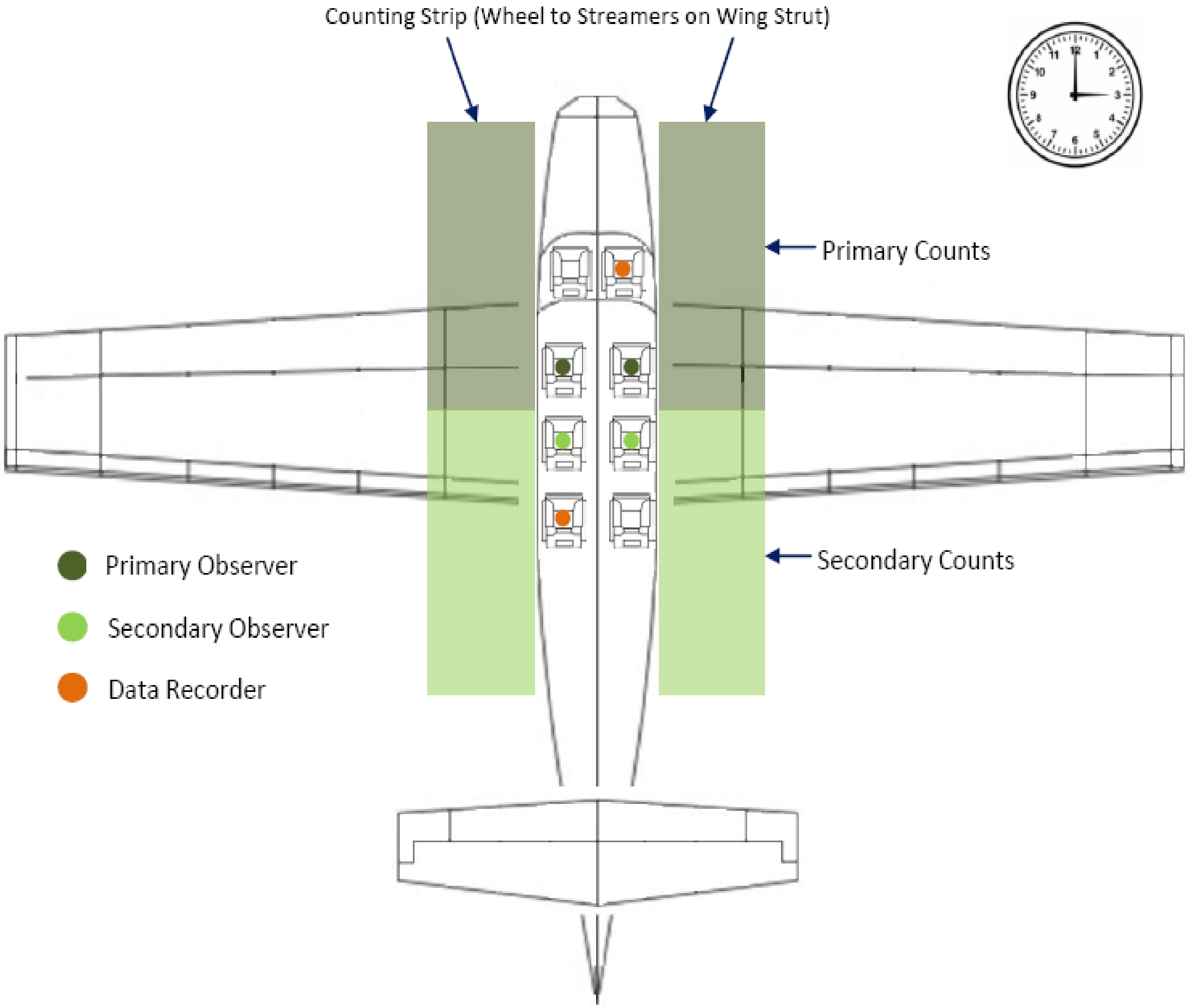


-DU fall 2020 survey strata placement and transect effort relative to DU late fall range (green shading).

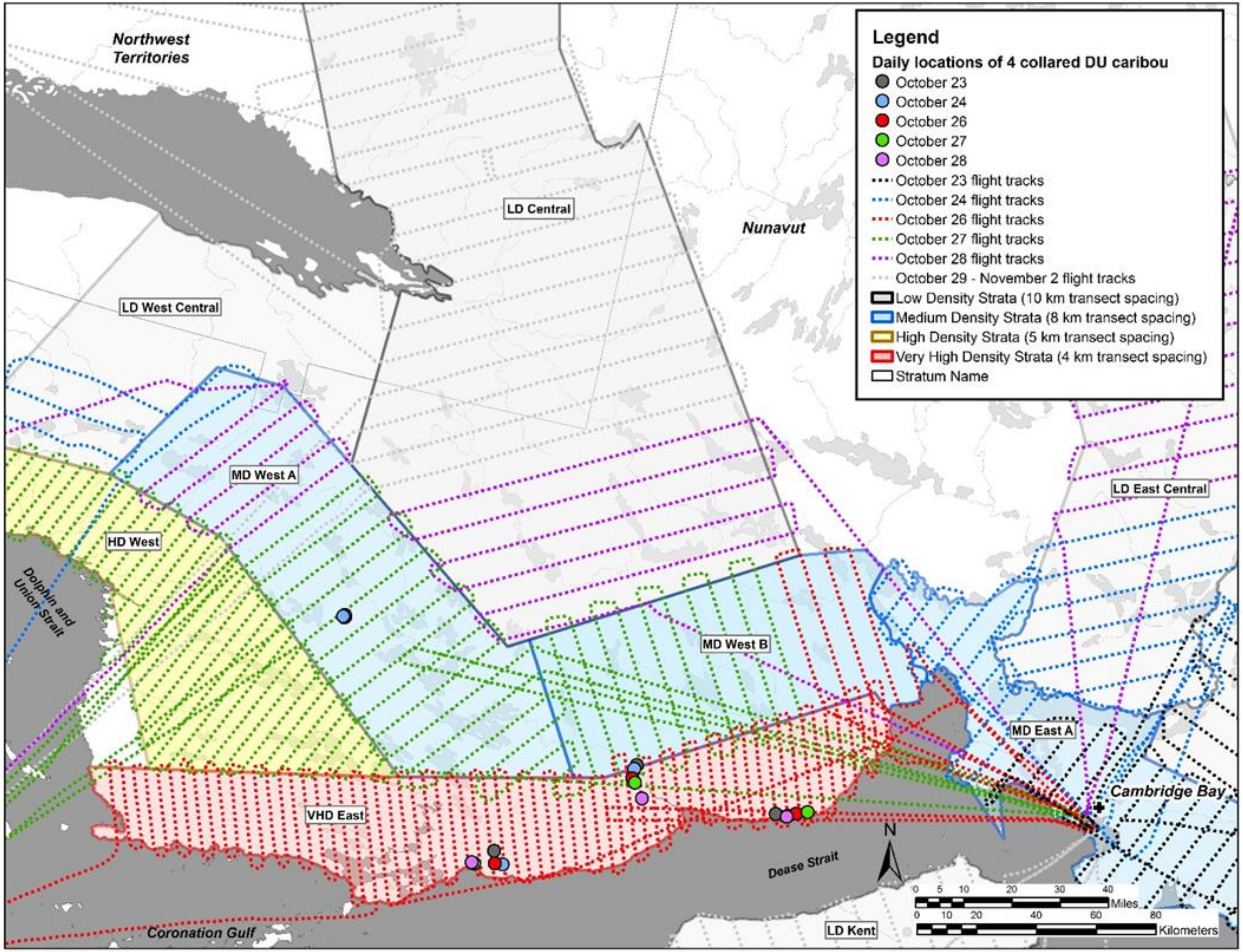
- Strata and transect effort based on historic survey observations, cumulative caribou telemetry data, IQ from the communities of Cambridge Bay, Kugluktuk, and Ulukhaktok, predicted weather windows and budgetary constraints.

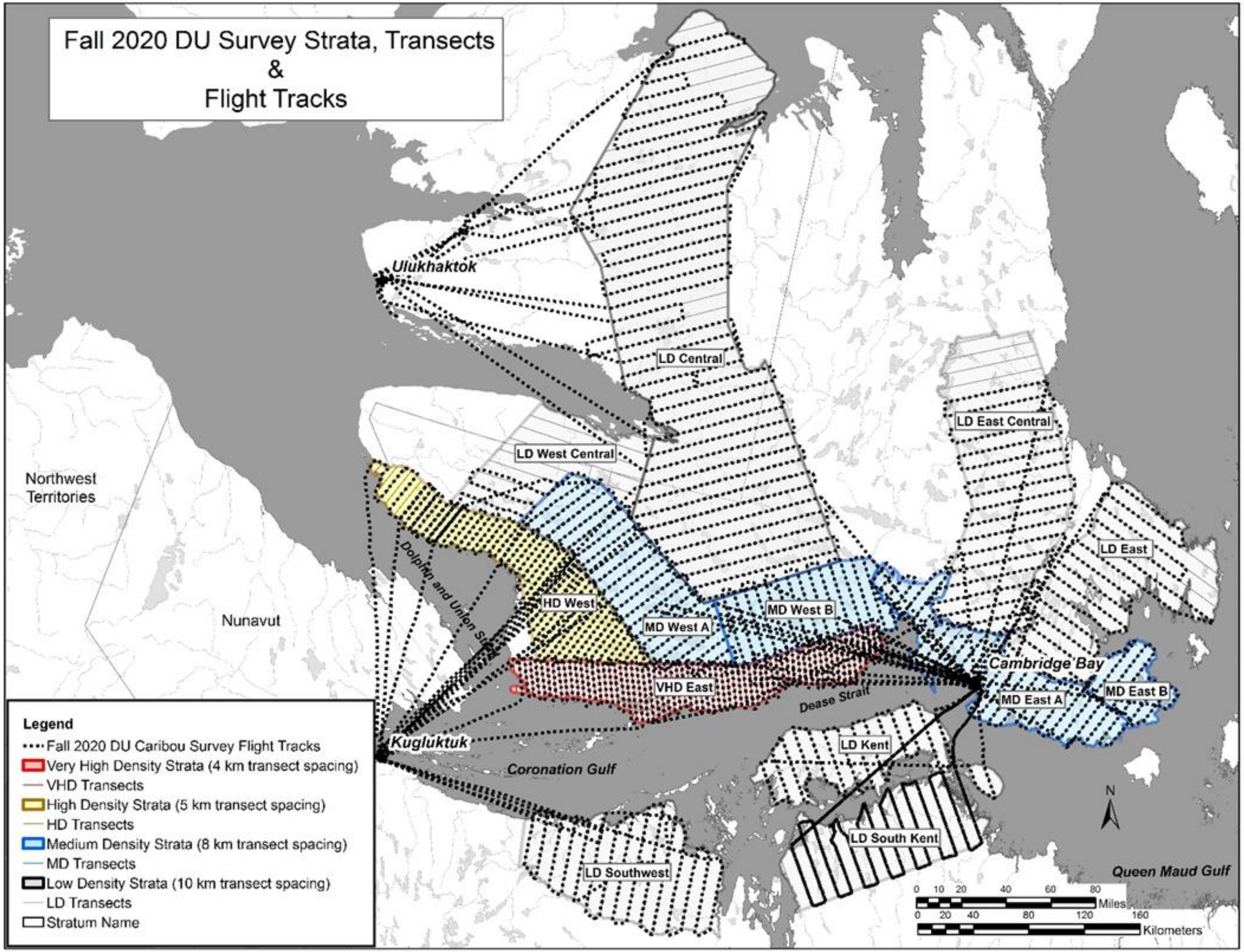


- The Double Observer Pair/distance sampling Method.



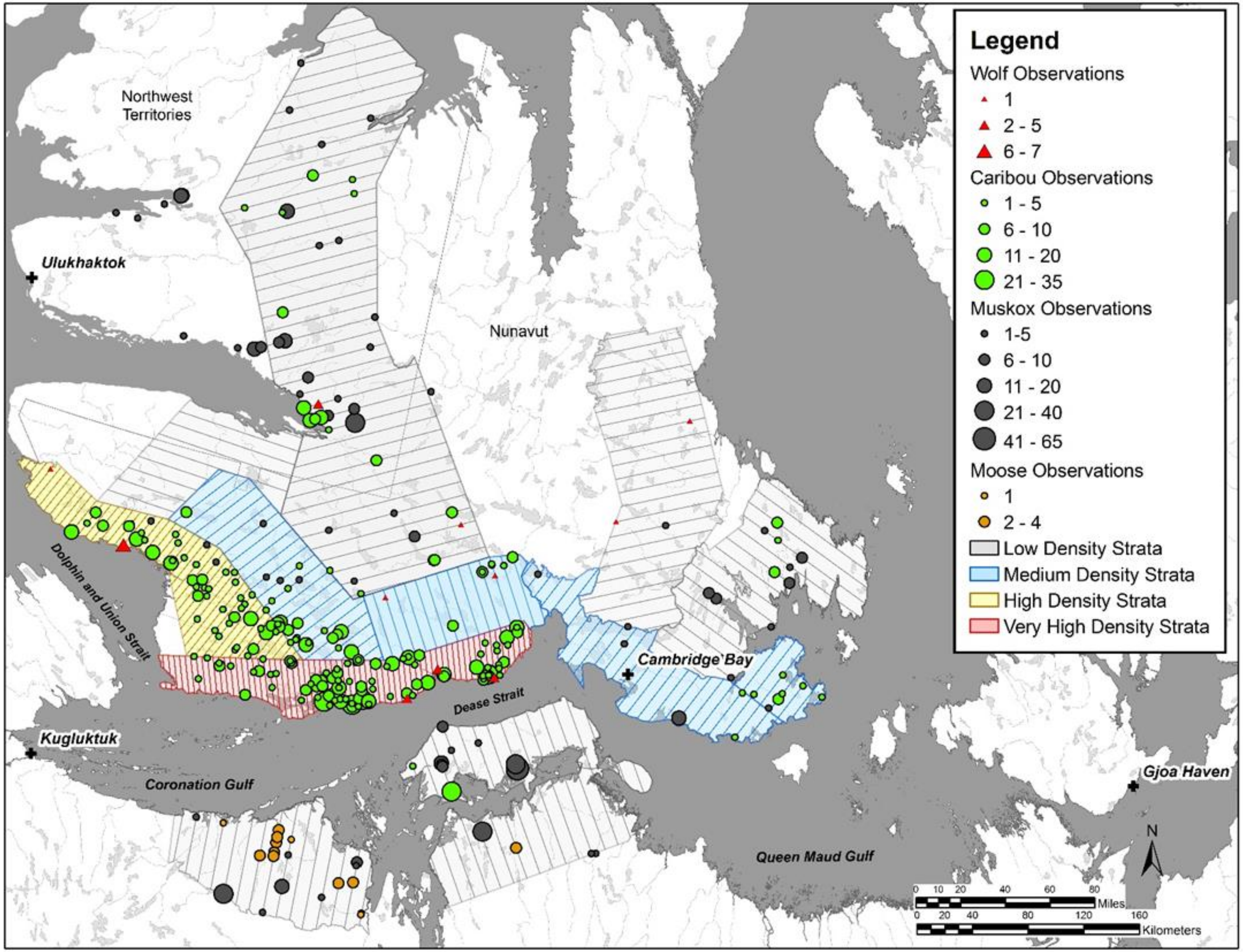
- Daily flight tracks compared to daily collared caribou locations throughout the first 6 days of the fall 2020 DU abundance survey.




Fall 2020 DU Survey Strata, Transects
&
Flight Tracks
Ulukhaktok
LD Central
LD East Central
LD West Central
Northwest Territories
LD East
Dolphin and Union Strait
HD West
MD West B
MD West A
Nunavut
Cambridge Bay
MD East B
MD East A
VHD East
Dease Strait
LD Kent
Kugluktuk
Coronation Gulf
LD South Kent
LD Southwest
Queen Maud Gulf
N
Legend
Fall 2020 DU Caribou Survey Flight Tracks
Very High Density Strata (4 km transect spacing)
VHD Transects
High Density Strata (5 km transect spacing)
HD Transects
Medium Density Strata (8 km transect spacing)
MD Transects
Low Density Strata (10 km transect spacing)
LD Transects
Stratum Name
0 10 20 40 60 80
Miles
0 20 40 80 120 160
Kilometers

Results

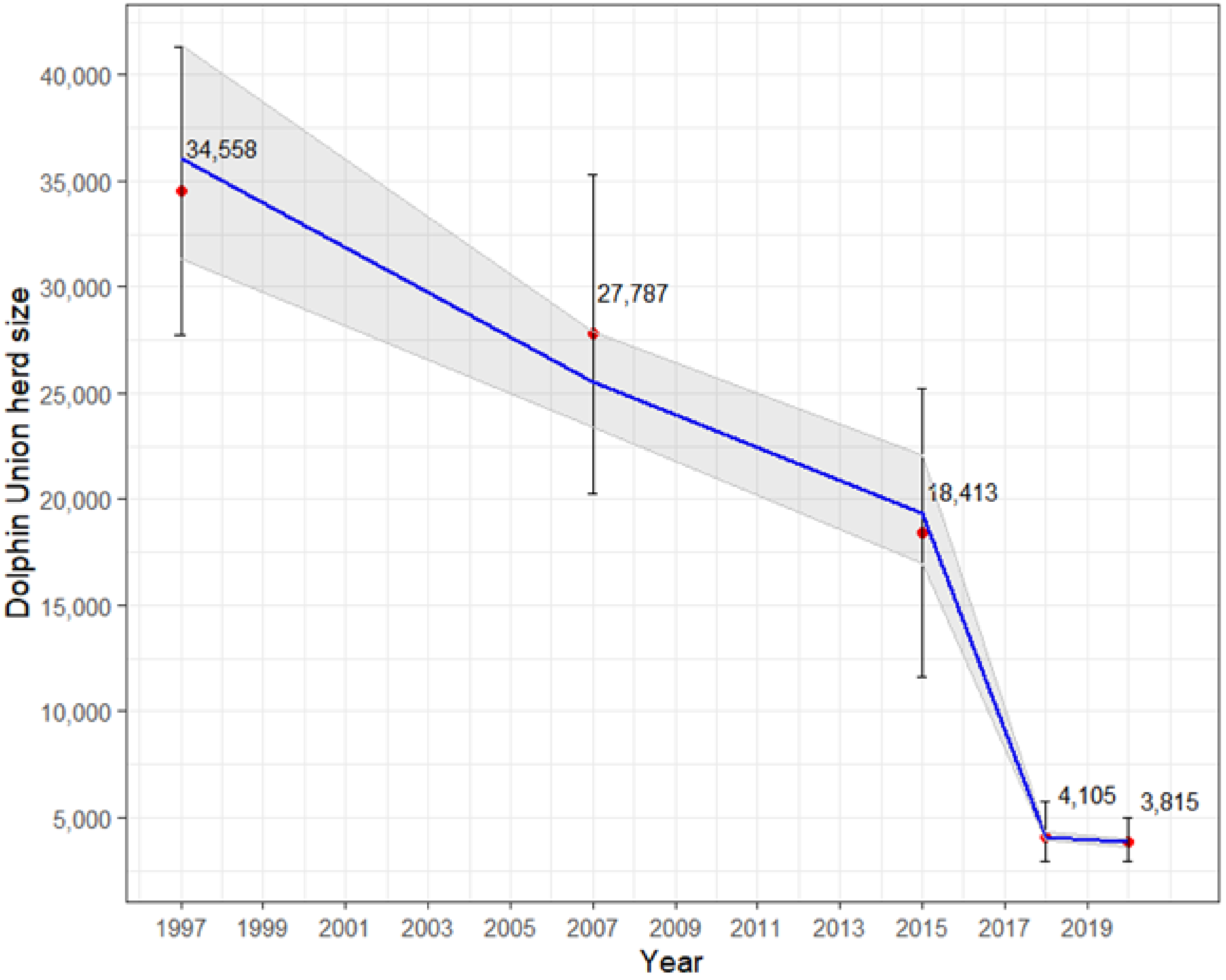
- DU 2020 survey observations.

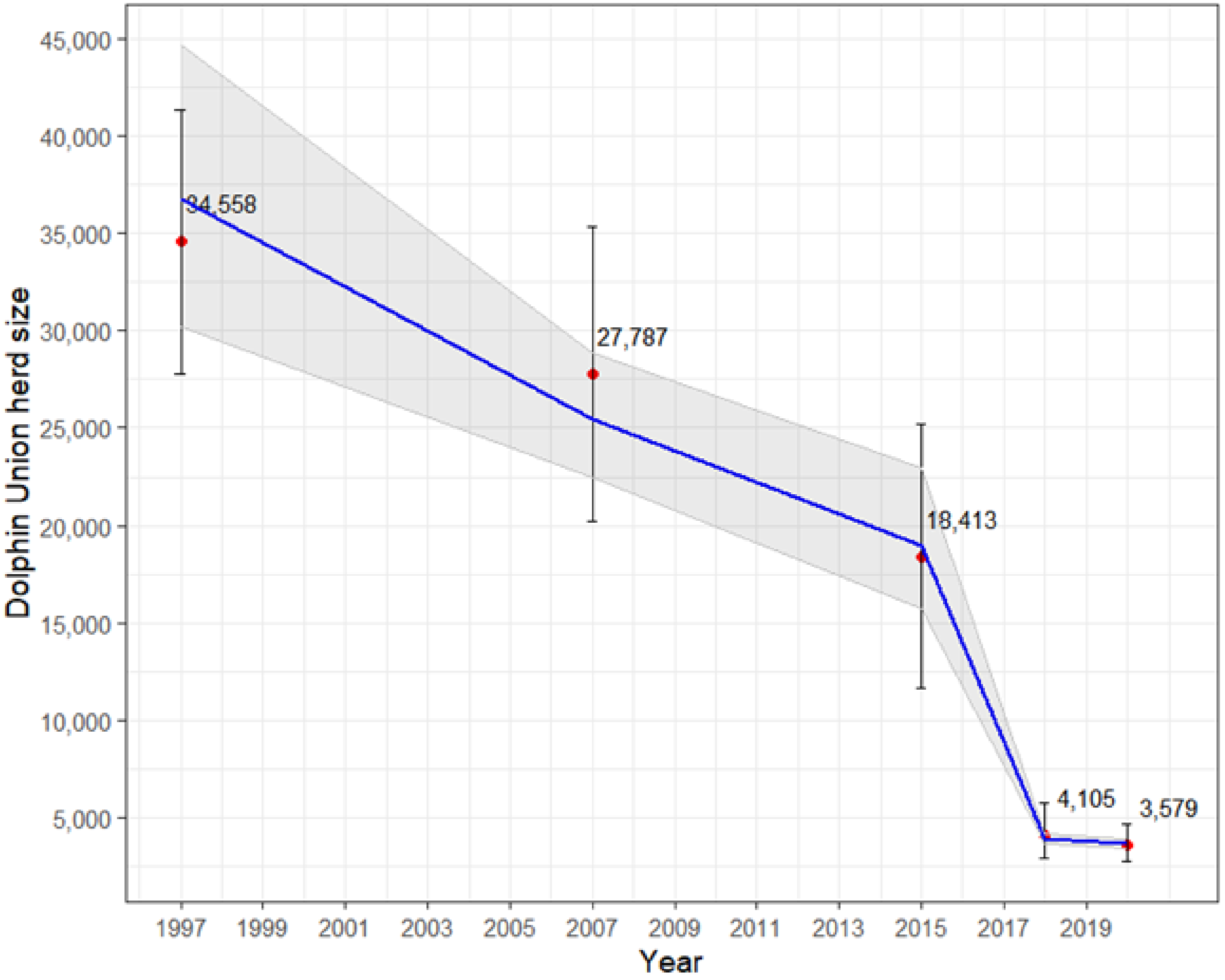


Strata	Strata_Name	Caribou counted	Abundance (N)	SE	Confidence Interval		CV
Victoria Island strata							
VHDE	High_Density_East	665	1,487	275.3	1,034	2,139	0.19
HDW	High_Density_West	262	821	164.4	554	1,217	0.20
MDEa	Medium_Density_East_A	1	5	5.9	1	33	1.08
MDEb	Medium_Density_East_B	22	130	48.7	58	290	0.37
MDWa	Medium_Density_West_A	150	470	121.3	281	784	0.26
MDWb	Medium_Density_West_B	26	89	37.3	38	207	0.42
LDC	Low_Density_Central	124	511	140.5	297	879	0.27
LDE	Low_Density_East	14	65	41.5	19	225	0.63
LDWC	Low_Density_West_Central	0	0				0.00
LDEC	Low_Density_East_Central	0	0				0.00
	Total	**1,264**	**3,579**	**476.5**	**2,758**	**4,644**	**0.13**
Mainland strata							
LDKP	Low_Density_Kent_Penninsula	66	236	174.9	57	980	0.74
LDSK	Low_Density_South_Kent	0	0				0.00
LDSW	Low_Density_South_West	0	0				0.00
Victoria Island + Mainland							
Total	Victoria Island + Mainland	**1,330**	**3,815**	**513.7**	**2,930**	**4,966**	**0.13**

- Abundance estimates

- Population estimates and estimated trends for the Dolphin Union caribou herd between 1997 and 2020.





- DU 2020 Caribou survey observers.

RWO, HTO, and Interjurisdictional Participation

In total, 20 individuals representing the communities of Cambridge Bay, Kugluktuk, and Ulukhaktok took part as observers in the survey effort. Our most sincere thanks go out to the Cambridge Bay observers including Mable Angohiaktok, Richard Ekpakohak, George Hakongak, Jimmy Haniliak, Allen Kapolak, Peter Kapolak, and Gary Maksagak; the Kugluktuk Observers including Regan Adjun, Albert Anavilok, OJ Bernhardt, Darian Evyagotalilak, Jeffery Niptanatiak, Jonathan Niptanatiak, and Antoin Nivingalok; and the Ulukhaktok Observers including Patrick Akhiaktak, Tiffani Akhiaktak, Tom Harvey, Jack Kataoyak, Susie Memogana, and Allen Pogotak. We would also like to thank Amanda Dumond (Kugluktuk Angoniatit Association), and Larry Adjun (Kugluktuk Angoniatit Association), Bobby Greenley, and Beverly Maksagak (Ekaluktutiak HTO), Connie Kapolak (Bathurst Inlet HTO), Bessie Inuktalik (Olokhatomiut HTC), Rosemin Nathoo and (WMAC), and Marsha Branigan (GNWT).

Conclusions

- Results of the 2020 DU caribou survey are consistent with the significant declines detected between the 2015 and 2018 abundance surveys.
- The 2020 survey findings are consistent with IQ and suggest that future surveys should be expanded beyond the coastal survey method, and include both inland & mainland strata.
- Future research should include a more complete, effective, and meaningful inclusion of IQ in planning to insure higher quality results, as proven during the 2020 survey effort.
- Population abundance should be carefully monitored, and the frequency of surveys should remain high while numbers are low.
- Monitoring predator and human harvest rates and other forms of anthropogenic mortality are important for effective long-term co-management.
- Telemetry is important for effective abundance survey stratification and the monitoring of changes in movement, behavior, and seasonal range use.
- Future research should look into the identification mechanisms for the observed declines.

Questions?

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Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

ᐊᕙᑎᓕᕆᔨᒃᑯᑦ
Department of Environment
Avatiliqiyikkut
Ministère de l'Environnement

DOLPHIN AND UNION CARIBOU

2021 Collaring, Kugluktuk – April 14-26

Field Report

Amélie Roberto-Charron, Kitikmeot Regional Biologist
Department of Environment
Government of Nunavut
Kugluktuk, NU

Executive Summary

Steady declines to the Dolphin and Union Caribou (*Rangifer tarandus groenlandicus x pearyi*) calls for increased monitoring, and additional research on threats and their impact on long-term conservation and recovery of this population. As this caribou herd is central to Inuit subsistence and culture in several communities in Nunavut (Kugluktuk, Cambridge Bay, Bay Chimo and Bathurst Inlet) and the Northwest Territories (Ulukhaktok and Paulatuk), a better understanding of this population is key to informing collaborative decision-making processes and adaptive management of this herd.

To effectively manage the herd, critical information is required regarding habitat selection, calving, and movement patterns, to better assess potential threats. Real-time location data is required to inform abundance and composition surveys. Also, individual health, stress levels, pregnancy rates, and parasite loads need to be monitored to ensure a complete understanding of factors impacting the herd. To accomplish this, Between April 14th to April 26th, 2021, Dolphin and Union caribou cows were collared along their spring migration in the Kitikmeot region of Nunavut, CA, with Telonics, TGW-4577-4 collars. A total of 36 collars were deployed during the project. During the collaring, samples were taken including blood, feces, and hair samples. Samples from the collaring program will be analyzed for parasites, stress, trace minerals, disease, and pregnancy. Additionally, photos of the body, teeth, antler, and eyes of the animals were taken to compare phenotypic differences, to obtain an approximate age and to ascertain the health of the individual.

Following collar deployment, each cow was monitored remotely for 72 hours to identify any potential issues or adverse effects. No issues were detected during the post-collaring monitoring period. Unfortunately, during collaring, three cows were injured and needed to be euthanized. A fourth cow had a heart attack. Resuscitation was attempted but was unsuccessful. For all four cows, the affected HTO was notified immediately, and the meat was brought to the nearest community (Kugluktuk, NU) and tags were removed from the community’s Total Allowable Harvest (TAH) allotment. One cow was harvested by a harvester following the collaring and another cow died due to natural causes.

Data received from these collars is anticipated to continue for three years. Pre-programming of data transmission coincides with a three-years battery lifespan, with the collar release mechanism activating in April 2024 to drop the collar without recapture. Collar data distribution will be used to study change in distribution, habitat selection, and seasonal ranges.

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1.0 Purpose and Objectives

1.1 Rationale

Throughout the coastal survey history of the Dolphin and Union caribou population, the overall trend has indicated a statistically significant and steady decline. The cause of which is largely unknown.

Dolphin and Union caribou herd abundance has declined from 34,558 (95% CI = 27,757 to 41,359; CV = 12%) in 1997 to 4,105 (95% CI = 2,931 to 5,750; CV = 17%) by 2018. These results indicate a considerable drop in population over a relatively short period of time. The results from the most recent 2020 survey (3,815 caribou (95% CI = 2,930–4,966, CV= 13%)) confirmed that a significant decline had indeed taken place but indicated that no significant decline has taken place since 2018 (Campbell et al. 2020, Figure 1).

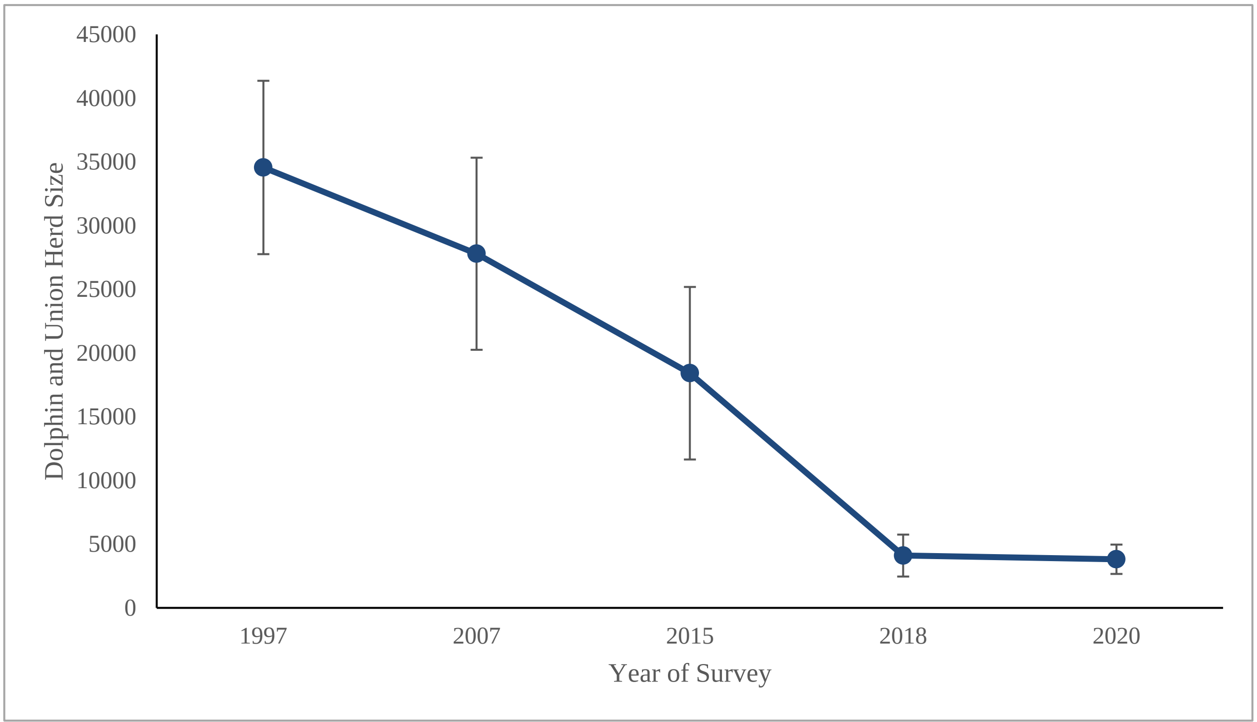

Figure 1- Population estimates and estimated trend for the Dolphin and Union caribou herd. Error bars represent 95% Confidence Intervals.

Collecting information on movements and population trends addresses concerns expressed by communities in both Nunavut and the Northwest Territories. This work will identify any changes in location and timing of migration, in distribution range, and in habitat selection. Furthermore, with increasing anthropogenic disturbance, it is essential to monitor how these factors will impact the herd to mitigate any possible impact.

By directly tracking caribou, we can provide information for real-time management to take place. Furthermore, having collared individuals will reduce overall cost and ensure the reliability and efficiency of abundance survey efforts. Having proportional representation of collared individuals will serve as a guide for where to focus future surveying efforts and will confirm that areas surveyed include the majority of the population. As we continue to monitor the population trend of this herd, having reliable survey information is essential.

Collaring of Dolphin and Union caribou allows for the improved understanding of the areas and time windows that caribou should be protected year-round. Additionally, this knowledge will support decisions made on climate change adaptation and habitat preservation.

1.2 Objectives

The objectives of this project were to:

1. Study the movement patterns of Dolphin and Union caribou over a multi-year program and in a changing climate,
2. Support the deriving of population estimates and trends for the herd,
3. Identify priority and sensitive habitat, and
4. Investigate non-migratory Dolphin and Union caribou that remain on Victoria Island year-round

1.3 Application of the Anticipated Results

The results of this study will be directly applicable to the Nunavut communities of Kugluktuk, Cambridge Bay, Bathurst Inlet, and Bay Chimo, and to the Northwest Territory communities of Ulukhaktok and Paulatuk. This study will provide insight into any changes in movement patterns, in migratory behaviors and migratory routes, and distribution range exhibited by Dolphin and Union caribou. These knowledge gaps have been identified for Dolphin and Union in the management plan and will be addressed by this research.

With the recent implementation of a Total Allowable Harvest (TAH) on Dolphin and Union caribou, it is important to have a thorough understanding of changes in the behavior in the herd, as well as possible threats. Following the 2018 Dolphin and Union survey, a TAH of 42 caribou was set in September 2020. The TAH was increased to 105 based on concerns raised by community members at the October 2020 Dolphin and Union caribou consultation. During this consultation, Hunter and Trapper Organizations (HTOs) brought up concerns that only a subset of the herd has been monitored, and that attention must be paid to non-migratory individuals to ensure information is being garnered for the herd as a whole. Collaring individuals across the species' range ensures that the entire population is being monitored. And by monitoring both migratory and non-migratory individuals it is possible to ascertain behavioral differences between the two, identify habitat use for both groups, and detect possible threats and their potential effect on the population.

To make decisions addressing any conservation concerns, detailed information on population abundance, range, behavior, and threats of Dolphin and Union caribou are required. By collaring

individuals, we'll be able to garner key information on the entire herd, providing insight on how best to manage Dolphin and Union caribou. This project will aid in future abundance surveys and provide vital information on the population.

2.0 Project Personnel

Project Lead:
Amélie Roberto-Charron, GN, Department of Environment, Kitikmeot Regional Biologist

Capture Crew:
Glen Sibbeston, Helicopter Pilot
Gord Carl, Net Gunner

HTO Representatives and Handlers:
Albert Anavilok, Kugluktuk Angoniatit Association
Regan Adjun, Kugluktuk Angoniatit Association

3.0 Materials and Methods

3.1 Study Area, spring 2021

To identify the study areas for the 2021 collaring program, a figure with deployment options was distributed to all the affected HTOs (Hunter and Trapper Organizations) or HTCs (Hunter and Trapper Committees), including Kugluktuk, Cambridge Bay, Bay Chimo, Bathurst Inlet, Paulatuk and Ulukhaktok HTOs and HTCs.

The organizations were asked to provide input on what key areas they were interested in seeing collars deployed and encouraged to provide alternative options. Areas selected by the most organizations were deemed the highest priority for deployment locations, and the remaining areas were ranked accordingly. The proposed areas were derived by reviewing past collaring locations and past collaring data; however, the organizations were encouraged to suggest any additional locations, which were added as potential deployment areas. Five areas on the mainland were identified (ML-1 to ML-5) and four areas on Victoria Island were identified (VI-1 to VI-4) as possible deployment options (Figure 2). Although previous collaring has not taken place on Victoria Island, one of the objectives of this project, in response to community concerns, was to collar on the island as well as on the mainland.

Input was received and incorporated from Kugluktuk, Cambridge Bay, Bay Chimo, Bathurst Inlet, and Ulukhaktok HTOs or HTCs. No response was received from Paulatuk. Three additional areas were added based on suggestions from Bathurst Inlet and from Ulukhaktok, adding two deployment areas in NWT (NWT-1 and NWT-2) and a sixth on the mainland (ML-6).

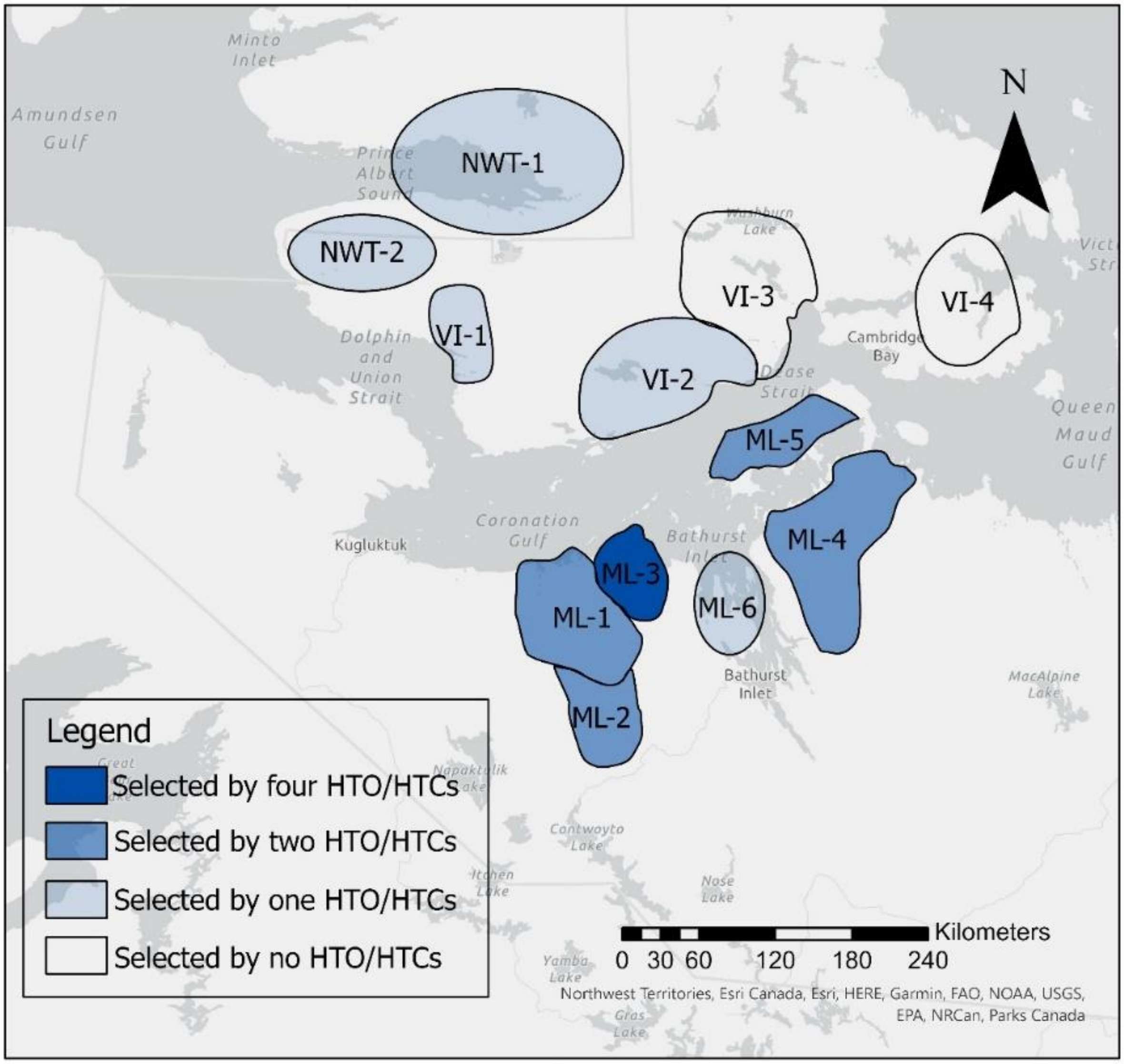

Figure 2- Options selected by affected HTOs and HTCs to identify study locations for the 2021 collaring program. Locations were derived from past collaring locations and collar data (ML-1 to ML-5 and VI-1 to VI-4) or were suggested by HTOs and HTCs (NWT-1, NWT-2, and ML-6). The areas were prioritized by the number of HTOs and HTCs that selected the area.

3.2 Project Design

The areas selected by the highest number of HTOs and HTCs were the highest priority for collaring locations, however, weather conditions and permitting constraints were considered in daily planning. Permits in place to collar in the Northwest Territories were only valid until April 15th, making entry into the territory time sensitive. Unfortunately, it was only possible to spend one day in the territory due to adverse weather conditions. A second day was spent surveying to the south on Victoria Island, but no Dolphin and Union caribou were observed or collared.

The intent of the project was to be based out of Kugluktuk and Cambridge Bay, NU, during an equal amount of time during the program to allow the participation of HTO observers from all the affected Nunavut HTOs. Due to Covid-19 restrictions, it was not possible to have contact with residents from the Northwest Territories. Unfortunately, due to logistical constraints, including poor weather, delayed start, and changes in Covid-19 restrictions during the project, it was not possible to reposition in Cambridge Bay, NU. As such, the entire project was run out of Kugluktuk, NU.

3.3 Methods Overview

Forty-two caribou were captured following the capture methods involving tangle net and helicopter net gunning team (TAEM, 1996), and thirty-six were collared using Telonics, TGW-4577-4 collars, equipped with a collar release mechanism that will activate in April 2024 to drop the collar without recapture. Pursuit and capture occurred on smooth, open terrain with good footing, and, whenever possible, in deep soft snow. Final, close pursuit was kept short (less than one minute of strenuous running) and was terminated when the target animal showed signs of fatigue (e.g., panting, stumbling, etc.). Capture took place at temperatures above -25°C. Chases per herd were limited to no more than two chases per group, and a herd was given a rest period of an hour or longer prior to a second chase being attempted.

Once a caribou was immobilized, sex was confirmed as female, samples were taken, and a body condition score was given according to CARMA's Rangifer Health and Body Condition Monitoring Protocol Level II, section 3 for live animals (CARMA, 2008). Handling times were kept short, less than 15 minutes, and sampling was done quickly and quietly. The samples taken included hair samples from two different body locations (shoulder and hip), feces, blood, and photographs were taken of the body, eyes, and teeth. A maximum of 35 mL of blood was taken from the carotid artery and divided into up to 4 tubes and up to three filter papers. Hair samples were taken from the rump and the neck and were placed in a coin envelope. When available, fecal samples were collected and placed into a plastic bag. Following collaring, the samples were processed and sent for analysis. Samples were sent to be analyzed for trace minerals, disease, parasites, pregnancy, stress, and genetic testing to confirm the caribou as Dolphin and Union. All the samples collected were subsampled, kept frozen and were sent to specialized laboratories for subsequent analyses.

Photos of the full body, antlers, animal, incisors, and anything unusual were taken. These photos will provide some insight into the health and age of each animal. Eyes were checked for bensoitia and other disease (das Neves et al., 2010). Photos of the eyes were taken to monitor possible disease outbreak.

Following the Rangifer Health and Body Condition Monitoring Protocol (CARMA, 2008), animals were palpated during collaring as a measure of the body condition of the animal. The ribs, shoulders and hip/spine areas were felt using bare hands to determine the overall fatness of the animal for those areas. Animals were scored on a scale of one through four for each area, with a value of one considered very bony and four considered healthy, fat, and well padded. The values for each key area were then summed to provide an overall score for the individual

Any animal in the field that was injured with an irreversible injury was humanely euthanized via a gunshot to the brainstem. Of the forty-two captured, thirty-six were collared. Of the six caribou that were captured that were not collared, three were euthanized due to injuries that were sustained during pursuit, one sustained a heart attack and two were released without collars due to lengthy handling time during detangling, which did not allow time to collar the animal within the 15-minute handling limit. The caribou capture work was performed by an experienced capture crew, and an HTO representative was present for every capture.

4.0 Project Schedule

The project start was intended to commence on April 1st but was delayed by two weeks due to adverse weather, which prevented the capture crew from positioning in Kugluktuk to start the program. During the collaring program, weather continued to be an issue, with several days with poor visibly and high winds. The collaring program took place over 12 days, four of which were unflyable weather days, and three were partial weather days where a half day was flyable.

The HTO and community consultations started September 2020, prior to the start of the program. HTOs and stakeholders were updated daily throughout the program, and an update on the program was provided at the July Dolphin and Union caribou user-to-user meeting. Further consultation is scheduled to take place September 2021, and collar data sharing with HTOs is ongoing and will continue through to the end of the program in 2024.

Table 1: Project schedule for the Dolphin and Union 2021 collaring program.

Item	Starting Date	End Date
HTO Consultation	September 2020	May 2021
Collaring	April 2021	April 2021
HTO Consultation	September 2021	September 2021
Collar Data Analysis	April 2021	April 2024
Distribution of Collar Data	August 2021	April 2024

5.0 Preliminary Results and Discussion

5.1 Deployment Locations

Two out of the ten areas that were selected by an organization were not visited during the 2021 collaring program (Figure 3). The other eight sites were all visited at least once. Collars were deployed in four of the ten areas (Figure 3).

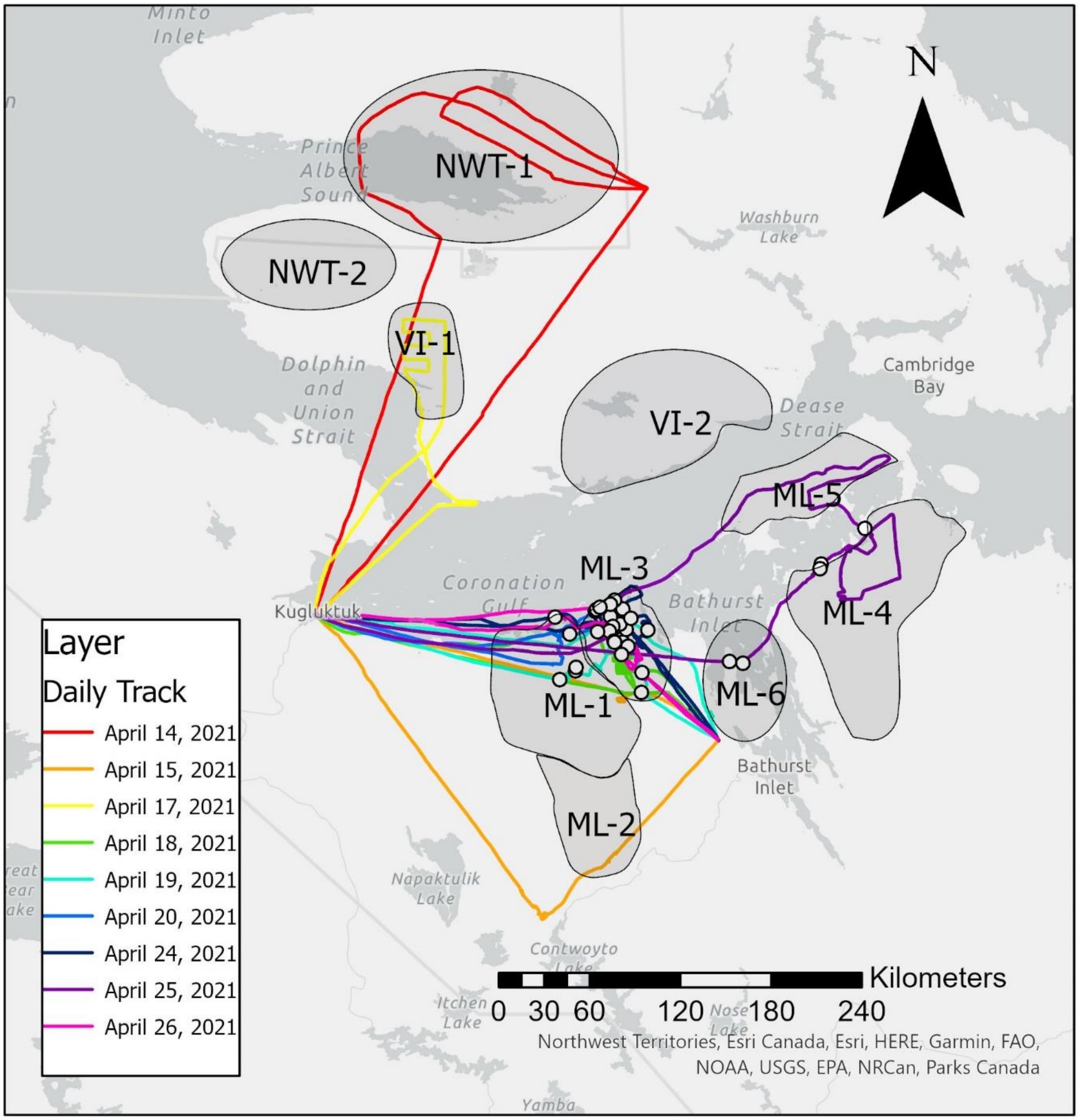

Figure 3- Dolphin and Union caribou 2021 collaring program deployment locations and daily tracks within the survey areas selected by affected HTOs and HTCs. Collar deployment locations are indicated by white circles.

5.2 Deployment Schedule

The project took place over twelve days. Four days of the program were unflyable weather days, and three were partial weather days where a portion of the day was flyable.

On April 14th, 2021, the project commenced, and due to permitting constraints allowing entry into the Northwest Territories until April 15th, NWT-1 was prioritized. The area was surveyed, but no caribou or tracks were spotted. On April 15th, 2021, the weather did not permit return to the Northwest Territories, and the weather was unfavorable along the coast of the Coronation Gulf. Areas that were of interest to the south where weather was favorable, near the north of Contwoyto Lake, were investigated as numerous observations of Dolphin and Union caribou intermixing with barren ground caribou were reported by the Kugluktuk Angoniatit Association. When the weather improved, searching resumed in higher priority areas (ML-3 and ML-2). A cow was collared in ML-3. Weather on April 16th, 2021, rendered it unflyable. Due to unfavourable weather over Bathurst Inlet, on April 17th, 2021, VI-1 on Victoria Island was surveyed. No caribou were observed. The weather improved on April 18th, 2021, a half day was flyable, and two caribou were collared in ML-1. On April 19th, 2021, weather remained good, a full day was flyable, and ten caribou were collared in ML-1 and ML-3. Weather on April 20th, 2021, was marginal, and a half day was flyable. Four cows were collared in ML-3. April 21st to April 23rd, 2021, were weather days and were unflyable. On April 24th, eight caribou were collared in ML-3. On April 25th, another four caribou were collared in ML-4 and ML-6. Although Kent Peninsula (ML-5) was searched, no caribou were observed. On April 26th, the final day of the program, a half-day was flyable, and 6 caribou were collared in ML-3.

Although the intent was to relocate to Cambridge Bay half-way through the program to access sites to the east and to involve observers from the other affected HTOs, this was not possible due to pandemic restrictions. The Minister of Health announced on April 21st that any non-essential travel was not supported due to the escalating Covid-19 situation.

5.3 Body Condition

The mean body condition score was high, with a mean health index of 9.5. The body condition index is not normally distributed, with a left skew indicating a high proportion of caribou with a higher health index (Figure 4). Although this measure is a good indication of the health of the herd, this factor is also biased by sampling. The individuals that were selected during the collaring program were fatter and seemingly fitter animals. No caribou with a health index lower than seven were captured during this program (Figure 4). Figure 4 shows the body condition index for 40 caribou that were captured (including the 36 collared, and the four mortalities).

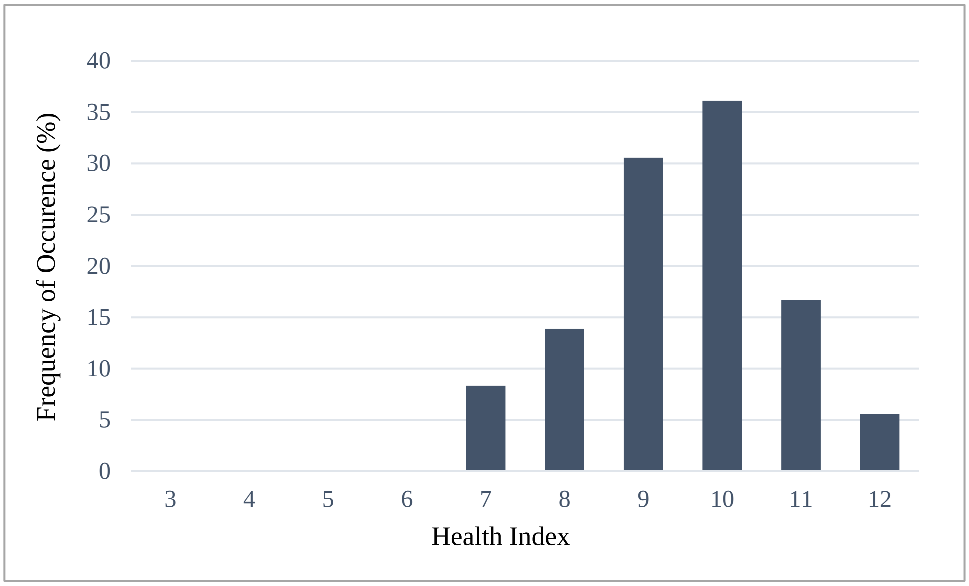

Figure 4- Average body score condition displayed as a frequency of occurrence (%) of the 36 captured caribou. The health index is scored on a scale of 3 to 12, with three indicating a bonier animal and twelve a very fat and healthy caribou.

5.4 Sample Analysis

Pregnancy rates were derived from progesterone levels from fecal samples. The progesterone thresholds were 20-200 ng/g feces non pregnant and >600 ng/g feces pregnant. The pregnancy rate for 2021 was as expected at 87.2%. The 2021 rate was calculated for the 36 animals collared, and the 4 mortalities that occurred during collaring.

Pregnancy rates from genetically confirmed Dolphin and Union caribou collared in 2015, 2016 and 2018 were 87.5%, 100%, and 92.1% respectively (Table 2) and were compared between years using a Pearson's chi-squared test (χ^2) in R (R Core Team, 2021). No significant difference was observed in pregnancy rates between years (2015, 2016 and 2018), χ^2 (2, N = 62) = 1.1278, p = 0.569.

Pregnancy rates from all caribou that are assigned to the Dolphin and Union caribou herd were also compared using a Pearson's chi-squared test (χ^2) in R (R Core Team, 2021). This included individuals that were genetically confirmed and matched the behavioral and physical attributes of Dolphin and Union caribou. Caribou from previous collaring programs (2015, 2016, 2018) were inferred to be from the Dolphin and Union herd based on physiological and behavioral characteristics when no genetic information was available (L. Leclerc 2021, personal communication, September 10). During the 2021 collaring program, samples were collected and submitted for genetic analysis, however, the results are not yet available. Prior to the receipt of the results of the genetic analysis, the 2021 animals have not been genetically confirmed as Dolphin and Union caribou; however, they were all assigned as Dolphin and Union caribou by HTO observers, Albert Anavilok and Regan Adjun. No significant difference was observed in pregnancy rates between years for all animals that were identified as Dolphin and Union caribou

based on genetics and/or assignment (based on physical appearance, or behavior) (2015, 2016, 2018, and 2021), $\chi 2$ (3, N = 118) = 1.2516, p = 0.741.

Additionally, a logistic regression with a binary response (pregnant or not pregnant) and multiple categorical predictors (year and herd assignment method) was conducted with a binomial distribution to determine whether there was a significant difference in pregnancy rate between the genetically confirmed and otherwise assigned Dolphin and Union caribou. Pregnancy rate did not vary between Dolphin and Union caribou that were genetically confirmed and identified by physical and behavioral characteristics (GLM: 1, N=118, p=0.755) and no difference was detected between years (GLM: 3, N=118, p=0.638).

Table 2: Pregnancy rates from collaring programs in 2015, 2016, 2018 and 2021 for genetically confirmed Dolphin and Union caribou and caribou identified as Dolphin and Union through behavioral and physical characteristics.

		Year			
Herd Assignment Method	Status	2015	2016	2018	2021
Genetically Confirmed Dolphin and Union Caribou	Not Pregnant	2	0	3	-
	Pregnant	14	8	35	-
	Pregnancy Rate	**87.5%**	**100.0%**	**92.1%**	-
Identified as Dolphin and Union Caribou through Behavioural or Physical Characteristics	Not Pregnant	0	2	0	5
	Pregnant	1	6	9	33
	Pregnancy Rate	**100.0%**	**75.0%**	**100.0%**	**86.8%**
Both Genetically Confirmed and Assigned Dolphin and Union Caribou	Not Pregnant	2	2	3	5
	Pregnant	15	14	44	33
	Pregnancy Rate	**88.2%**	**87.5%**	**93.6%**	**86.8%**

Additional samples were collected to assess the presence of trace minerals, disease, and parasites. These samples are still being processed; however, the results will be made available when possible.

5.5 Collaring tracks

Location data from all collared Dolphin and Union caribou, from deployment to mid-July, were mapped to visualize the migration routes taken and the timing of migration (Figure 6). One caribou was harvested on April 25, 2021 (indicated on the figure with a red ‘x’). A second caribou died of unknown natural causes on August 13, 2021. This mortality is not visualized on this figure as the mortality occurred following the mid-July limit.

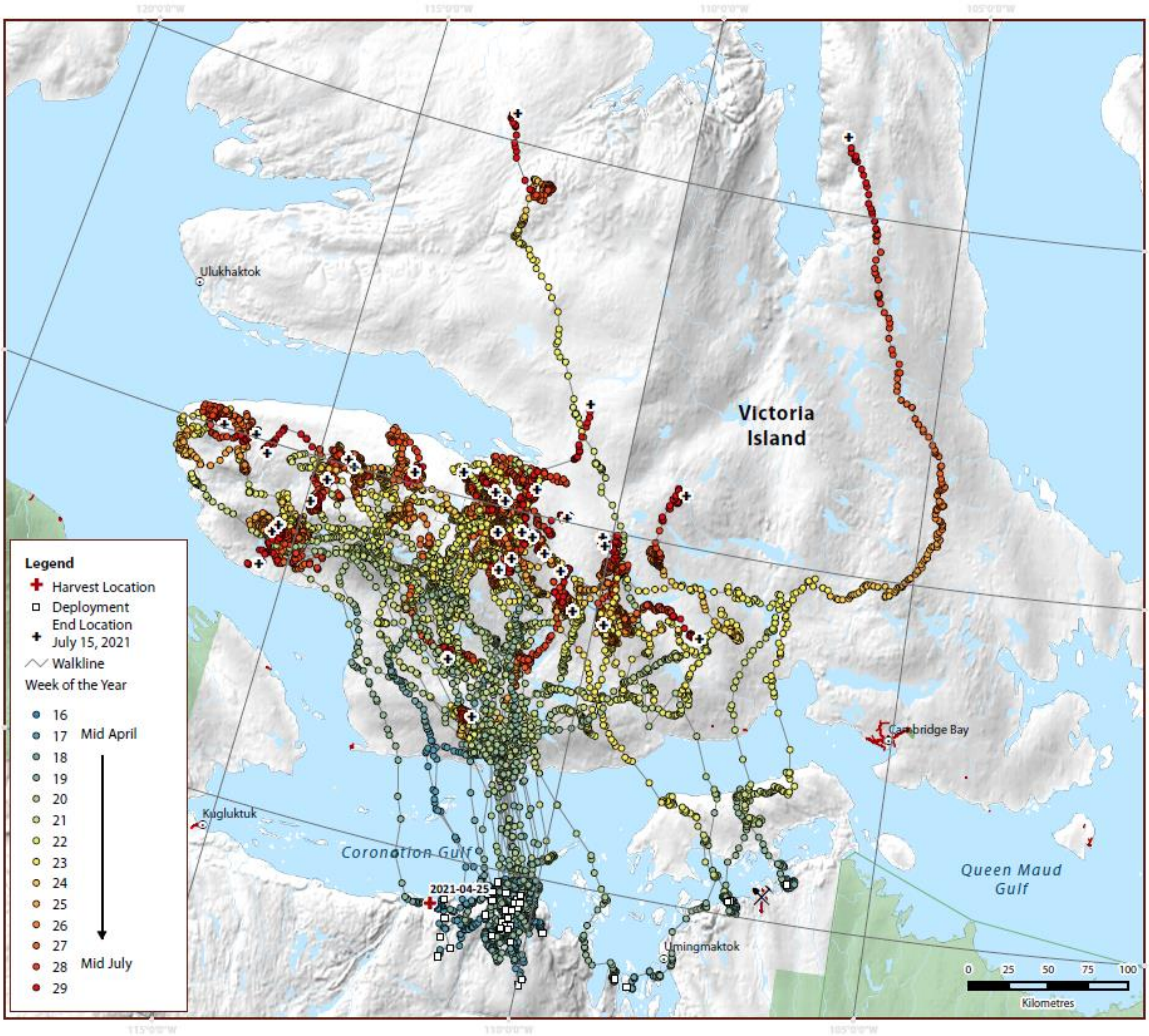

Figure 6- Locations and migration timing of 36 collared Dolphin and Union caribou cows from collar deployment (April 14th to April 26, 2021) to July 15, 2021.

5.6 Mortalities

Four mortalities took place during the collaring program, and one collared cow was harvested after being collared. Of the four mortalities that took place during the program, three were euthanized following unrecoverable injuries, and the fourth animal had a heart attack during capture. Resuscitation was attempted, but the animal did not survive. All four animals died closer to Kugluktuk, NU, and the HTO was notified immediately. The animals were field dressed, quartered, sampled, and brought to the HTO for distribution. The animals were counted towards the Kugluktuk TAH for the Dolphin and Union caribou herd.

Table 3- Summary of mortality events during and after the 2021 Dolphin and Union caribou collaring program

Identification Number	Mortality Date	Mortality Type	Cause
DU-M1-21	April 19, 2021	During Pursuit	Euthanized, broken leg
DU-M2-21	April 20, 2021	During Capture	Euthanized, injured hip
DU-M3-21	April 24, 2021	During Capture	Heart attack
DU-M4-21	April 24, 2021	During Capture	Euthanized, broken neck
DU-206-21	April 25, 2021	Harvested	Harvested
DU-218-21	August 13, 2021	Natural	Unknown

5.7 Program Limitations, Future Recommendations and Next Steps

This program was severely impacted by adverse weather. The program started two weeks later than anticipated due to poor weather. Additionally, 33% of the days during the program were unflyable, and an additional 25% were partial weather days. Poor weather impacted areas that could be surveyed and limited the time available to search.

A major program limitation is that only caribou on the mainland were collared, and only from a concentrated area. It was not possible to collar any individuals on Victoria Island due to logistic constraints. Future collaring programs should focus on distributing collars more evenly, including deployment in Northwest Territories and on Victoria Island on non-migrating Dolphin and Union caribou. As a subset of the population is being monitored, individuals that are on Victoria Island year-round are not being effectively monitored through this program at present. Future programs should focus on addressing this deficit.

Another project shortfall was the number of collars deployed. Only 36 were successfully deployed from the fifty collars that were proposed to be deployed. Having more collars deployed is beneficial in monitoring a higher proportion of the population.

Future collaring programs should continue involving HTOs and HTCs in determining possible deployment locations. On the ground surveys prior collaring have been identified by stakeholders as a possible method to improve collaring efficiency by identifying locations where Dolphin and Union caribou are present, particularly on Victoria Island where limited information is available on the distribution of non-migrating individuals.

Consultations will take place mid-September in Kugluktuk, NU, to discuss this collaring program. Data will be disseminated to co-management partners until the completion of the project in April 2024.

6.0 Acknowledgements

This work would not have been possible without the help and support of the Hunter and Trapper Organizations and Committees from Kugluktuk, Cambridge Bay, Bay Chimo, Bathurst Inlet and Ulukhaktok. Thank you specifically to Amanda Dumond, Larry Adjun, Beverly Maksagak, Bobby Greenley, Connie Kapolak, Peter Kapolak, and Bessie Inuktalik. Additionally, thank you to Albert Anavilok and Regan Adjun. This work would have not been possible without their assistance in the field. Thank you also to Lena Davies, Terry Milton, John Ringrose and Mitch Campbell for their support and assistance with planning and logistics.

This program was supported monetarily by the Canadian Wildlife Service, the Government of Northwest Territories, and the Nunavut Wildlife Management Board. TMAC Resources Inc. provided fuel as in-kind support to the program. Thank you for support for the program, it made the work possible.

Thank you to Caryn Smith, Mitch Campbell, and John Ringrose for reviewing this report and providing insightful feedback and edits.

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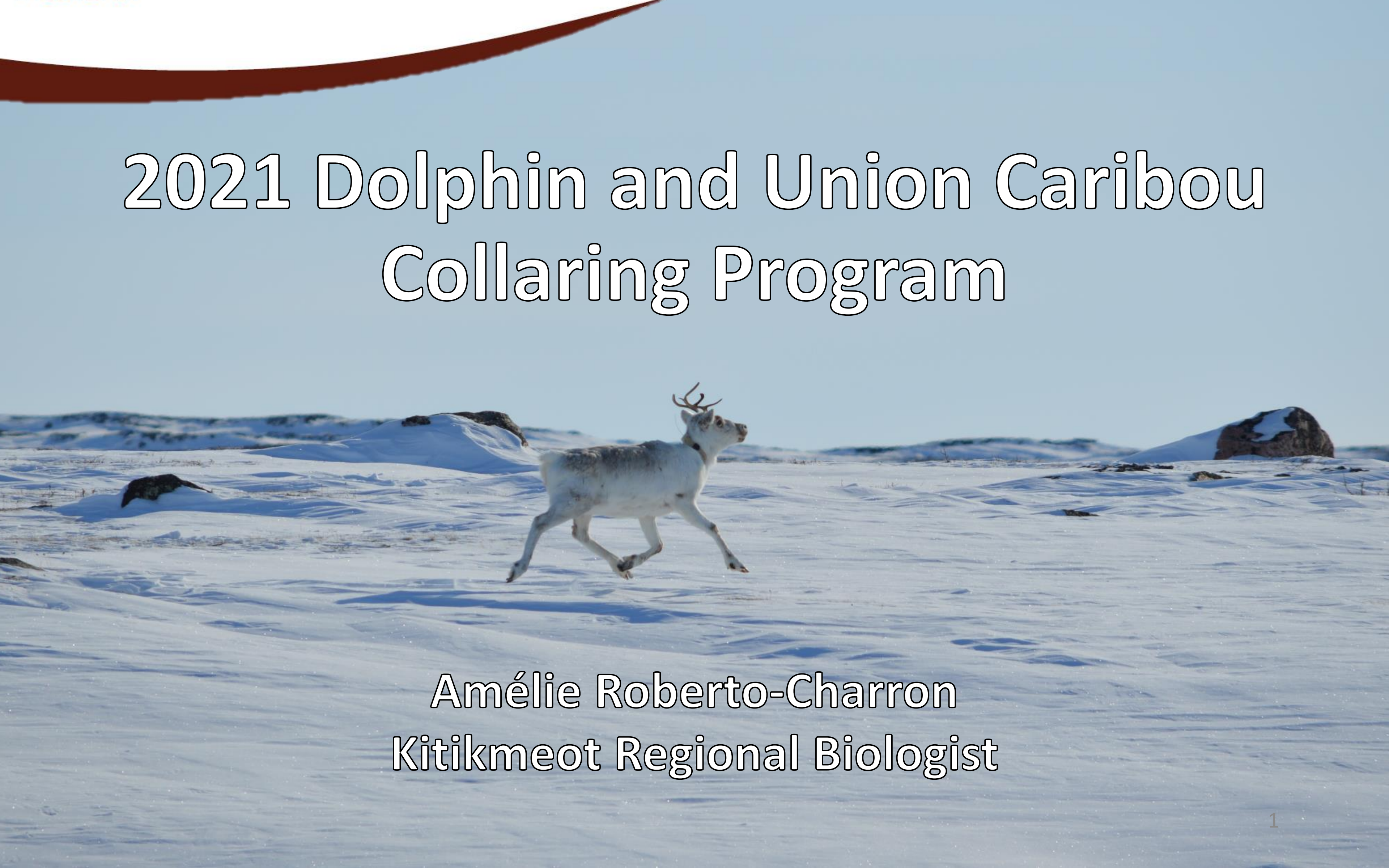
Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

2021 Dolphin and Union Caribou Collaring Program



Amélie Roberto-Charron
Kitikmeot Regional Biologist

Dolphin and Union Collaring Program

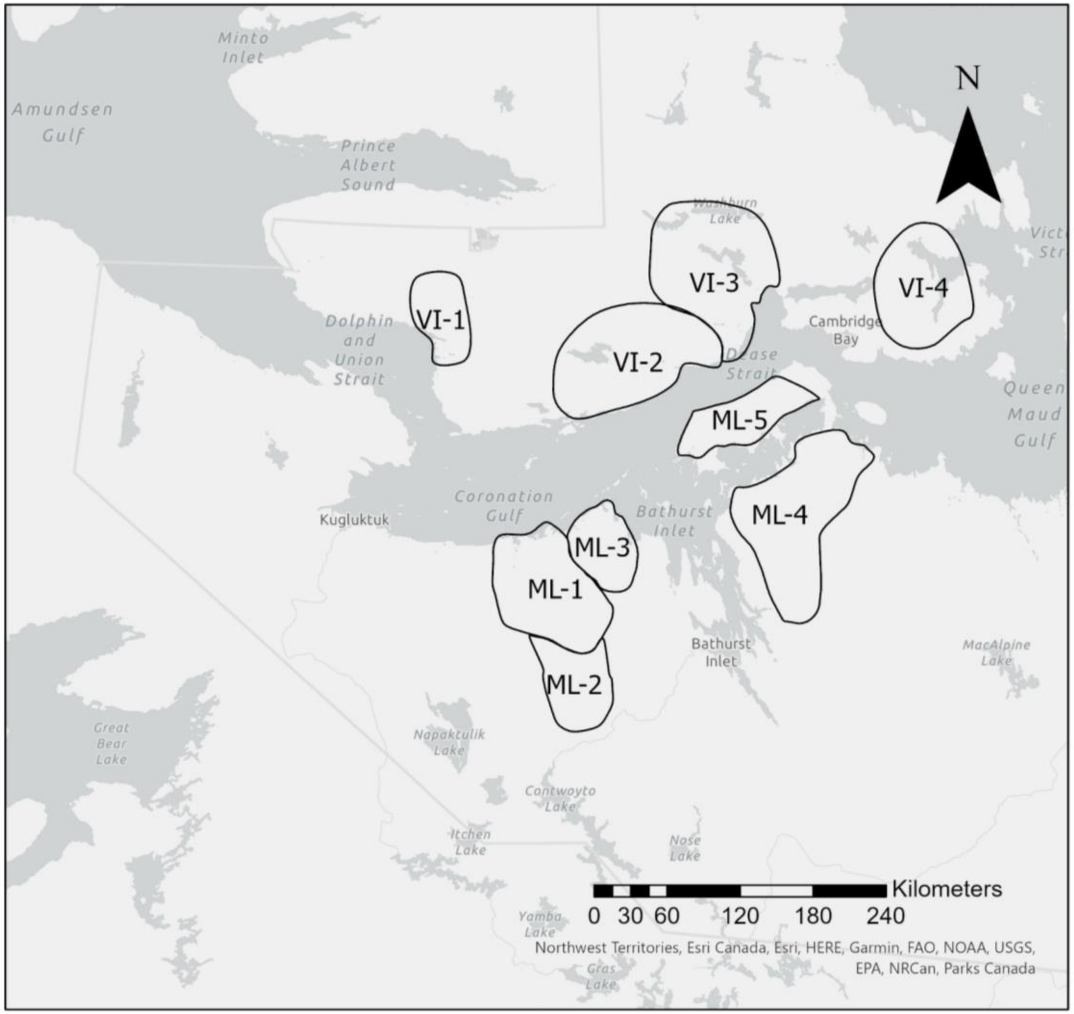
Objectives:

- Study the movement patterns of DU caribou over a multi-year program
- Support the deriving of population estimates and trends for the herd
- Identify priority and sensitive habitat
- Investigate non-migratory Dolphin and Union caribou that remain on Victoria Island year-round

Proposed Activities

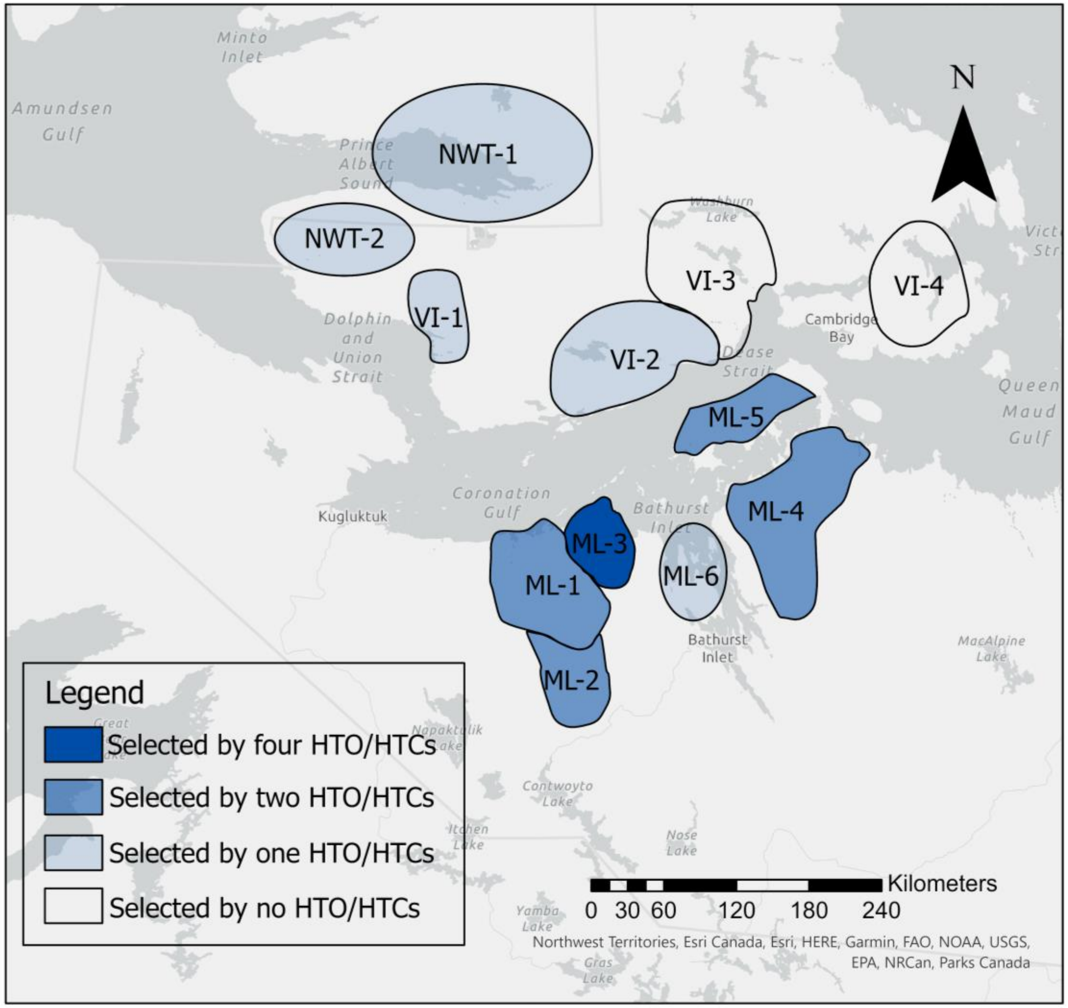
- April 1st to April 14th, 2021
- Collar 50 female DU caribou on mainland and Victoria Island performed by experienced capture and collaring crew
- Incorporate HTO/HTC input into collaring locations
- Take samples (blood, feces and hair), assess body condition and take photos (full body, antlers, eyes, incisors)

Proposed Collaring Areas



Map with possible collaring locations distributed to affected HTOs/HTCs, and to NTI for input.

Selected Collaring Areas

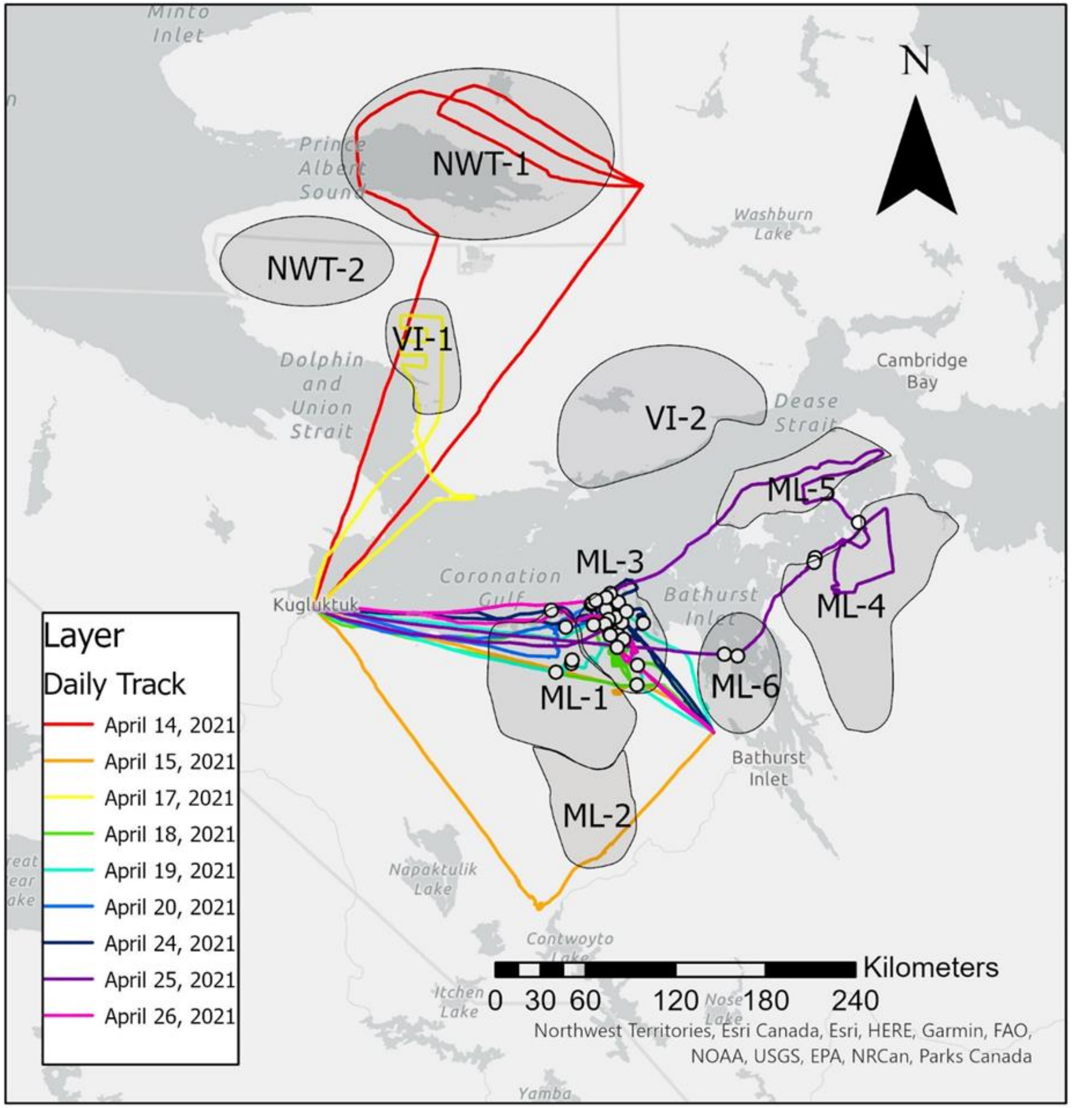


Input received from Kugluktuk Angoniatit Association, Ekaluktutialik Hunter & Trappers, Omingmaktok Hunters & Trappers, Burnside Hunters & Trappers, and Olokhaktomiut Hunters & Trappers.

2021 Collaring

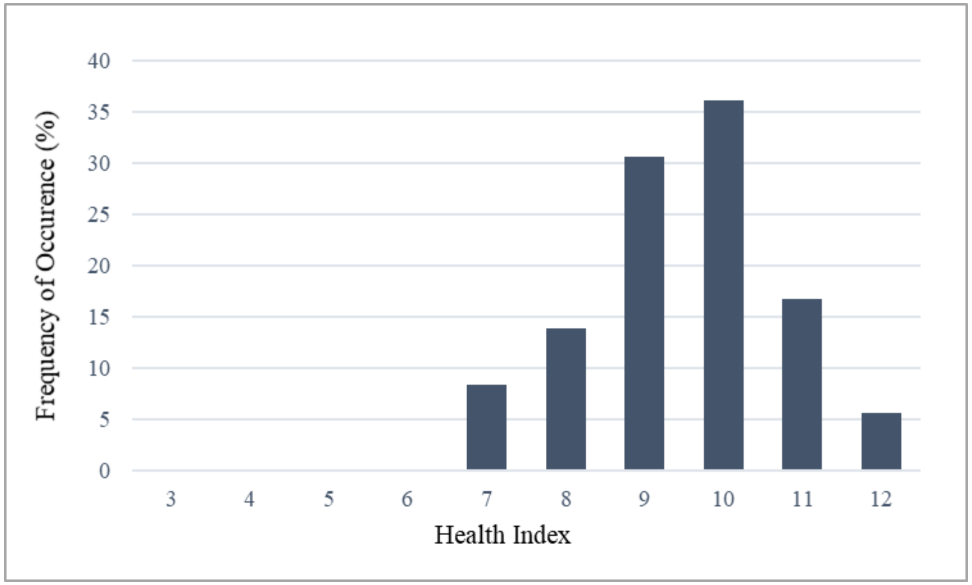
- Start date was delayed due to weather
- Collaring took place April 14th to April 26th 2021
- 8 areas selected by HTOs/HTCs were visited during the program
- 36 animals were collared, 42 were captured
- Samples were taken (blood, feces and hair), body condition determined and photos taken
- HTOs/HTCs were emailed daily to provide project updates
- An HTO observer was present for every capture

Collar Deployment Locations



Body Condition

- Followed CARMA's Rangifer Health and Body Condition Monitoring Protocol
- Health index on a scale of 3 to 12
- Ribs, shoulders and hip/spine scored and summed
- Mean health index of 9.5 for 2021



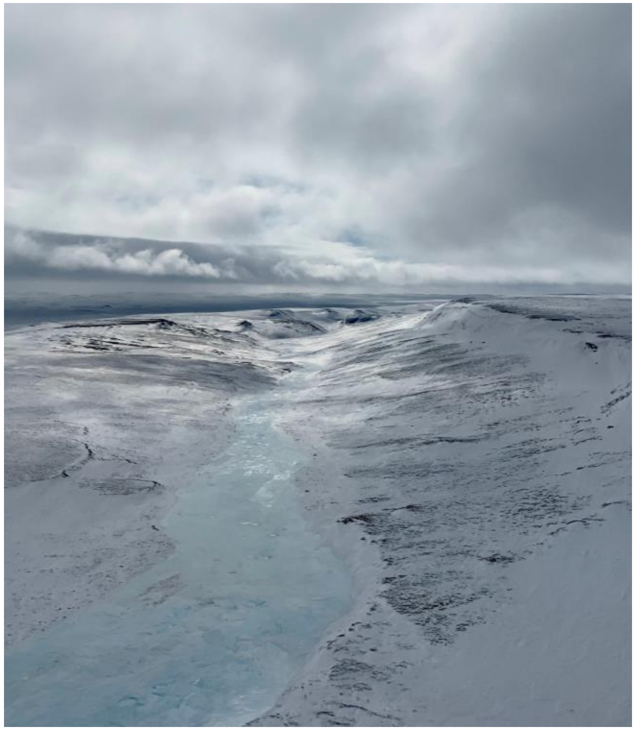
Pregnancy

- Fecal samples were analyzed for progesterone levels to determine pregnancy rate
- Progesterone >600 ng/g in feces indicated pregnancy
- In 2021, 87.2% were pregnant

	Year
Status	2021
Pregnant	35
Not Pregnant	5
Pregnancy Rate	**87.2%**

Program Challenges

- Adverse weather
  - Delayed start
  - 1/3 days during program unflyable
- Caribou only collared on mainland
- 36/50 collars deployed
- Unable to relocate
- Mortalities during collaring



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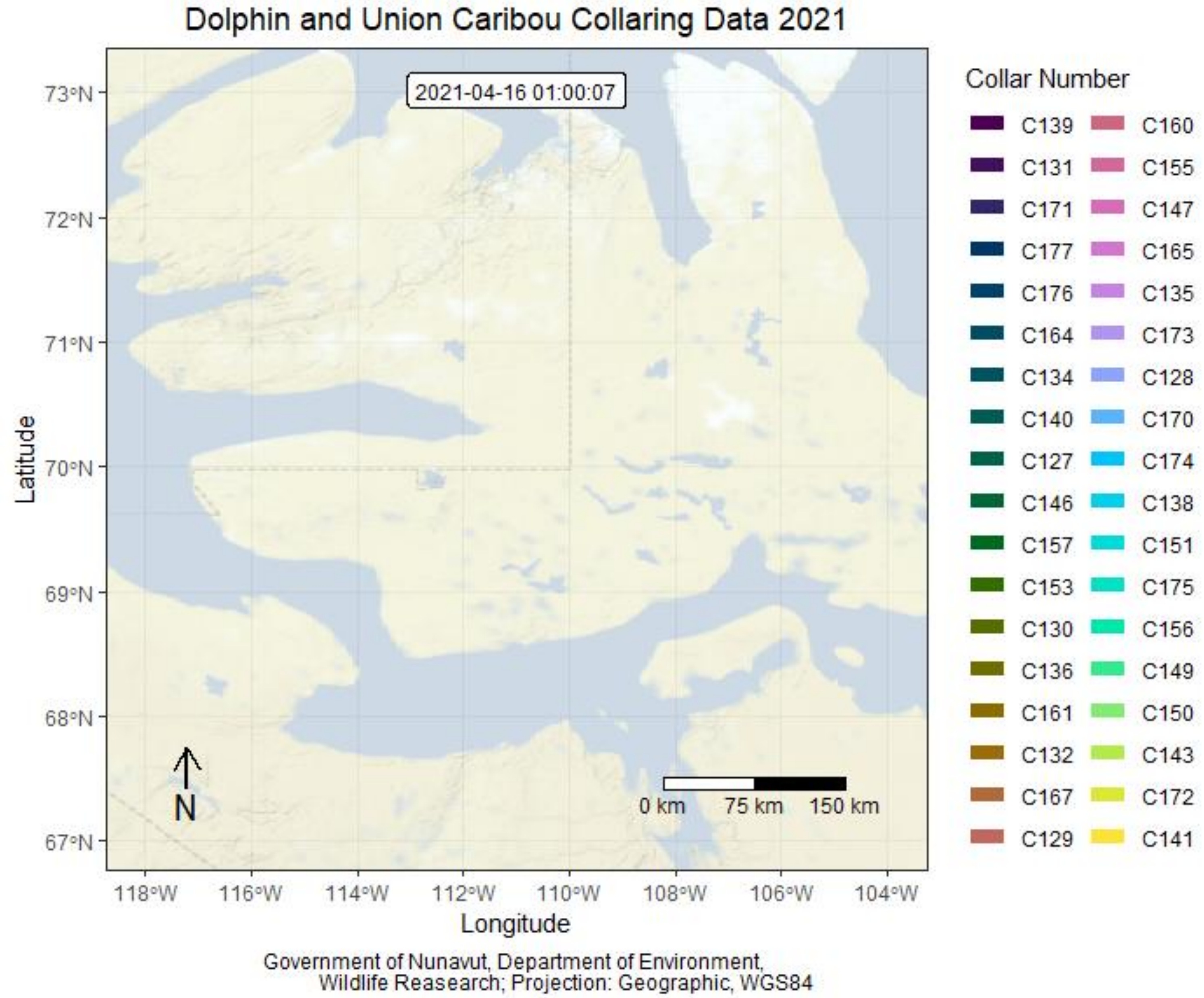
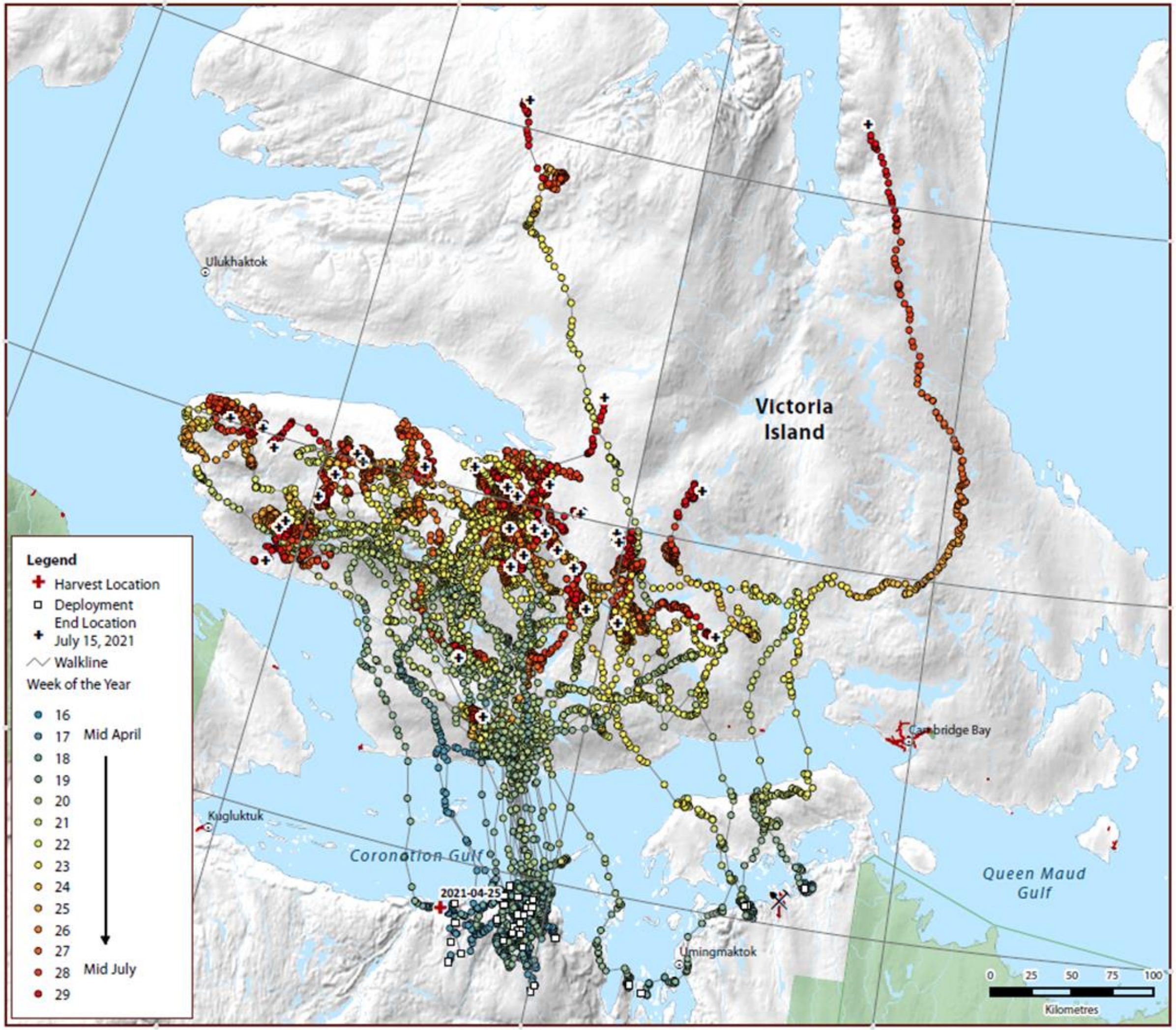
DU-206-21	April 25, 2021	Harvested	Harvested
DU-218-21	August 13, 2021	Natural	Unknown

Dolphin and Union Caribou Movement



Dolphin and Union Caribou Movement



Movements from 2021 collared caribou from mid-April to mid-July

Future Recommendations

- Collaring on Victoria Island should remain a focus
- On the ground surveys recommended prior to collaring program to increase efficiency
- Continued close collaboration with other stakeholders, specifically HTOs/HTCs

Thank you!

Thank you to the Kugluktuk, Cambridge Bay, Bay Chimo, Bathurst Inlet and Ulukhaktok HTOs/HTCs.
Thank you specifically to Amanda Dumond, Larry Adjun, Beverly Maksagak, Bobby Greenley, Connie Kapolak, Peter Kapolak, Tracy Davison, Bessie Inuktalik, Terry Milton and Lena Davies.
Additionally, thank you to Albert Anavilok and Regan Adjun and to Mathieu Dumond.
This program was supported by the CWS, GNWT, NWMB and TMAC.

Questions?

SUBMISSION TO THE

NUNAVUT WILDLIFE MANAGEMENT BOARD

FOR

Information: X **Decision:**

Issue: Inuit Qaujimajatuqangit (IQ), knowledge, and perspectives on M'Clintock Channel and Gulf of Boothia Polar Bears

Background:

The Kitikmeot Regional Wildlife Board (KRWB) is providing a summary to the Nunavut Wildlife Management Board (NWMB) on IQ and community knowledge and perspectives on M'Clintock Channel (MC) and Gulf of Boothia (GB) polar bears. This information is being presented due to the lack of IQ on these populations shared with NWMB. This information is being presented as contextual information for consideration in anticipated and future polar bear management issues. It is possible other Inuit communities across Nunavut may share the same concerns.

In 2020, the Government of Nunavut Department of Environment (GN DOE) contracted Trailmark Systems Inc. to conduct an IQ study of MC and GB polar bears with communities harvesting from those populations. This project involved:

- The co-development of a work plan and interview guide with GN DOE, Cambridge Bay, Gjoa Haven, Taloyoak, Kugaaruk, Igloolik, Hall Beach, and Naujaat Hunters and Trappers Organizations (HTOs)
- HTO recruitment of 3 to 5 community members in each community to be interviewed
- Interviews over telephone and Zoom video conferencing (due to COVID-19 travel restrictions) from 11 May to 10 August 2020
- An analysis of interview transcripts using a grounded theory (inductive) approach, where information is categorized and analysed without any pre-existing theory
- Remote validation of interview summaries for each community by each HTO

This project was reviewed and finalized by GN DOE in February 2021; GN DOE did not interpret or make changes to interview results. The resulting two (MC and GB) reports were distributed to the communities by email. The reports were also shared with NWMB staff but the information contained within them was never presented to NWMB.

The information in the two reports include important information from community members and their HTOs. This information has been reviewed by KRWB and we list the themes that are relevant to our region below.

<u>Polar bear hunting</u>

- Ranging experiences with polar bear hunting and encounters among hunters
- Polar bear behaviour and differences among sex and age groups: bears can be persistent, and learn from and respond to humans
- Polar bear areas (e.g., where they feed, den, and/or can be harvested)

- Traditional hunting practices and, hence, why polar bear IQ is important, how it is learned, and how it evolves
- Ranging familiarity with history of polar bear management and harvesting regulations among hunters
- Harvest restrictions affecting land use and access to polar bear hunting experience and knowledge
- Community-specific tag allocation practices
- Changes in polar bear use over time (e.g, effects of less access to hunting depreciating value of hides on hunters)

Population changes

- Increasing numbers of both MC and GB bears and indicators of this change: frequent encounters, hunting success, distinguishing tracks or bears during mating season, more young bears, more mothers with cubs, more cubs per female, opportunities for harvest selection when hunting
- Serious concerns about bear aggression and safety due to higher densities of them
- Bears responding differently to humans today compared to the past

Concerns about bear research

- Lack of trust in bear management and research
- Ongoing criticism of past mark-recapture methods (bear handling), despite new research methods
- Criticisms of scientific research and survey areas
- Failure of scientific models to incorporate bear safety and Inuit livelihood
- Disagreement with perceptions of climate change affecting population persistence; bears are adaptable

Bear management

- Movement of polar bears between MC and GB, although some differences in body fat and behaviour were described
- Perceptions of harvest regulations being imposed on versus agreed upon by Inuit
- Lack of community support for harvest restrictions, although regulations are always followed
- Acknowledgement that regulations can prevent overharvesting
- Inadequate inclusion of elders' concerns in polar bear management
- Precautionary approaches to bear management conflicting with Inuit needs
- The need for more tags to accommodate bear safety and harvesting needs
- Disturbances to polar bears (e.g., transportation vehicles and interacting with without harvesting them) that make them more aggressive

Consultation:

The idea for this information to be shared with NWMB was first proposed by Pamela Wong during KRWB's Annual General Meeting in Kugluktuk from 19–21 October 2021. During that time, the Board agreed that they would follow-up on this topic over teleconference. During a teleconference meeting on 27 October 2021, KRWB decided to submit this summary as

information for consideration by the NWMB. This memo was reviewed and validated by the Executives on 3 November 2021.

Recommendation:

Consideration of IQ and Inuit perspectives when interpreting narratives about polar bears, research data on polar bears, and bear management; inclusion of social, cultural, and economic impacts to Inuit in bear management and population assessments.

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Date:

5 November 2021

INUIT QAUJIMAJATUQANGIT OF GULF OF BOOTHIA POLAR BEARS

FINAL REPORT

23 February, 2021

Nunavut

P.B.Y. Wong
Trailmark Systems Inc.

Report for Department of Environment
Box 209, Igloolik, NU, Canada X0A 0L0

Gjoa Haven Hunters and Trappers Organization, Gjoa Haven
Spence Bay Hunters and Trappers Organization, Taloyoak
Kurtairojuark Hunters and Trappers Organization, Kugaaruk
Aiviq Hunters and Trappers Organization, Naujaat
Igloolik Hunters and Trappers Organization, Igloolik
Hall Beach Hunters and Trappers Organization, Hall Beach

Disclaimer

Inuit *Qaujimajatuqangit* and traditional knowledge of Indigenous peoples are intellectual property and, hence, protected by national and international intellectual property rights on Indigenous peoples. Inuit reserve the right to use and make public parts of their Inuit *Qaujimajatuqangit* and traditional knowledge when and as they deem appropriate. Use of Inuit *Qaujimajatuqangit* and traditional knowledge by any other party does not imply a full understanding or experience of such knowledge, nor necessary support by Inuit for the activities or projects under which the knowledge is used, whether in visual, aural, written, digital, and/or other media formats.

Acknowledgements

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1. Summary

In Nunavut, both science and Inuit *Qaujimajatuqangit* (IQ) support co-management decision-making. To complement their recent scientific assessment of the Gulf of Boothia polar bear subpopulation, the Government of Nunavut Department of Environment contracted Trailmark Systems Inc. consultants to conduct an IQ study led by Inuit communities who harvest polar bears from Gulf of Boothia. From May to August 2020, we interviewed active hunters and elders from Gjoa Haven, Taloyoak, Kugaaruk, Naujaat, Igloolik, and Sanirajak remotely to document their knowledge of polar bear ecology, population changes (including relationships to humans), and management perspectives and considerations. In-person interviews were not possible due to social distancing and travel restrictions resulting from the COVID-19 pandemic. Interview participants reported increasing bear numbers, females and young bears, and bear encounters. Interviewees also described how they make inferences on population changes. Interviewees were concerned about harvest regulations that fail to take into account increasing bear numbers and human relationships to bears, from a cultural perspective. An appreciation and better inclusion of IQ is needed in bear management, which will inform how decision-making impacts animals, as well as the livelihood of the communities who co-exist with them.

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ᓄᓇᕗᒻᒥ, ᑕᒪᒃᑬ ᖃᐅᔨᓴᕐᓂᑦ ᐊᒻᒪ *ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᑦ* ᐃᑲᔪᖅᑐᑦ ᐊᐅᓚᑦᑎᖃᑎᒌᖕᓂᕐᒥᒃ ᐋᖅᑭᒍᑎᒃᓴᓕᐅᕆᓂᕐᓂ. ᐱᓪᓗᐊᑕᐅᓗᒋᑦ ᒫᓐᓇᓕᓴᖅ ᖃᐅᔨᓴᖅᑎᓄᑦ ᖃᐅᔨᓴᕐᓃᑦ ᐃᑉᐱᒋᓴᐅᑉ ᐃᒪᖓᓂ ᓇᓄᐃᑦ ᐃᓚᒃᑲᓐᓂᖏᑦ ᐅᓄᕐᓂᖏᓐᓂ, ᓄᓇᕗᒻᒥ ᒐᕙᒪᒃᑯᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᖏᑦ ᐊᖏᖅᑎᒌᒍᑎᒃᑯᑦ ᐱᓕᕆᑎᑦᑎᓪᓗᑎᒃ ᐃᒡᓕᓂᓕᕆᔨᒃᑯᑦ ᐊᑐᖅᑲᑦᑕᖅᑐᓂ ᐱᓕᕆᔾᖕᒋᓐᓂ ᐱᓕᕆᐊᖅᑲᖅᓗᑎᒃ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᓐᓂ ᖃᐅᔨᓴᕿᑎᒃᓴᓂᒃ ᓯᕗᓕᖅᑕᐅᔪᖅ ᐃᓄᐃᑦ ᓄᓇᓕᖏᓐᓄᑦ ᓇᓂᐊᖅᑲᑦᑕᖅᑐᓄᑦ ᐃᑭᖃᓴᐅᑉ ᐃᒪᖓᓄᑦ. ᒪᐃ ᐊᒻᒪ ᐊᐅᒍᓯ 2020-ᒥᑦ, ᐊᐱᖅᓱᓚᐅᖅᑐᒍᑦ ᐊᖑᓇᓱᒃᑎᐅᔪᓂᒃ ᐃᓐᓇᑐᖃᕐᓂᓪᓗ ᐃᖃᓗᒃᑑᑦᓯᐊᒥ, ᐅᖅᓱᖅᑑᒥ, ᐊᒻᒪ ᑕᓗᕐᔪᐊᓂ ᓄᓇᖏᓐᓂ ᑎᑎᕋᓕᐅᕐᓗᒋᑦ ᖃᐅᔨᒪᓂᖏᑦ ᓇᓄᐃᑦ ᐆᒪᔪᑦ ᓇᔪᒐᖅᑲᑎᒌᖕᓂᖏᓐᓂᒃ ᓯᓚᖅᑲᑎᒌᖕᓂᖏᓐᓂᒡᓗ ᖃᐅᔨᓴᕐᓂᖅ, ᐅᓄᕐᓂᖏᓐᓂ ᐊᓯᔾᔨᖅᑐᓂ (ᐃᓚᐅᓪᓗᓂ ᐃᓄᐃᑦ−ᓂᕆᔪᑎᑦ ᖃᓅᖅᑲᑎᒌᒃᐸᖕᒪᖕᒌᑕ), ᐊᐅᓚᑦᑎᓂᕐᒧᓪᓗ ᐃᓱᒪᒋᔭᐅᔪᓂᒃ ᐱᖁᔭᐅᔪᓂᒡᓗ. ᑕᐅᑐᖅᑲᑦᑕᐅᑎᓗᒋᑦ ᐊᐱᖅᓱᕐᓂᕐᓂ ᐊᔪᕐᓇᓚᐅᕐᒪᑦ ᐱᔾᔪᑎᒋᓪᓗᒍ ᖃᓂᒃᓴᓇᐊᖅᑲᖏᓐᓂᖅ ᐃᓅᖅᑲᑎᒥ ᐊᐅᓪᓚᕐᓂᕐᒧᓪᓗ ᑭᒃᓕᖅᑲᖅᑎᑕᐅᔪᓄᑦ ᐱᑎᑦᑎᔪᓂᒃ ᓄᕙᒃᔪᐊᕐᓇᖅ−19 ᐊᒥᓱᓄᑦ ᖃᓂᒪᓐᓇᐅᔪᒧᑦ. ᐊᐱᖅᓱᖅᑕᐅᔪᑦ ᐅᖃᖅᓱᑎᒃ ᓇᓄᐃᑦ ᐊᒥᓱᕈᓇᐊᕐᓂᖏᓐᓂᒃ, ᐊᕐᓇᓪᓗᐃᑦ ᐊᑎᑦᑕᓪᓚ, ᓇᓄᖅᓯᓐᓇᕐᓂᕐᓗ. ᐊᐱᖅᓱᖅᑕᐅᔪᑦ ᓇᓗᓇᐃᖅᓯᕆᓪᓗᑎᒃ ᖃᓄᖅ ᑐᓴᖅᑕᒥᒃ ᐃᓱᒪᑖᕐᕕᖃᖅᐸᖕᓂᕐᒥᓂᒃ ᐊᒥᓲᓂᖏᓐᓂ ᐊᓯᔾᔨᖅᑐᓂᒃ.

ᐊᐱᖅᓱᖅᑕᑦ ᐃᓱᒪᓘᑎᖃᕐᓗᑎᒃ ᐊᖑᓇᓱᒃᑕᐅᔪᓐᓇᖅᑐᑦ ᒪᓕᒋᐊᓕᖕᒋᓐᓂ ᐊᑐᖅᑎᙵᒋᕐᓗᒍ ᐊᒥᓱᕈᓇᐊᖅᑐᑦ ᓇᓄᐃᑦ ᐃᓄᐃᓪᓗ ᖃᓄᐃᓕᐅᖅᑎᕐᒋᑦ ᓇᓄᖅᓄᑦ, ᐃᓕᖅᑯᓯᒃᑯᑦ ᐃᓱᒪᒋᔭᐅᔪᓂᒃ. ᖁᔭᓕᔾᔪᑎᖃᖅᓂᖅ ᐃᓚᐅᑎᑦᑎᑎᐊᖅᓂᖅᓗ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᕐᒋᓐᓂ ᐱᔭᓇᐊᓕᒃ ᓄᓇᖅᓂᒃ ᐊᐅᓚᑦᑎᓂᖅᓂ, ᓇᓗᓇᐃᖅᓯᓇᔭᖅᑐᒥᒃ ᖃᓄᖅ ᐋᖅᑭᒍᑎᑦᑎᓂᖅ ᐊᒃᑐᐃᓂᕐᒐᓂᒃ ᓂᕐᔪᑎᓂᒃ, ᐊᒻᒪᓗᑦᑕᐅᖅ ᐆᒪᓇᑦᑎᐊᖅᓂᖅ ᓄᓇᓕᖕᓂ ᐱᑕᖅᑲᖅᓯᐅᑎᒋᔭᖕᒋᓐᓂ.

Naittuq titriaq

Nunavutmi, tamatkiknik naunaiyainiq tamnalu Inuit *Qaujimajatuqangit* (IQ) ikayuqtuqtai aulattiqatigikniq ihumaliurutit. Ilagiaqnianut tapkuat qangahaq nainaiyainiqmun qauyihaqni tahamna Tariunga Boothia nannut amigaiqatigikni, Tapkuat Kavamatkut Nunavut Timinga Avatiliqiyit kanturaqtitat Trailmark Systems Nanminilgit qauyimayiuyut havarininut tamna Inuit Qaujimajatuqangit (IQ) naunaiyaut hivuliqtat Inuit nunaliuyut angunahuaqpaktai nannut tahamanga Tariunga Boothia. Talvanga May tikitlugu August 2020, apiqhuqtavut angunahuaqpaktut inutuqatlu talvanga Uqhuqtuuq, Taloyoak, Kugaaruk, Naujaat, Igloolik, tamnalu Sanirajak ungahiktumin titiqhugit ilihimani nannut uumatyutai, amigaitni allanguqni (ilautitlugit piqatigikni inungnut), aulatyutitlu tautuquqnit ihumagiyaunilu. Tautugutiplutik apiqhuinit ayurnaqmat piplugu inungnut qaglivalaqtailinit aularniqmutlu pittailitit taphumanga Qalakyuarniq-19 aaniaqyuarniq. Apiqhuqtauyut piqatauyut tuhaqhityutai ilagiaqni nannut qaphiuni, aqnalluit piarahangugaluitlu nannut, nannutlu apquhaqtauyut. Apiqhuqtauyut unniqtuqmiyai qanuq ihumakaphukhutik amigaitniqnut allanguqni. Apiqhuqtauyut ihumaaluktut angunahuaqtauni maligait pingitai ihumagiqahiutini ilagiaqni nannut qaphiuni inungnutlu piqatigikni nannut, ilitquhiliqutit ihumagiyaunit. Quyagiyauni nakuuhivalliqnilu ilaliutyaqni Inuit Qaujimajatuqangit (IQ) piyalgit nannut aulatauni, tapkuat tuhaqhitauni qanuq ihumaliuqni aktuanit angutikhat, tapkualuttauq inuuhigigutai nunaliuyut uumaqatigit tapkununga.

2. Introduction

Accurate and reliable information on polar bear population status and trends are necessary for decision-making in polar bear management. Collaborative polar bear management among the Nunavut Wildlife Management Board, Government of Nunavut, Department of Environment (GN DOE), Nunavut Tunngavik Inc., Regional Wildlife Organizations, and Hunters and Trappers Organizations (HTOs) in Nunavut focuses on ensuring populations are viable so that Inuit can continue to harvest polar bears, in part through harvest regulations (e.g., Total Allowable Harvests [TAH] and non-quota limitations). Both conventional science and Inuit *Qaujimajatuqangit* (IQ) contribute to this process.

IQ includes knowledge of wildlife trends, as well as the values, opinions, concerns, traditional management practices, and perceived impacts to harvesting and livelihood that are held by Inuit (Wenzel, 2004). This unique characteristic of IQ differentiates it from conventional science, which tends to focus on wildlife data at the exclusion of human relationships and values. Incorporating IQ in polar bear management supports “Inuit harvesting rights and priorities and recognizes Inuit systems of wildlife management that contribute to the conservation of wildlife and protection of wildlife habitat” (Nunavut Agreement, Article 5). Documenting and using IQ require the direct inclusion and guidance of IQ holders in formulating research questions, analysing and validating results, and interpreting and presenting data (Wenzel, 2004). Culturally appropriate research methods are systematic yet informal and based on respectful communication, narrative discourses, subjective and personal engagement, and unhurried meeting styles (Ferrazzi et al., 2019).

GN DOE recently completed a biological survey and data analysis of the Gulf of Boothia polar bear subpopulation (GB; Fig. 1; Dyck et al., 2020). To complement this study, GN DOE sought to obtain IQ information, and contracted Trailmark Systems Inc. (Trailmark) Consultants to conduct an independent IQ study for the Gulf of Boothia, as well as M’Clintock Channel (Ekaluktutiak et al., 2020) polar bear subpopulations. The results from both scientific and IQ research may inform harvest recommendations to the Nunavut Wildlife Management Board—Nunavut’s main instrument of wildlife co-management. These data have the potential to guide TAH and management objectives for the two subpopulations. Here, we report on polar bear IQ documented from communities that harvest Gulf of Boothia polar bears.

3. Methods

We followed a grounded theory approach to guide this work, where hypotheses and patterns in information emerged inductively, without any pre-existing theory (Strauss & Corbin, 1994). This contrasts the deductive approach (Lewis, 1988) that is used in conventional wildlife science, where hypotheses are established and tested (Johnson, 2002).

Initially community visits were planned to conduct interviews with selected local knowledge holders. However, as the COVID-19 pandemic spread across Canada, we decided on an alternative and mutually agreed upon approach. A Trailmark consultant met remotely with Gjoa Haven, Spence Bay (Taloyoak), Kurtairojuark (Kugaaruk), Aivilik (Naujaat/Repulse Bay), Igloolik, and Hall Beach HTOs. HTOs suggested public community meetings be held in each community in March and April 2020 to document IQ. Trailmark staff drafted a list of guiding interview questions focusing on hunting experience, perceived population changes, knowledge of polar bear ecology, and management perspectives. This interview guide was circulated to each HTO and the GN before being finalized.

In March 2020, the COVID-19 pandemic restricted travel and community meetings were not possible. HTO staff suggested remote interviews over telephone and videoconferencing so that IQ research could continue. Because interviews occurred remotely and mostly through telephone, participatory mapping and GIS data collection was not possible; however, interview questions probed for place names to identify geographic locations when they were relevant for the discussion. HTO staff recruited all interview participants for their hunting experience, breadth of knowledge, and familiarity with polar bears, bear hunting, and hunting areas (i.e., purposeful sampling [Marshall, 1996]).

We interviewed participants in a semi-directive manner (Huntington, 1998; Huntington, 2000) remotely from May 21 to August 10, 2020. We interviewed five Taloyoak participants individually over Zoom videoconferencing. We interviewed all other participants over telephone: five as a group and one from Gjoa Haven; three from Naujaat; three from Igloolik; and five from Sanirajak (Hall Beach). Because interviews occurred as a group discussion in Gjoa Haven, the resulting information was interpreted as perspectives of the entire group, rather than individuals. It was not always possible to distinguish who was speaking over the telephone, so we identified individual interviewee's quotations where possible, and otherwise denoted quotations with "unidentifiable Elder". We replaced identifying names with alphanumeric codes ("GH", "T", "K", "N", "I", and "HB" to denote Gjoa Haven, Taloyoak, Kugaaruk, Naujaat, Igloolik, and Hall Beach home communities, respectively) to protect participant confidentiality.

We conducted interviews in English, and interpreters provided translation between English and Inuktitut for four Taloyoak interviews, the group interview in Gjoa Haven, two interviews in Naujaat, and one in Hall Beach. We audio recorded and auto-transcribed interviews using Sonix transcription software (http://sonix.ai). We manually edited transcripts and analysed them using conventional content analysis, where common themes and categories were determined from the data (Hsieh & Shannon, 2005). We identified quotations that represented common themes and reported on them. Additional quotations are listed in Appendix 1.

We sent community interview summaries (English and Inuktitut) through email to each HTO. Because of travel restrictions and the limited time available for this work, HTO board members validated the results remotely instead of the participants for accuracy and representativeness for their community. In-person validations with each participant would have strengthened engagement and data analysis. Results need to be interpreted with this consideration in mind and any uses or applications of these results need to be approved by HTOs and/or interview participants.

4. Results and discussion

4.1. Participant hunting experience

Participant experience provided context to and reliability of interview data. In Gjoa Haven, one participant was an active polar bear hunter (had been polar bear hunting in the area this year) and the other four participants were elders (no longer actively hunting due to old age). These elders had harvested an innumerable number of bears over their lifetime before quotas were implemented; since then, they reported having been able to harvest only up to five bears due to limited access. In Taloyoak, three interviewees were active polar bear hunters. Two interviewees were elders and had not visited polar bear areas in the last 20 years.

In Naujaat and Igloolik, all interviewees were active hunters who had visited the Gulf of Boothia area (Appendix 2) in the last 3 years. In Hall Beach, three interviewees were active polar bear hunters; one interviewee recently stopped hunting but had been to hunting areas earlier this year; and the other interviewee was still actively polar bear hunting but had not harvested from Gulf of Boothia since 1999. HTOs recommended non-active hunters and elders for inclusion in this project because of their unique experiences, wisdom and/or historical knowledge of geographic areas.

4.2. IQ of polar bear ecology

Remote interviews occurred in the spring and summer and recruitment was challenging due to limited in-person coordination (HTO staff were on annual leave) and hunter availability. It is possible some interview participants did not feel comfortable sharing information openly over telephone. Some interviewees expressed a preference for face-to-face meetings, where additional contextual information could have been gathered (e.g., through participant observation).

Gjoa Haven and Taloyoak interviews also contributed to a M’Clintock Channel IQ study (Ekaluktutiak et al., 2020) and interviewees shared knowledge of both M’Clintock Channel and Gulf of Boothia subpopulations. Where possible, we distinguished the populations that interviewees referred to by geographic area. Gjoa Haven interviewees did not consider Gulf of Boothia their traditional hunting area and, as a result, focused most of their interview discussions on M’Clintock Channel (reported in Ekaluktutiak HTO et al. [2020]). Taloyoak interviewees harvest most of their polar bears from the Gulf of Boothia area and, conversely, focused most of their discussions on Gulf of Boothia bears. However, interviewees referred to polar bear characteristics broadly across both populations.

> The polar bears and animals don't have any boundaries. For example, on the map you set up a boundary or a line, and the hunters not supposed to pass that line. Well, the polar bear has no lines to cross. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June 2020; Ekaluktutiak HTO et al., 2020)

> The government sets boundaries right. Polar bears don't have boundaries. They go anywhere. (GH1, 3 June 2020; Ekaluktutiak HTO et al., 2020)

> Inuit believe that the Boothia Channel or Boothia population and the M'Clintock polar bear populations are the same. (GH2, 16 June 2020; Ekaluktutiak et al., 2020)

Interviewees indicated polar bears are curious animals and their behaviour varies from individual to individual.

> Mostly bears seem more personality than other animals. We know, we know other animals have different personalities. But the polar bears seem to have more, almost like in tune with human. (T1, 21 May 2020; Ekaluktutiak et al., 2020)

> The polar bears has its own inclinations, it's like some of them run away from the disturbance, some of them don't run away from the disturbance. (K1, 26 May 2020)

> They are different. Some very mean polar bears, some are not mean polar bears. Some polar bears are friendly, some polar bears are not friendly. I don't know why, just like a human being. (HB1, 23 July 2020)

They indicated younger bears are generally more curious and tend to be encountered on the mainland (versus open water).

> It's the younger ones that are coming more closer to town, like the younger ones, anything, any animal. Caribou, wolf, polar bear, they're more curious to see. And coming closer to town. But the older, older ones, there they know. They know more...like they're going to be hunted if they come closer, or they're going to be shot. But the younger ones, they're more curious. (Interpreter translating for N1, 16 June 2020)

> It's usually the older ones that always running away. It's the juveniles that are curious like human beings, they'll do stupid things as well. And they would come into camps wandering on and also to look at what's happening, like whether it's a dangerous area to go to or not. Like any humans, the young people would take chances to go into certain areas. Most of the bears that do come through the community are juveniles. Inside the ages of one year old to three or four years old. Those are the ones that are most nuisance. But the older ones always stay away from the communities. (I1, 13 July 2020)

Tulajuittuq, that's extra-large polar bear, live in the ocean. They hardly go to the land...big bears *tulajuittuq* harder to go around here, because I think there's too many polar bears...usually mother with the young cubs around mainland, people see them a lot and they hardly see big ones now because they protection is not to go to the main ocean because they were eaten by bigger bears. (I2, 10 August 2020)

Interviewees indicated polar bears prefer rough ice, where seals are more easily accessible.

In rough areas, the packed areas, they tend to be in that area. And when seals are giving birth it's pretty much all over you can see them. In that area where there's seal holes, breathing holes and that will usually be in April, May. (HB2, 23 July 2020)

They used to be more in the more rough ice...maybe there's more seal, because there's more snow back in the more ice, and the rough ice. So, the snow builds up on the rough ice. (HB3, 23 July 2020)

Interviewees also reported polar bears prey on a range of species, including other polar bears.

They go after bearded seals and other sea mammals but when they're hunting for them, when they see other polar bears, cannibalism comes into play to due to hunger. (Interpreter translating for HB4, 29 July 2020)

Interviewees indicated polar bears can be encountered all year round.

Mostly summertime, when we're boating, they’re on our shore. And in the fall too, they're on the shore, and some in the water. Sometimes we hear [about] them miles from land, swimming. And fall time there's quite a bit near our hometown now. Wintertime, there's less to see, and early spring, you can see them on the sea ice. I mean the sea ice, yes, and there is more [captured] on the sea ice near where I go. And they, all winter, I think they stop moving, I don't know, maybe they go down to the ice, moving ice, pack ice. (N2, 15 June 2020)

Some interviewees described seasonal patterns in feeding, distribution, and denning.

In the summertime, when they're swimming along, they get fatter, they eat more. I know that they eat more, refuelling. And in the wintertime they're mostly in the den, some of them, and they get fat mostly in summertime 'cause there's more prey, their prey is ringed seal. And they would also need, I've seen some bears eating grass in the summertime, or even in the winter they dig the grass. (K2, 13 May 2020)

Polar bears are mostly noticed in maybe the open area, like open water area. Most polar bears go after seal in the water or on the ice for seal, make a hole in the ice all winter long. Polar bears, they tend to come in the area [south of] community in the fall time. Not so much in the springtime. They're more out north of us in the springtime hunting seal. (Interpreter translating for K3, 19 May 2020)

Normally polar bears den in the fall time through October, beginning of October, that's for the pregnant female. But the males tend to den through in November, which is a bit

> later than the female. But there are a lot of people that don't bother denning all through their winter. (Interpreter translating for K3, 19 May 2020)

Even though bears are known to travel across population boundaries (Ekaluktutiak et al., 2020), some interviewees described differences between M'Clintock Channel and Gulf of Boothia populations.

> In M'Clintock Channel where we studied, before the bears over there are mostly always skinny and the bears on Gulf of Boothia are fatter bears, healthy bears, and they're more yellow because they're healthy and over on the other side of the ocean is because they're more skinnier. They're fur is more white. (K2, 13 May 2020)

> I've always noticed the M'Clintock Channel's bears are not as aggressive as the bears in Boothia. But that may be due to the size of the populations because the bears I get from the M'Clintock Channel have a lot less scars. They don't look as beat up and they're healthier...whereas the bears in Boothia, they tend to have a lot more scars. I guess there's too much competition for food or they seem to be a beat up a bit more in Boothia. (GH2, 17 June 2020; Ekaluktutiak et al., 2020)

> Bears on M'Clintock Channel area seems to be more slender, less fat. And it's always been that way, they always heard of it. And it's still like that today. And for Gulf of Boothia, you have the open floe edge area behind Astronomical Islands. The ice would close up, freeze, and then through the cycle of the strong current following the moon, the ice would open up. And there's many seals. And wherever you have a floe edge or open water, there's known to be more seals and more bears in those areas. And that is the difference and we've known it for a long, long time. (Interpreter translating for T2, 21 May 2020; Ekaluktutiak et al., 2020)

Hall Beach and Igloolik interviewees also distinguished Gulf of Boothia from Foxe Basin polar bears by their migration patterns, body size, and how avoidant they are of humans.

> I think the Gulf of Boothia I see more bull, bigger bears, male bears than here in Foxe Basin. That's the only thing I could really discuss, the difference between Gulf of Boothia and Foxe Basin. I see more bigger bears over at the Gulf of Boothia. (HB2, 23 July 2020)

> The one around there, they are a bit more scared. And on this side, the Foxe Basin, they don't get scared much. (HB3, 23 July 2020)

> Gulf of Boothia they only migrate once a year and they go back up again to the Gulf of Boothia once they are down here, and there's a big difference between the Gulf of Boothia polar bear and the Foxe Basin polar bear, so polar bear from the Gulf of Boothia they migrate down to Foxe Basin, they migrate back when it by the fall time. But these Foxe Basin polar bears are just on the Foxe Basin area. (HB5, 27 July 2020)

Interviewees indicated bears travel between Gulf of Boothia and Foxe Basin management boundaries.

> The ones that come from Foxe Basin and Gulf of Boothia, they change places. Like the one from Gulf of Boothia goes to Foxe Basin and the one from Foxe Basin goes to Gulf of Boothia. Yes he can tell that the one from Gulf of Boothia who's been there for a long time, you can tell it's been there for a while because of the back of the palm of his hand and (running) out of skin from hunting too much. But he can, all he can see is that he sees them same. From Gulf of Boothia and Foxe Basin. (Interpreter translating for N1, 16 June 2020)

Information on polar bear ecology and behaviour, as well as patterns, is learned through hunting experience and travelling and living on the land. This knowledge is important for hunting success, as well as hunting shared prey.

> How I know there's seal is if I can find polar bear tracks on the ice. They're hunting there. If I want to catch seals, I will try to look for polar bear tracks. They are the ones that know seals more than we do. (I3, 27 July 2020)

4.3. Description of hunting

Interviewees described polar bear hunting using tags (Appendix 3). Other animals such as caribou, wolverine, wolves and fish are harvested in polar bear hunting areas. In the past, polar bears were harvested using dog teams.

> The dog teams be using to hunt harvest polar bear besides snowmobile because they know the polar bear then and they have a little bit of like not a sound at all, not like a machine. (Interpreter translating for HB4, 29 July 2020)

Today, polar bears continue to serve as an important source of accessible food, as well as clothing and income from their hide.

> Polar bears are very important because in those days, the polar bears were everything to us. The fur itself would be used for clothing or you know, as well as the meat which was never wasted. It is very important to us to this current time. (K4, 26 May 2020)
>
> Currently, with the polar bears, how important to people, it's like when we catch a polar bear, it’s very important about the meat, where there's meat. And in those days, they were always important and still today, still important because we Inuit eat lots of country food and meat, and so because of polar bears’ meat that's how important it is. And with the hide, with the polar bear hide, the skin, we used them too in those days, but usually we kept them...today, with the hide, we try and make everything with the polar bear hide and that's how important it is to us. (Interpreter translating for K5, 26 May 2020)

> Polar bears are used as a mattress or they can use them for a wind pants because the fur will never, ever absorb moisture. It just never absorbs moisture. So, it's the best thing for to use is as a mattress or a wind pants, for Inuit style wind pants. And the meat we eat, it's like baby pork ribs. (Interpreter translating for N3, 4 July 2020)

In this manner, hunters are knowledgeable of and select for certain bear characteristics depending on what they harvest them for.

> I prefer younger than older. I didn't believe my parents when they were alive, now that I'm older, I prefer younger bears, because the meat is more tender, but they mostly go for bigger polar bear so some people today...most of them always look for bigger bear. Like sport, lots of people, the hunters I call sport hunter, they want bigger ones and some people, most of the people they sometimes, when they see a bear, they don't mind them if it's sow [female] with cubs even though if they're same size, they just leave them and look for bigger ones. (K2, 13 May 2020)

> Polar bears or any animals, the meat, they taste better in the winter season than in the springtime and that is why nobody really wants to catch polar bear around the springtime season. (K4, 26 May 2020)

> If I want to go polar bear hunting, male or female, I'm going to shoot the fat one and the very clean fur. That's what I'm always after, I don't kill skinny ones and bad furs. So, I shoot, more like that, I shoot for food, young and clean. Not very often, sometimes, if I see a polar bear, I'll just shoot it and sometimes if I go to Gulf of Boothia, I have to choose what I want. One time I was going polar bear hunting to Gulf of Boothia I saw many polar bears and I never get one, I go back empty handed. (HB1, 23 July 2020)

Older, more experienced polar bear hunters are able to discern polar bear characteristics.

> There's two different hunters now, the older one that's been hunting for polar bears for long period of time, they learn about how polar bears move. They have different movements, male and female. So, they watch and learn about the bear to see if it's a male or female. But these younger one now too that are starting to just hunt. When they go hunt, they as soon as you see a bear, there's a bear, so they just shoot it without noticing or learning about the bear. There's two types, I would say. But the older hunters, they can for sure tell if it's a female, or a male...the young hunters, all they know is if it's a big one that must be a big male. But if it's a female size, it's really hard to tell. (Interpreter translating for N1, 16 June 2020)

Uses of polar bears have shifted and, as a result, so have hunting practices. Hunting for the sale of hides encourages hunters to select for bigger bears.

> We catch a polar bear by a big size. The bigger size it is, the height will add more money into it. The meat we keep but due to the fact of fundamentally speaking, like even *qablunaaq*, the white people likes to have a bigger—they like to have a big polar bear skin around their home so we do the same thing, you know, we try catch a bigger

> polar bear just because of the size of the hide that will you know, benefit. (Interpreter translating for K1, 26 May 2020)

> In more old bears, the polar bear skins are important for their pants, for the mitts, or kamiks. But now, only for few people use them now. So not much polar skin goes there now. (HB3, 23 July 2020)

However, fewer community members harvest bears for their hide today, due to their lower economic value.

> The polar bear hide is not very pricey around this time. Not too many people outside of Nunavut want to buy the hides of polar bear. Actually, there is a place where people sell down south for the polar bear hides and today's market is down. There's no interest in selling the polar bear hides to many people. (Interpreter translating for K3, 19 May 2020)

> Nobody wants the polar bear hide anymore, it's very cheap, that's why in Gulf of Boothia nobody goes hunting, maybe five years, nobody goes hunting so we got right now lots of credit in Gulf of Boothia, nobody goes hunting because of highest risk route and the gas is so expensive, the food is expensive, nobody wants to go spend the money for nothing. I mean last spring, three hunters went polar bear hunting from Hall Beach to Gulf of Boothia, they got three more polar bears. And so that's the first in maybe 5 years someone go hunting polar bears to Gulf of Boothia. (HB1, 23 July 2020)

Income generated from selling hides is usually reinvested into hunting. Today, the lower market prices for hides can no longer support increasingly expensive hunting supplies.

> When it's fat, they were eaten by the people and the fur, the pelt, was sold to the Hudson's Bay, I believe was the only place they sold furs anyway and it didn't cost very much. The last time I remember my mom, let's say my father caught one in early spring, and my mom did the fur, and she said, I remember she sold it for $40 at Hudson's Bay company. Later on, when I was a teenager, there were more bears. And people would sell the pelts and a good polar bear, a good size one would cost enough to buy a machine, like the early Bombardier machine. But those were really kind of small bills and one bear, let's say a small bill, were about $700, $800 for a machine, when I was a teenager. And people would buy a machine right away from the Co-op store or in order by the Hudson's Bay. Now, in the 90s, bears became more and in 2000, there were quite a bit around. So, I think the price went down a bit and then it grew, but I think the folks know about it. It was just a fraction of what you earned from the bear skin to buy a machine, that's around $18,000 worth now. (N2, 15 June 2020)

Expensive hunting equipment and supplies can limit access to hunting.

> Not all of them have snowmobiles, all the equipment. Not a whole lot of people have the opportunity to go and catch a polar bear. (HB5, 27 July 2020)

> Oh my goodness, for my trip this past May it costs me just over $2000 out of my own pocket. You know, the gas is getting expensive, the grubs is getting expensive. All the bullets and whatnot are pretty much expensive. So, it's quite an expensive, would be an expensive hunting trip nowadays. That's what I experienced in May. It's quite far so you need other snowmobiles, like other guys that you need to go with too. So, it's a costly hunting. (HB5, 27 July 2020)

Hunting is also limited by employment.

> Most that are not working hunt polar bear either in fall or winter or like around this time, springtime. But whenever a person working, who has a full-time job just get a chance to maybe stay around on the weekend, they would go after that opportunity. (Interpreter translating for K3, 19 May 2020)

The practice of polar bear hunting alone is demanding and requires a lot of work to prepare and distribute meat.

> To be honest, catching a polar bear, a big game, is a lot of work and butchering the skin and preparing the meat and cutting up all the pieces into pieces. Make sure it's grabable for people to just grab without, you know, cutting themself a piece of meat. (HB5, 27 July 2020)

Polar bears can be harvested on the sea ice or land, depending on season and location.

> During the winter season we wouldn't have polar bears out on the sea ice. But during early fall about October November, we would catch polar bears, the ones that are mostly on the land. (Interpreter translating for K5, 26 May 2020)
>
> Everybody knows that bears can be in the ice or on the land, it's more like where you go hunting...on the ice is the best time because bears like to be on the ice most. But that [I have] hunted bears on the land. (N2, 15 June 2020)
>
> During summertime, you can catch a polar bear sooner than winter. During winter you're going to have to search for the polar bear. It depends on the season and it depends on the polar bear. (Interpreter translating for N3, 4 July 2020)

For Gjoa Haven (Ekaluktutiak et al., 2020), Naujaat, Hall Beach, and Igloolik communities, Gulf of Boothia bears are farther away than the other polar bear populations that they can access. Hunting in Gulf of Boothia areas requires considerable time, experience, safety precautions, and fuel.

> It's pretty far away from Hall Beach. Maybe the hunter is just going out for the weekend or spending the whole week over there. They really decide, oh well, they get first bear they see, or any bear that they see or if they're spending more time over, they will pick and choose which bear really like and really try to get the fatter ones. (HB2, 23 July 2020)

They want to go polar bear hunting on the other side it usually lots of food and lots of gas. So not much people go up there. (HB3, 23 July 2020)

The polar bears skin is too low now to sell the polar bear hide. That's the point and the point is the Gulf of Boothia is kind of far from our community. (Interpreter translating for HB4, 29 July 2020)

However, some community members prefer to make the trip.

I prefer hunting in the Committee Bay region [Gulf of Boothia] because it's quite a trip and also hunting caribou at the same time and taking my time and that's what my father used to hunt as well, so I think that's one of the reasons why I enjoy hunting more on Committee Bay area. Or the west coast of Melville Peninsula. And also, around Frederik Island and in that area. Normally there's a lot of bears there and I could choose what type of bear that I would want and mostly males, and also there is all kinds of bears around there. (I1, 13 July 2020)

The considerations and risks involved with polar bear hunting shed light on the deep relationships between Inuit and polar bears. Barriers to accessing Gulf of Boothia bears might explain why the quota for the population has rarely been filled (Dyck et al., 2020). However, polar bears continue to play an important role for community members from a cultural, ecological, and economic standpoint. This importance is an incentive to preserve traditions, gather knowledge, and learn how to hunt. Being able to access harvesting also permits younger hunters to learn how to hunt and, through selection, distinguish polar bear characteristics.

4.4. Changes in abundance

Interviewees reported an increase in the polar bear population in the last two decades. This change was noted in comparison to the distant past, when bear encounters were rare and more time and effort were required to pursue them.

When I was a child, polar bears were very scarce in the area. They've been scarce, not too many polar bears are spotted 50, 60, 70 miles around the area. One polar bear may have been spotted maybe [few times], once. Maybe four or five years at a time. Back then that was 1950s, 1960s. But today, there are polar bears being spotted in the area five miles, 10 miles 20 miles, something like that. (Interpreter translating for K3, 19 May 2020)

When I was a kid ‘till when I was a teenager, there was almost no bears. We couldn't see one for a whole year. And I do a lot of traveling, I did a lot of traveling with my parents anywhere on the winter and summertime. We didn't get any bears in summertime, fall time, winter when we travelled. Now, you will see them everywhere in the summertime. Summertime, fall time, even near town. And when I was a small,

> small kid I could walk around anywhere without a gun and my parents wouldn't even worry about me for the whole day I used to go out hunting. And like, talking [about] hunting, bear hunting. And my parents wouldn't even get worried about me and right now, you cannot even go camping without a dog or something or a tent. You have to have a cabin now if you go about, so many are out going camping...you can't get enough sleep because there will be bears when you're sleeping. There's bears all over right now. (N2, 15 June 2020)

> When she was growing up, she didn't really mind about polar bears or be concerned of them. But these days, these early 2020s, right now, polar bears are so many that she is scared for her grandkids now. That's her concern, is that there's too many polar bears now. Because when she was growing up, there was hardly polar bears that you can see, but now there are so many polar bears to be concerned of that because they're just coming to town. (Interpreter translating for N3, 4 July 2020)

The increase in bear numbers can be noticed when they gather during mating season. Hunters are also aware of these changes while traveling on the land over years.

> When we travel we see more bears. And nowadays we can see much bears when we are traveling, today we see them everywhere when we are traveling. (HB3, 23 July 2020)

> They gather more on the shorelines. And during mating seasons, pretty much in May, April, May, females are out more and so I would say that when it comes to mating season, they gather and once they gather, after that, they hunt and so once the solid ice is gone, they just go on the shore of the beaches, and you know not be solitary anymore and be with other polar bears. I guess that's also, perhaps something to do with the population increase too. (HB5, 27 July 2020)

Interviewees attributed the population increase to harvesting limitations.

> Due to the fact of the tags being placed after the tags being placed, that's how we see increasement of polar bears, now, more polar bears now because of the tags being in place. Now we cannot even catch a female polar bear with cubs because of the tags….hardly anyone is catching them nowadays and than in the past. (Interpreter translating for K1, 26 May 2020)

> They're like human beings. And in the past, back in the 1960s, the population of Inuit was very low and because of a better health system and also better food and welfare coming in, there's a lot more people. And exactly the same with polar bears. They're now being looked after and they're well looked after. There's not as many in the past, but now there's more. And that could be part of it. And the purpose of the quota system was to bring more bears in. And now we have more bears. (I1, 13 July 2020)

> In the old days, they don't have a quota and there is no law in the old days, if they see a polar bear with a cub, they kill it right away and use them for food or dog food, the skin, use it for clothing, and back in the 1970's, we got the quota system, we have a

quota in 1960's or the 70's so we are not allowed to shoot the cubs anymore so we never shot a cub, with a cub before. If we have to we shoot sometime for safety and now, they don't kill them anymore so the population is growing up. (HB1, 23 July 2020)

Interviewees also indicated that bears are aware of how human relationships to them are changing.

> The change is that's the bear seems to know that the females with cubs are not to be shot. So, they're coming, they're more coming to town. 'Cause they know they're not supposed to shoot the female and the cubs. But the big one, male one, they don't really come closer to town. The female ones are getting more. (Interpreter translating for N1, 16 June 2020)

> These days, there's more female polar bears with the cubs that's going to town because they're just being scared with loud bullets or being scared with guns not being killed. So, I think the females are used to getting to town because they're not getting killed when they go to town. But just being scared, so I think they're used to it now. Because polar bears in Naujaat goes right to our house under the steps. That's how bear is in Naujaat, like they go right under the steps. Or they’re just four feet away... her concern is that there's too many females now that are just being shot at, not killed, but being scared with those bullets that just crack bullet. So, they're used to being to town now and then they go, and then about a year later, they come back. With female cubs, with baby cubs. And the polar bears are very hungry when they get to town. (Interpreter translating for N3, 4 July 2020)

More females are being encountered on the land versus male bears.

> I seem to notice that there are a whole lot of females, more female than male. (Interpreter translating for K3, 19 May 2020)

> I think I see some little bit of changes here on polar bears regarding the genders. I like to say that there's more female polar bears now than male polar bears. That's what I see. (K4, 26 May 2020)

Some interviewees added they can distinguish gender by observing tracks, body shape, and behaviour, as well as taste.

> We're not allowed to get bears with small cubs anymore. I see more females; I can tell by the tracks 'cause I can tell by the track now. I don't like calling myself an elder, but I know just by looking at the tracks. I could even tell these boys that's a female and male. Young male, female, so I've seen more female tracks than young male bear so I think there's more female than male these days. (K2, 13 May 2020)

> It's really easy to tell when there's a female or a male because of the feet, you know their feet, and the female polar bear has longer neck. (K4, 26 May 2020)

> The female polar bears' meat, it's tender than the male polar bears' meat. The meat of the male polar bears'...after you cook the meat, it tends to be stone hard. With the female polar bear, when you boil the meat, it's more tender, and it tastes more better. (K4, 26 May 2020)

> Males are more skinnier now, and females I guess they save their energy and the males tend to be more aggressive than females. And that's how we recognize them. (HB5, 27 July 2020)

Interviewees reported seeing more young bears.

> There seems to be more younger polar bear than older polar bears in the area...hunters go for more big male bears than the younger bears. But nowadays, people seem to go for the younger polar bear for their meat, for they're tender, like the meat that's from a younger polar bear. (Interpreter translating for K3, 19 May 2020)

> Seems like the smaller, younger bears are very many and easy to see. (Interpreter translating for T3, 21 May 2020; Ekaluktutiak et al., 2020)

> The younger ones seem to have increased due to the fact that we don't have to hunt them with their mother and so they're leaving their mother even on a very young age, like two years old, when they're supposed to be still with the mother, and I see them more often rather than the adults one. (HB4, 29 July 2020)

Females with more cubs are being observed, as an indicator that the population is increasing.

> We always see a sow [female] with three cubs instead of just two or one. These days we see more sow with three cubs...every year...every summer. When I was boating, we see sow with—we see four polar bear, mother with three cubs...it was more than one day and different bears. We saw about 10 bears in one day. And about two of them had three cubs and the others had two...in the late 90s we start seeing them, summertime, every summer when we're boating, we see polar bears down there at the bay. (K2, 13 May 2020)

> In summer, I notice there's more mother bears with a family. And more younger, younger bears around. I see quite a bit of a young bears in summertime now. (N2, 15 June 2020)

> In my late teens I would see a mother with two cubs mostly. But now, three years ago, I saw mostly, two or three years ago now, I see some with three cubs. Three cubs now. I think that there's more—I never saw a bear with three cubs when I was a teenager. (N2, 15 June 2020)

Interviewees reported polar bears going into meat caches is indicative of a population increase, as this behaviour was rarely observed in the past.

> In the summertime, people may have caches in the area like 30, 20 miles out of the community and polar bears will smell that animal buried there and they'll find where it is. That's one of the reasons that polar bears are coming, come near the community area, and other times they might be smelling the garbage dump. That's never often that go into the garbage but once in a while. (Interpreter translating for K3, 19 May 2020)

> The way I found out the polar bears are increasing is by like, when we cache the meat every year, and when we go out to go get our meat that our cache we can, in those days, those cached meat would be still there and when we get them. But in recent time, recent years, when we go get our cache meat, they're all been eaten by polar bears because the polar bears are increasing and that's where we find out that there are more polar bears now. (K4, 26 May 2020)

> We don't bury, leave the meat, get it after because there are so many polar bears now. So, before that, when we get here, we used to cover with all the rocks and then get it in wintertime. We can't go that way nowadays, Igloolik area, too many polar bears nowadays. (I2, 10 August 2020)

Hunting success was considered an indicator that the population is increasing.

> I'm a bear hunter and when I was young, we would be out for more than a week and sometimes we'd go home with no bear. But these days hunters go out, look for bear, and come same day. Hardly anybody ever overnight out there anymore. Only mostly me, when I'm out, I like to be out on the land. (K2, 13 May 2020)

> When the quota system opened and people were told that so many bears had to be caught once a year, so many of them, they put a number. And then people would be out hunting, and they would not find any. Keep looking for one until end of the season. I think we've been quite lucky for us to finish all the quotas. Now there's too many that actually comes to the community, which we hardly ever heard of before. We definitely know that there's more bears along the shorelines than ever before. And in the past, there was hardly any. (I1, 13 July 2020)

Interviewees expressed that shared observations among hunters confirm validity.

> He can say that the bears are coming more to, closer to town, and we look at the radio so other from this community to different community, he talks with a lot of people. So that's the same thing that they're saying, that we can see bears more, closer to town, and everybody is noticing that there are more populating. (Interpreter translating for N1, 16 June 2020)

Interviewees from all communities were in agreement that numbers of polar bears are increasing. Hunters shared unique observations that they have made over time to make inferences on population trends. These indicators provided insight into Inuit knowledge formation. Interviewees also shared information on polar bear population changes within the

context of impacts to hunting and land use; population changes are inseparable from human relationships.

4.5. Changes in distribution and behaviour

All interviewees reported polar bears are more frequently encountered in and around communities in recent years.

> Some years are bad for bears coming into the community, and some years are okay. And she know that, they will come into the community again. Especially the young juvenile bears, the young cubs. They are very plentiful. (Interpreter translating for T4, 21 May 2020)
>
> To my knowledge about polar bears coming into the community, 20 years ago, today, there are more polar bears now coming into the community, maybe because of the scent of seal of the community garbage dump, they might smell some kind of an animal or a carcass around town [I think]. There's more polar bears now coming into the community than before so that's how I see the changes. (Interpreter translating for K5, 26 May 2020)
>
> Bears used to be around the floe edge all the time 'cause that's where there are good seals and hunting area. But now they're more spotting dead animals or unfinished harvest. So, they're used to be more at the floe edge, that was their environment. But now they're everywhere. They're on land near the community. (Interpreter translating for N1, 16 June 2020)

Interviewees were particularly concerned about human safety while camping on the land.

> I have concerns about polar bears, especially around time of the year they start to come around closer to the community...specific to people they're very dangerous because they sometimes can destroy or kill a human. (K4, 26 May 2020, Kugaaruk)
>
> If I were to go out camping near town or just out there on the land, currently it's more riskier now to camp inside an igloo or a tent because there is so many polar bears that always migrates from one place to another. To me, right now, I think to be in the camp, it's more appropriate to have a cabin, sleep in a cabin, than a tent or an igloo. Because of the population increasing that dramatically. (Interpreter translating for K5, 26 May 2020)
>
> It changed right now. Even though if I go to caribou hunting, I have to bring my own bag for safety or take some safety stuff for polar bear. Right now, it's very uncomfortable on the tent right now, even though not too far from here. Every year, I don't know how many years, I've been traveling towards the Repulse Bay area to hunt narwhal or polar bear. Every time in the 1980's, 1990's and 2000's, every time I go travelling, polar bears everywhere on the shoreline. They are growing up right now, lots of polar bears right now. (HB1, 23 July 2020)

In the past, dog teams could keep bears away.

> There's barely any more dogs, like traditional dog sleds, so that's something that there's no more dog watch for polar bears. And the dumps are so close to the community that polar bears now by dumpsters and that's her reason why she's thinking polar bears are coming to town. (Interpreter translating for N3, 4 July 2020)

Today, polar bears are more aggressive and no longer afraid of human activity.

> Our polar bears are not so afraid anymore in the community. There's some kind of an interaction with the environment, the polar bears are not really afraid to come into the community anymore, although there is so much traffic or so much activity happening in the community, when they hear any kind of noise in the community, the polar bears aren't afraid to come to town no more. (Interpreter translating for K5, 26 May 2020)

> They used to run away from people when I was a young person. Like walking along and a bear can see you, they run right away. They're scared of people. Now, they're more curious. They see people, they won't, most of them won't run away now. They stick around or try to figure out what you are. And they go to tents and they're not scared of tents anymore. (N2, 15 June 2020)

> Polar bears are just as human as they can show off. You know when humans are teenagers, they're active, very active and strong. And they can show or show off their muscles. Inuit, like humans, can do that, right. Polar bears are just like humans when they're young teenage polar bears, their super white, clean fur. The more white fur they have, that aggressive they are. When you see a polar bear, young polar bear going to town. They're just going to be as a young teenager who's showing off. 'I'm scary, I'm tough, I'm good looking. I'm bigger than you, I'm more powerful than you are.' That's how polar bears are when they're as young teenagers. They'll go to town and not be scared but show off everything with all their power. (Interpreter translating for N3, 4 July 2020)

Some interviewees indicated polar bears are more aggressive when there is a higher density of them.

> All polar bears vary, some of them are very vicious. Some of them aren't vicious. Some of them are, but yeah some of them are scary...to my knowledge I think they are more vicious now than in the past because of the population of the polar bears are increasing. There is more polar bears that are more. They've become more vicious. (K4, 26 May 2020)

Interviewees cautioned the increase in aggression is due to the lack of respect for bears by humans; interacting with bears without harvesting them is not considered respectful.

> Back then before the quotas, people, their rule was, if you're shoot a bear, don't just lose it, leave it, wound it. If you can catch it, kill it there. And before going out hunting,

> elders would tell the young ones, don't talk about bears, don't tease them, don't wound them and leave it. And that was their rule, so elders would tell the young ones not to tease anything about bears, so any animal. So, don't make fun of it, don't get it wounded. If you do, kill it here. And there was a lot of use for it. But now, if they would see it, trying to scare off a bear back then, the elders would see that, they'd be so angry about the person that you're just getting angry, that you're trying to anger the bear. Don't do that. Don't throw rocks or don't use bear bangers or things like that. (Interpreter translating for N1, 16 June 2020)

Interviewees described the impacts of bear research on polar bears.

> As soon as they started using those tranquilizers, and when they started using the quotas, that's when he started, two years. It's roughly there, in between there, the population for the bears were getting more. (Interpreter translating for N1, 16 June 2020)

> They make them go to sleep, that's when they seem to lost their mind. Like Inuit, we used to be good friend, don't steal, things like that, we used to listen to law. Until white guys come around, start drinking booze, start smoking marijuana, we lost our mind. We seem to be so crazy today. That's how the polar bears are too. So well, the quota comes, you are to kill one bear. So, if we see two, we kill the other one, and the other one is mad. They've always not do anything, start breaking cabins, rip the tents. There's so much today. It's so dangerous today. (N1, 16 June 2020)

Interviewees indicated polar bears are learning from and responding to changes in human behaviour towards them. Human-bear relationships are no longer in balance.

> Polar bears know that they are protected by something. They know. They are intelligent animals, no matter what animal you are. They, as if, know what people are doing. What guidelines, what policies and procedures, as if they know what's going on with the tagging system. (Interpreter translating for T1, 21 May 2020; Ekaluktutiak et al., 2020)

> We have a traditional old belief that polar bear can hear when we talk about them. (I3, 27 July 2020)

> Long years ago, polar bear were so afraid to people who were from the community, want the people, want anything, human belonging, like igloos or we don't like too close right now, so I will turn into a different person. In my view, polar bears are polluted. Their brain is no good now. They could come up to you and usually they will smell you because ocean is polluted and filth and poison. What they eat is brain damage them, so it's very much different right now, years ago. Sometimes, few times, when I see polar bears...I always say, ‘oh that's a good polar bear’...because nowadays, they see you, they likely to come to you, smell you around, that's different. So, I can say their brain is not same anymore. (I2, 10 August 2020)

Interviewees also indicated individual bears are distinguishable and the same bears tend to come into town.

> You can recognize polar bears. The polar bears keep coming back and forth. Once you let them run away, try and scare them, they're going to come back for sure. They will come back. They really come back and there's no other way that they're just going to come back. You have no other choice but to say they're going to come back because there's some meat there. And that's the only way. The only way. You can recognize polar bears as human beings; you can recognize them by their skin colour or they have a scar or how fat they are or how small they are. They are just recognizable. (Interpreter translating for N3, 4 July 2020)

Interviewees indicated the changes in polar bear distribution and behaviour is largely due to changes in how humans perceive, relate to, and interact with polar bears. Relationships with polar bears have shifted from harvest-based ones to research interactions and scare tactics. Increasing aggression and distributions close to communities are a result of polar bears learning from and responding to these shifts.

4.6. Polar bear health

Interviewees reported polar bears over the last 10 years have been generally healthy.

> This winter all the bears they caught were very healthy bears they got. Like fatty bears all of them...I never really used to see an unhealthy bear. To tell you the truth, all the bears. (K2, 13 May 2020)

> There's not much really changes in the health of polar bears. It's just like us, like a human being, we get sick and [here and there]. But I don't see a lot of, you know, big concerns in this area because they get sick and you know, they get healthy. (K4, 26 May 2020)

> You never will ever see an unhealthy polar because all of the polar bears are healthy. The only time they will see an unhealthy polar bear is when they age and they can't do hunting anymore. That's the only polar bear that you would see that would not be healthy or not normal because of their age. Because all polar bears are all healthy and very well hunters. You'll never see an unhealthy polar bear until they're aged like they can't do hunting no more. (Interpreter translating for N3, 4 July 2020)

Sick bears are rarely encountered, and interviewees can distinguish them by their body fat and fur colour.

> The only thing I can tell is when a polar bear might be look sick is when the polar bear haven't had anything to consume or to eat or hunt. It's when the polar bears like famine or something like that. That's the only time when he had seen skinny polar bear that looks sick. (K4, 26 May 2020)

> The way I can tell when the animal is sick is when the polar bear is really, really doesn't look a natural bear. The fur, it's skin or the fur itself may not look that usual, really

skinny, no fat. You know, that's how I would tell when a polar bear is sick...recently or currently I myself haven't seen the one like so many polar bears like that. (Interpreter translating for K5, 26 May 2020)

Interviewees indicated skinniness reflects poor hunting ability.

Came back to my late grandfather, like some hunters are skilful and lucky, and the others some hunters are not very lucky. He said it's the same thing with bears. The bears that are not very good hunters, they die of starvation, but it’s rarely happened, he said, if you know what I'm saying. Those bears are not very good hunter...rarely get skinny polar bear. And I think just when the scientist see something skinny and they say the bears are starving it's not like that. It's been like that for thousands of years here 'cause the bear is not a very good hunter, the polar bear they die of starvation. (K2, 13 May 2020)

Back then when they open up the polar bear hunt for Gulf of Boothia, they used to catch polar bears that are very fat and healthy, but now they're just mostly skinny now, cause they're poorly hunting now, the bears are poorly hunting. (Interpreter translating for N1, 16 June 2020)

Bears that had been previously handled for research are considered unhealthy.

They have a second thought of eating the bear, cooking it and eating it. And the colour of the bear doesn't look as good as another bear that never been tranquilized or doesn't have a lip tattoo. On any given day, they'd rather have a hunt a bear without a lip tattoo or anything. (Interpreter translating for T2, 21 May 2020; Ekaluktutiak et al., 2020)

Most of the ones that were caught were nice and fat and they seem healthy. But the ones that have tattoo and that, they tend to be skinnier. It's usually the older bears that have the tattoo and that, so could be because of age or that. But our elders that passed down were reluctant to have what was studied by scientists. They have tattoos and ear tags and that. And what, if they don't have tags or ear tags, or tattoos or ear tags; they a lot happier and know that they're healthier and they're less reluctant to consume it. (T5, 21 May 2020; Ekaluktutiak et al., 2020)

Polar bears have become drug addicts because once you're tranquilize them they’re nice and high and even though you put them away, about 20 miles away, they always come back to the dumpster because get another fix. So, they become drug addicts. And also, with the meat that we consume, there is absolutely no taste and a strange taste to the bear meat. We would throw those away right away because they had been tranquilized. The ones that had been tranquilized had very different taste, quite unique. And even though, I don't know for how many years they have been in their system, they stay in their system for so many years, we don't know. But in the past, we would throw away the meat. The meat is already spoiled. And it's been tranquilized. (I1, 13 July 2020)

One interviewee indicated radio collaring for polar bear research interferes with the bears' ability to hunt.

> The ones that have radar collars, they're usually not healthy, very skinny, and under the collar, people who have actually caught bears with collars, we don't take the meat, the meat just behind the head on the neck part where the radio transmitter is. It's usually very rotten and spoiled. Doesn't smell good. (I1, 13 July 2020)

Aggressive bears that enter communities were considered atypical and unhealthy to eat.

> He knows the meat is really different today. He think it's mostly from the fast food or [all the] food [that] we're eating from the dumps and stuff like that. The quality of the meat is more different from a long time ago. And he knows like some meat are still good, a lot of polar bears are still good. But he notice some of them, they're not as good as they used to be. (Interpreter translating for T1, 21 May 2020; Ekaluktutiak et al., 2020)

> When you have polar bear is aggressive more, it doesn't taste as much good, but when you spot a bear and it's not running away. And if you should shoot it there and kill it. That's when it tastes better. He notice, I mean, he can tell the bear hasn't been running, that's when it tastes better. If it's been running away and you have to chase it for a while, it doesn't taste too good. (Interpreter translating for N1, 16 June 2020)

While interviewees described indicators of poor health, they emphasized that polar bears are generally healthy. Unhealthy polar bears are rarely encountered. When they are observed, poor health is attributed to poor hunting or human handling for research.

4.7. Disturbances to polar bears

Interviewees reported pollution and noises (helicopters, snowmobiles, shipping traffic, and seismic testing) are the main disturbances to polar bears.

> Mostly people will disturb polar bears. And aircraft, helicopters. Helicopters will disturb the polar bear during the February season, hunters will disturb the polar bear...the sounds of the snowmobile and sound of the helicopter. (Interpreter translating for K3, 19 May 2020)

> The ships or vessels using the passage of the sea ice and how polar bears could be affected by some kind of a traffic through vessels are going through the sea ice. (Interpreter translating for K1, 26 May 2020)

> Probably main thing is the transportation. They are very aware of the sounds they're surrounded with I guess; I would say it's more of the transportational sounds or any human presence. (HB2, 23 July 2020)

Interviewees indicated these disturbances make bears more aggressive toward humans.

> They become more vicious because of there's traffic, vessels, air crafts flying over. Because so many traffics around these areas know where there's polar bears and [when they're] being interrupted with this kind of traffic [they have] become more vicious. And that's how I understand them. (Interpreter translating for K1, 26 May 2020)

Interviewees described changes in sea ice formation, thickness and consistency.

> Like in my younger years, I don't hear elders talking about the changing or the condition of the weather, you know, the condition of the sea ice. I haven't heard people talking about that very much, back then. But there was a few of them that already knew what will be happening in the future. And up to today that forecast has happened and it's already happened. And I don't know how elders would know the future of the world coming. (Interpreter translating for K3, 19 May 2020)

> I've noticed big time throughout my entire life that back then when the snow was melting, we used to get a lot of water on the ice. But nowadays snow melted just like that and it's supposed to get solid, but it just floats up and then starts to disappear. And it's a lot thinner nowadays. (Interpreter translating for HB4, 29 July 2020)

> I know Repulse Bay every year. So, there was ice floe edge, it's been down about 30 miles from here when I was young guy, and it used to be like every year about 30 miles everywhere...now it's about 15 miles, about half of the Repulse Bay, only 15 miles every year now. So, it's less sea ice. I think it's less sea ice now. But on the fast ice. (N2, 15 June 2020)

Interviewees indicated these changes contribute to increasing bear encounters, as polar bears are more frequently gathering along shorelines.

> The ice moves away a lot sooner and they usually end up on the lands. And they just following the shorelines to look for food. I think that's why we encounter them more. (HB2, 23 July 2020)

> The solid ice is disappearing easier sooner than we anticipate. And, you know, by the time they're hunting seal pups, the solid ice is disappearing, and I think that is also a factor too. (HB5, 27 July 2020)

Interviewees felt these changes are very unlikely to impact population sizes.

> With the ice changing and all that, I don't see any big changes to polar bears, you know, information ‘cause they move from, they migrate and they move from, they can swim, they can be on the ice and they can be on the land. With the ice being a factor, the ice condition, it is what it is but I wouldn't really see any changes on how polar bears could be affected by the condition of the icing. (K4, 26 May 2020)

> Polar bears would never be affected by the climate or no matter how the weather is changing, the universe is different. Polar bears will never be affected by the weather

> or no nothing. Because they can walk through a really thin, thin ice, they can be on the water for a long time. I don't think polar bears climate will never ever be affected with this weather. They're very wise and smart...white people are concerned that the ice is thinning, there is little thin ice now and polar bears can't survive in the ice, weather, because there is no more ice. She wants the white people to know that even if the ice is melting, the polar bears can survive in the ocean where there's water. And she's saying polar bears are super, super smart...they are good at everything. (Interpreter translating for N3, 4 July 2020)

Interviewees disagreed with reports on bears being impacted by changing sea ice; polar bears can hunt in open water for long periods of time.

> There seem to be a lot of concern about polar bears declining or being endangered or a risk of bears declining due to ice being thinner and that. Climate change is a big talk, and it's concerning some people, that talk about polar bears from the south. But polar bears are like sea mammals. They can swim for miles. They can catch seals. In the water even, even when there's no ice. There was a polar bear survey, and it wasn't talked about but one of the guys that was the helper was on the chopper or the plane, and they saw a bear right in the middle of the ocean between that area where Igloolik is and Gulf of Boothia. They saw a bear right in the middle of the ocean, holding a seal and eating it, like no ice close by to be seen. And some biologists and scientists think because there's no more ice, they'll have hard time harvesting seals, that's not so. Because seals do sleep in the water while they're floating, and they sleep. Anybody can walk up or go right close to a seal by boat while the seal is sleeping, floating, and same thing with the bear can catch up to, I mean [get] the seal while the seal is still sleeping in the water, it's floating, sleeping. So, some people don't know about that. They think that polar bear needs ice in order to catch a seal. They catch seal even if there's no ice to be seen for miles and miles. They're predators. They know what to do. (T5, 21 May 2020)

> When there's no ice I've seen bears, some bears [food] like seals on the shore. Eating seals on the shore that I'm pretty sure they caught, because there is no hunters around [miles] from here. And bears eating seals on pack ice. So, I don't know, what I'm thinking is even if the ice is gone, they'll be hunting on the shore for seals. Catching them in open water...on the shore we saw bears with freshly caught seals and baby seals in the summertime, when there is no ice and somebody said they saw a bear hunting a caribou on the island, that they caught up to and ate. And also, I seen them with beluga whales, I'm pretty sure they caught on an island, too, and I've seen them eating seals and bearded seals on the ice too, summertime. (N2, 15 June 2020)

> Believe it or not, in the Foxe Basin or Gulf of Boothia, the polar bear stay on the water for a month. They can stay on the water for a month, maybe two months. We got somewhere of August 'til, I mean of open water August 'til July, 'til October, late October, there's the freezing of the water, November. Right now, it's coming late and freezing water. So, they can stay on the water for two or three months without go in the land. (HB1, 23 July 2020)

Interviewees emphasized polar bears are persistent; they are intelligent animals and can respond to environmental and human impacts.

> They always said if the arctic doesn't, when the ice was melted, the polar bears are going to be died. I don't agree with them. I know the polar bears, they hunt even though if there is no ice, they always go hunting. They can swim, any kind of weather. (HB1, 23 July 2020)

> You would never ever decrease polar bears because they're very, very, very, very smart. And very independent, they're very wise. That's going to swim miles and miles and miles, and the elderly people always will say, or our culture, or our ancestors say that the polar bears are very wise, very smart. They can swim days after days on the ocean. They can dive under the water. They can live in the sea. And you still going to see polar bears that's gonna survive the hardest weather that you can imagine. So, she's saying that you'll never, ever see polar bears decrease. It's been like that since our ancestors as though they say polar bears have the power over anything. So yeah, you can't beat, or you can't decrease polar bears. No way. (Interpreter translating for N3, 4 July 2020)

Interviewees were not concerned about population declines. When asked about disturbances, transportation vehicles were considered threats, but only through impacts to presence/absence in an area or how polar bears behave toward humans.

4.8. Comparisons with scientific research

Community members shared their knowledge of polar bear behaviour and ecology. This information is important not only for hunting success, but also for safety and maintaining balanced human-bear relationships. Community members described the importance of polar bear hunting and how it has changed over time, as well as the challenges hunters must face today to achieve access to hunting and traditional practices. These contexts shed light on the impacts of harvest regulations on community members.

Community members indicated polar bears travel across management boundaries, which has been suggested through scientific research (Paetkau et al., 1999; Thiemann et al., 2008; Dyck et al., 2020). Community members also reported an increase in abundance, evidenced through unique indicators of population change. These observations are consistent with the recent scientific survey that reported Gulf of Boothia population as stable (Dyck et al., 2020). Increasing bear numbers was largely attributed to harvesting limitations, which has also contributed to more frequent bear encounters and aggression. Community members also reported increasing proportions of females and young bears, as well as encounters with larger family sizes due to harvest regulations; these observations are supported by empirical

reports of high reproductive indices for the population (Dyck et al., 2020) and scientific predictions under sex-selective harvesting (McLouglin et al., 2005; Taylor et al., 2008).

Community members considered polar bears healthy (in agreement with [Dyck et al., 2020]) and described threats as impacts to distribution and behaviour. Community members also reported sea ice changes that are consistent with empirical data (Barber & Iacozza, 2004; Stern & Laidre, 2016; Environment and Climate Change Canada, 2018; Dyck et al., 2020). Community members indicated sea ice changes have contributed to increasing bear numbers and encounters. Although the long-term impacts of climate change and reduced sea ice on Gulf of Boothia polar bears cannot be predicted with certainty (Dyck et al., 2020), community members emphasized the unlikelihood that populations would decline as a result. Community members cautioned polar bears are intelligent and adaptable animals and perceive changes to populations and behaviours as a result of how humans relate to them. In addition, communities voiced their concerns, considerations and recommendations for polar bear management and research, summarized below.

4.9. Management considerations

Harvest limitations have shifted how polar bears are valued (appreciated) by community members. Management decisions impact human relationships to polar bears.

> In those days before the politics and regulations were placed in, the polar bears were so very important to us and but after the policy, the regulations, like to catch a polar bear, it requires tags now. In those days they were so more important, although right now they're important, but with the policy the regulation placed in I like to think it was that they're not more important as much as before. Because of the tags. (Interpreter translating for K1, 26 May 2020)

Even without harvest limitations, Inuit historically practiced their own traditional forms of management; animals should not suffer, nor should they be overharvested; meat is shared and not to be wasted.

> Traditionally speaking, custom law about harvesting animals, our traditional speaking of custom that we have is, if you were to try to kill an animal and if you injure or shoot at an animal and you just injured it without killing it, there was a policy, Inuit law that we have. We have to make sure that we Inuit destroy the animal effectively. Make sure it's not going to suffer. You don't just shoot, or you don't just shoot at an animal, putting a wound, people just shooting it. If you wound an animal, no matter what we're doing, don't let it suffer. We have to kill that animal. That's kind of a system that we have. (Interpreter translating for K5, 26 May 2020)

> When you catch an animal and of course we open the meat, we treat the meat, but we try not to also overharvest animals because we don't want to waste all that meat. So, we have indications as well to hunt for food. Of course, he said earlier too as well that we have to feed dogs and feed the family members. But we try not to overharvest as well. That was another custom law that he would add. (Interpreter translating for K5, 26 May 2020)

> I hate wasting you know, I don't like to waste what I caught, so after my both parents deceased pretty much, what, five years ago, I said to myself, I'm not going to hunt big games like polar bears due to you know, the meat will be just wasted nowadays. (HB5, 27 July 2020)

Harvest quotas should be increased to reflect increasing bear numbers and encounters. More quotas will also support hunters who rely on hunting as a source of income.

> We need more quotas. I always need more quotas so if we get more quotas for Gulf of Boothia, it's alright because the sport hunters, they got lots of money and today only one sport hunter comes to Hall Beach. They gave us more money than if I go hunting a polar bear down to Gulf of Boothia, if I get one, I lost quite a bit of money for hunting. I know I'm not gonna get my money back for that polar bear. So, if we have one polar bear sport hunter, they pay a guide 3000, or if two guides $6000. And the dog team owner only gets more, and the big business probably get more money. So, it's a lot of money for the polar bear sport hunting. We need more quota for sport hunters. (HB1, 23 July 2020)

> My thought is we need more polar bear tags so there can be less polar bears...whoever out camping they get disturbance by polar bear more. (HB3, 23 July 2020)

> I would like to see the number of tags we are given, I would like to see included being allowed to catch a few more each year to control the population a little bit more. There are way more polar bears than when I was young. (I3, 27 July 2020)

Some hunters expressed a desire to hunt male and female polar bears throughout the year, for safety reasons and their own preferences.

> When the polar bear hunting season opens, and when it closes in the month of May, and after all polar bear tags are used up, and then there's no more tags, more polar bears come close by community or comes right into the community. And they come into the community at the wrong timing because polar bear hunting season is closed, no more tags and when polar bears are always vicious in the community nearby...polar bears don't have borders and they you know, they come near town, or they come right into town and when they come into town and when there's no tags placed anymore it would be nice to [get] that polar bear be destroyed because they're vicious, they're vicious animals when they come into town. That's the only area that I like to see improved. (Interpreter translating for K1, 26 May 2020)

> If they would open up the hunt, polar bear hunt season sooner before they start hibernating. November, December is when they start hibernating. And it would be a lot more fair if any bear that comes close to town that they can shoot the bear, even if it's a female. Male or female. Any bear that comes close to town. It'd be better if they can be able to hunt. (Interpreter translating for N1, 16 June 2020)

> I would like to see us being able to hunt them the whole year. At some point while I'm still alive, I would like to see that, not have particular dates. Our elders tell us that they taste good in fall, like late August, September. But we are only hunting that one date, polar bear hunting March, April, especially the male. Not so much the female but the male bears. (I3, 27 July 2020)

Hunters stressed that certain polar bears are aware of whether or not harvesting is a threat. Traditionally, bear characteristics were selected for during harvest as a form of population control. Current regulations do not take this practice into account.

> Once in a while when they get into town, even if they have cubs, even when they keep them in my town, they always destroy them right away. That's why there's hardly any threats here in Kugaaruk. 'Cause I know in the late 90s, my late uncle used to get mauled by a bear so after that, not very often but when they do come in town, we just destroy them, hunters destroy them and get tags for them. (K2, 13 May 2020)

> You are to kill that many males and that many females. That's really that's female, and more males to be killed. So, these big males don't bother much coming into town or wrecking things, are the ones that we are killing. (Interpreter translating for N1, 16 June 2020)

> They just go to town because they've done it before, so they're just used to it now. And males are killed, and they don't go to town. So only females and mother cubs go to town or communities. (Interpreter translating for N3, 4 July 2020)

Community members were concerned that management focuses too much on polar bear protection and not enough on human safety and livelihood.

> I have been to my cabin, they break in, break things, wreck the camps and all that. I've talked to HTO, they'll talk to wildlife somewhere, but nobody never paid for all those wrecked things...seems like it's okay for a person if they wreck my boat, or sometimes when you break down and you have to leave your boat behind, they get at it. Your tent, not by accident, you have to leave it. They wrecked it. Then you have to buy another tent...the government maybe cares about the polar bear that want to have more polar bears. Not to kill the polar bears, don't seem to care about people. You know, kill the person. Eat the person, it's okay. It seems like they're doing that...I'm not too happy about the law and the polar bears. Since the government put up a law and they can't do nothing about them breaking things. All they care about is not shooting them or trying to scare them away. These polar bears that have been scared away are so mad. So, we have lots of polar bears that are so mad. Make them go to sleep. Trying to

> scare them away. Banging them, or tricks like that, it seems like we're trying to get them more mad, so they are so mad today. (N1, 16 June 2020)

Community members disagreed with species at risk listings.

> They say polar bears are some kind of endangered species, but I do not. I would say, again, I disagree on that. If they need the proper information, they just tell them to come experience in the community and see it for yourself. That's the only concern that I have, I mean, I would say they're not on endangered species list. (HB5, 27 July 2020)

Narratives concerning polar bears and the management decisions they influence need to take into account and include Inuit knowledge and wisdom gleaned from experience. Inuit should play a larger role in managing the resources they have interacted with for millenia.

> The Inuit *Qaujimajatuqangit* knowledge that they've left, that their wisdom from the elders, and like I mentioned, that I grew up within elders. And so, my father used to say that even though scientists say that in the future they might say that polar bears will be endangered due to the fact for climate change, pollutions, and multi-year ice are disappearing. But there are also multiyear ice that aren't pretty much seen. And that's where the polar bears are also not counted too. And so that is also I would say, an unknown factor by the scientists. That elders have knowledge, even though they say that multi-year ice is disappearing, polar bears are very adaptable animals and so my father used to say that they're just like humans. But they walk on their four feet and we walk on with our two feet and they're pretty much like humans and they adapt very fast and so they know the currents they know their environment very well. And so, my father used to say, well, I guess there's a word that when it comes to something, don't just jump into a conclusion or what not. So that's what I'm sticking by with my old man's old words. These are the traditions that were let on and passed on to me and to you, the younger generation. (HB5, 27 July 2020)

> Looking at the law control by Inuit people, not from Ottawa, not from government. I think we should control more by the people who hunt, hunting people. But right now, it would be very difficult because the...system is too high, Inuit don't really like that, what white man is doing, just because it's white man it is true, but some of us Eskimo people, really some of them Inuit nowadays thinking we should control more animals than before, because we got rot bananas and apples from the store and can't get bears. Before that we didn't have anything, only we were given animals, so Eskimo, Inuit people, still trying to fight the law. I think it was fighting the white people most of the time, in my what I hear when I listen...before that, it was very different, the law, Inuit law, Inuit control, they were very different. Properly they were doing it, proper more than we doing right now. Without control by Ottawa, from Ottawa. So, if animal needs to control, I think those hunting, Inuit hunters should be running more. Inuit to Inuit, Eskimo to Eskimo. (I2, 10 August 2020)

Polar bear research should include IQ and Inuit participation. For example, surveys could be guided by Inuit knowledge of when and where bears are likely to be detected to reflect more accurate counts.

> Up on the Gulf of Boothia area he have noticed that when the sea ice, the solid ice, when it's disappearing, when it disappeared in the summertime polar bear swim more often. And by the time they're on the shoreline, I guess when their feet are cold, that's the time when they go on the shoreline and he have seen more polar bears on the shoreline, due to the fact that the solid ice has disappearing faster than expected. So, he'd like to probably make a recommendation that sea ice is disappearing fast, polar bears are on the shoreline more. And so, if there is any polar bear counting at this time of the year, whoever is dealing with counting to take off on the shoreline and take it from there. (Interpreter translating for HB4, 29 July 2020)

Community members criticized past surveys for not including local people and affecting meat quality and bear behaviour. This has contributed to a lack of trust in scientific methods and resulting management decisions.

> When biologists are in town, and you know, when they're counting the polar bears. They're not really hiring local peoples where locations are. You know, all these, all these knowledge are not associated with the communities since they know, they experience the land and the oceans and the sea ice where they are. Not just elders, but I have grown up in elders. And so, I pretty much know where the good hunting areas are thanks to my late father that I've been given this knowledge. And so, these can be, you know, worked on due to the fact that when they're tranquilize a polar bear it stays in the meat for quite a while. And so that was the concern that was given to me, and the meat becomes different. It becomes soft, all the way to the blubber. And so that was also a concern that they're not getting any fatter. Their population is decreasing. But there's community, more community sightings. And these are the only polar bears coming to town are the same polar bears. And so, the older polar bears are more, I would say, decreasing and young ones are more in the communities. And that's a concern to me nowadays too. Due to that the scientists say the ice is shrinking every year. And so that is also a concern to other hunters, elders. So, if they say they're endangered species I would disagree on that. They're not. The way Inuit culture it's not really familiarized by southerners. (HB5, 27 July 2020)

> When it comes to polar bear, I have not seen anyone going up to the helicopter. I mean, perhaps they have hired some kind of wildlife monitor, but I have not seen anyone who has that knowledge of polar bear migration routes, polar bear hunting areas and polar bear harvesting areas. All these matters are have to come in play when it comes to community, knowledgeable people. (H5, 27 July 2020, Hall Beach 2020)

> All those polar bears that researchers trying to figure out the weight, the height, the length, but they shoot it with the little needle, those are the main polar bears...they don't get scared at all to anything when the researchers shoot with that needle. (Interpreter translating for HB4, 29 July 2020)

Interviewees were concerned about losing access to hunting and with it, their traditional hunting practices.

> There is more people going out and they're not as observant as they were in the past. Because in the past, during my father's time, they were actually living off the land and observing, knowing the behaviour of animals, especially the polar bears. And the dogs were trained to look after them from bears and this is not a reality any longer. Since we have motorized vehicles like boats, snowmobiles, four wheelers, hunt with them and it's now totally different. And it is now harder for us to teach the younger generation how to observe animals, especially bears. The movement of animals and to show respect to the animals. There have been quite a few unnecessary kills of animals because of a lack of knowledge. And these knowledges have hardly been recorded...it is important for individuals to actually learn the behaviours of animals once they go out on the land. A lot of the hunters are complaining like myself, for instance, it's cost too much money now to go on a caribou hunt or a bear hunt. It's not worth it. So, a lot of these things are—we're in the transition period where a lot of these are disappearing and dying off. (I1, 13 July 2020)

Management decisions need to take into account the ecological *and* cultural relationships between Inuit and polar bears, which include hunting and land use practices. For Inuit, polar bears are viewed as intelligent, adaptable, and responsive beings. These considerations may shape how community members share information and/or approach management.

> If we speak of polar bears, we have to speak respectful of them, even though they cannot hear us, we're not with any polar bears anywhere. It's as if they know what we are saying, what we're talking about. We cannot say hopefully a polar bear can come so we can hunt a bear, they know their well-being, they're as if they know true spirit that what we are saying. (Interpreter translating for T4, 21 May 2020; Ekaluktutiak et al., 2020)

> The animals in Nunavut or our land are going to be wrecked or ruined by the government if we get so much rules from the government and we try and follow them. That's not how we used to deal with it, because the elders know how goes it is. If the government gets too much rules, the animals and the land are going to get ruined. (Interpreter translating for N3, 4 July 2020)

> We have to be scared of any animal that we are around. That's a big, big belief. Often, we would never make fun of any animal, and how much respect we have for each animal and so much for the bears, how powerful they are. We will never make fun of them and never ask to see one. Because we have a big superstition that if we do ask to see one, we might come across one when we are not in a safe situation. There's a few men I know that have been attacked and are still alive telling us that they are very, very powerful animals. We fear them all the time. There's big respect for them. (I3, 27 July 2020)

Still, some interviewees praised co-management efforts and decisions.

> The HTO and in the Environmental Department are doing a great job in doing the polar bear population. Maintaining the proper bear population in Nunavut. (Interpreter translating for K3, 19 May 2020)

> Having this tagging system as well as policies, procedures, laws in place. They are there for a reason. Management, no matter what it may be, in life, we have to abide by the rules. Because if there weren't...you know, things can deteriorate right away if they [weren't] in place. (Interpreter translating for T3, 21 May 2020; Ekaluktutiak et al., 2020)

> The numbers of tags for males and females are kind of consistent now, so he likes that area. (Interpreter translating for K5, 26 May 2020)

The concerns and considerations that community members expressed suggest Inuit engagement and involvement in polar bear research and decision-making processes have been inadequate. The cultural and traditional interactions between Inuit and animals need to be recognized and considered in management objectives. Management decisions impact polar bear populations, and—through their relationships with them—Inuit livelihood. These relationships can also guide scientific methodologies toward approaches that are respectful, yet effective in data collection. In addition, IQ can include unique indicators of population changes that could inform scientific models. A deeper appreciation and understanding of IQ through relationship-building and improved communication strategies with communities can also support collaborative knowledge co-production. Community engagement in this process should be guided and led by Inuit and their knowledge.

5. Summary

This study provided a rare opportunity for community members to share their knowledge and voice their concerns on the Gulf of Boothia polar bear subpopulation. Inuit have coexisted with polar bears for millennia; the knowledge that they have gathered across generations includes important information on polar bear ecology, which is important for human survival, as well as hunting success. Hunting practices traditionally included methods of selecting for bear characteristics and forms of population management; these practices have shifted over time as a result of contemporary forms of management in Nunavut. Community members reported increasing population numbers and encounters, which are a safety concern. Current harvest regulations fail to take these changes into account. Community members also criticized management and scientific practices for not including Inuit knowledge and perspectives, including important human-bear relationships, which has impacted how polar bears respond and interact with communities. However, the observations of population changes and activity reported here are consistent with scientific data. Better engagement and communications with communities within the context of bear research and management will cultivate more trusting relationships toward collaborative management.

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Appendices

Appendix 1. Additional quotations

Importance of polar bears

> Their foots, they're the best—one of best source of meat for the people and some people they use them for their wind pants and they're very useful for the people, and mitts. (K2, 13 May)
>
> Around April perhaps they have good hair. The hair is thick, and it's a good quality for selling. Seems like that's when, is good time. Even though fall is a good time, but their hair is not as thick. (Interpreter translating for T4, 21 May; Ekaluktutiak et al., 2020)
>
> They're important 'cause they're our regular diet. And [Inuit] of course, we have polar bear meat, we pray for them when the season's over to have that dietary. They're important to us too, they're part of our diet, so, regular diet, annually it's, we do pray for them...we also make the hide into our clothing as well so it's quite important to our community [and the people]. (T5, 21 May; Ekaluktutiak et al., 2020)
>
> Some elders prefer to catch younger ones because they're more tender, smaller bears. Some people prefer possibly more people prefer the large male bears. Of course, it's hard to find work up here and they do have some price in them, to sell them. (T5, 21 May; Ekaluktutiak et al., 2020)
>
> At this time today, it's pretty hard to sell a polar bear hide...we are not allowed to sell any hides anymore to the States. And to certain areas like the parts of the world, so that's why it's a lot harder to sell the hides. And if that, you know, if you can't sell the hides to the States, even the auction where we send it first down, they don't even be bought anymore. I sent a hide two years ago I have not seen nothing yet 'cause it hasn't been bought yet. (T5, 21 May; Ekaluktutiak et al., 2020)
>
> Many years ago, they used the fur, the hide for clothing as well as the meat for food. It is very important for our way of life and even for today, we still enjoy the meat. We share the meat as well as the hide. We still use it for clothing today. And we can also sell the polar bear hide and make money off of the polar bear hide to sell. (Interpreter translating for T1, 21 May; Ekaluktutiak et al., 2020)
>
> Today, polar bears are very useful to the people. The meat, of course, that we don't waste. We take the meat and with the hide today, we have to survive, you know, financially. And so therefore we sell the hide to be financed. And that's how we deal with, that's how we know about polar bears. (Interpreter translating for K1, 26 May)
>
> The best time of the year to go out for harvesting for polar bears is probably about October or November...because of the meat...the meat is more tender. (Interpreter translating for K5, 26 May)

Before I hunted bears, they weren't too important because for any person, there wasn't much bears around. We didn't see them anywhere, sometimes for a whole year. And somebody caught one or that one time, my father caught one. The meat was eaten if it was fat, if it was skinny, you just use it for dog food. (N2, 15 June)

There's a lot of ways, use for polar bear. Let's say I catch a polar bear, if that bear is fat, the whole community wants. They share it to the whole community, and the hide, since it doesn't cost a lot much more, they use it for clothing now. I mean, they've been using it for clothing, but since it doesn't cost a lot to bring it now, they also use it for clothing. (Interpreter translating for N1, 16 June)

It's to maintain traditional ways. Store bought food, that is pretty expensive, and it can last longer than the store-bought items and it is shared with the community and provides a little bit of income for their pelt. So, I see those two that's an important part of the community. (HB2, 23 July)

I was taught to hunt smaller bears. That's what I want, for bear are taking food and each year it's in the skin and some men prefer to hunt bigger bears to sell their hide for a higher price. (I3, 27 July)

Description of hunting

A lot of young people are very interested in harvesting polar bear. Whenever they get a chance. Or whenever their dad would allow that person to harvesting polar bear, depends on their dad or parents for the young person to go after the polar bear. (Interpreter translating for K3, 19 May)

March, April, that's one of the good times too but on the first day of opening day, October or November, it's more people like to go out. (N2, 15 June 2020, Naujaat)

Going up to Gulf of Boothia is further. But going down to Foxe Basin is not that far from here. (Interpreter translating for N1, 16 June)

Gulf of Boothia, the trail is not the best going one up there. So, they usually don't go there until the trail is much better. But when it opens up in Foxe Basin, that's when they finish all the tags right away. (Interpreter translating for N1, 16 June)

The best part for the polar bear skins are November and September. But the government gave us by-law to follow, so we just follow the by-laws of HTO or the government policy. What they gave us for quota. So, they're good all year round. They're a good. It doesn't matter what date they are, just the furs are the best on September and November. (Interpreter translating for N3, 4 July)

Sometimes I go caribou hunting and I've been in the rangers for a long time now. We have to check the unmanned radar site in the Gulf of Boothia area, so we've been traveling a lot to Gulf of Boothia. (HB1, 23 July)

All day. We start driving in the morning and we get there at 9. By skidoo. Yeah, first time when I went up there but that was dog team, so we took four days to get up there by dog team. (HB3, 23 July)

We have to travel to the other side of another peninsula. It's about, if you take your time, it's about six-hour ride. But if you pretty much all by yourself, it's a four-hour trip pretty much nonstop. And so, and it's quite far, but you've got to know the routes from here...to the coast of Gulf of Boothia. You've got to know the route and it's quite a distance. (HB5, 27 July)

Changes in abundance and impacts of harvest regulations

There's more polar bears after we start that tag thing, what what how you say it and we're and we're not allowed to catch too many bears I mean, after we start that tag system we get more bears now. (K2, 13 May)

Right back in the 70s, when polar bears are very scarce. The government made bylaw or a policy that hunting polar bear, [that] we can only solely by tag using a [death] tag for polar bears. That's what raised the population of polar bears...after the people started using tags, polar bear tags for hunting, the polar bear population increased. And I have so far, I have not seen any decrease after people started using tags to hunt polar bear. (Interpreter translating for K3, 19 May)

They're go out perhaps within the few hours. Getting a hold of a tag and taking off within a few hours there, they harvest their polar bears, if not, the next day. Due to the fact that the numbers of polar bears are so many now. They're so protected, you're unable to hunt the cubs or anything like that. And you're only to harvest so many a year. And that is the reason why he knows for a fact that there's many, many bears today. (Interpreter translating for T3, 21 May; Ekaluktutiak et al., 2020)

Today there are too many bears. Especially in the summertime camping out, boating, when you're camping or at your outpost camp [they are] guaranteed for a bear to come into your camp. Because they are too plentiful and we Inuit like to do our hunting and we cache our meat we bury it. We ferment it. And you're guaranteed if you try and pick it up in the fall time in the winter, it's gone. You're guaranteed you'll lose that fermented or buried seal that they're trying to save for the winter. It will never be there. The bears will get to it regardless. No matter where we cache our meat. (Interpreter translating for T3, 21 May; Ekaluktutiak et al., 2020)

They're would be in areas where there was polar bears, like there was polar bears, but they're not as plenty as now. They used to use dog team, once in a while they see the bear out in the outpost camp or out on the sea and they'd get a polar bear every so often. But it seems like there is a lot more polar bears within the last years, like starting around '90s up to today, even though we have snowmobiles. Seems like they're easier to see. (Interpreter translating for T1, 21 May; Ekaluktutiak et al., 2020)

Before the white people came around, before the tagging system, they were able to harvest whatever they want. Anything that you see, even the cubs because they're

very good eating like a delicacy. As now, starting sometime in the 70s, you get the tagging system and you're not allowed to hunt any of the cubs. And he knows for a fact that is how they know that there's a lot of polar bears now. (Interpreter translating for T1, 21 May; Ekaluktutiak et al., 2020)

If I'm not going to choose what kind of polar bear I'm going to catch, I could catch a polar bear in the same day and come back home. (Interpreter translating for K1, 26 May)

After, you know, the NWMB or the GN put the policies and regulations on polar bears about, you know, total harvest of the year for polar bears. After they put policies on...didn't want us catching more females. So therefore, [there are] actually there are more females now. Because, you know, of the regulations and policies that we have to follow and the policies that we have now is that not to catch so much females than in the past and that's why I see more female now. (K4, 26 May)

Reason why I think they're increasing is because much more harvesters hunting for polar bears no more, and some polar bears they migrate from one location to another. And you know that's that's how I see the increasement of polar bears. Because you know not much in the year hardly any people capturing polar bears now than back in the day. (K4, 26 May)

The way I see this of concerning increasing the polar bear numbers, is by after the polar bear tags were placed in. And the tags are telling harvester to catch only limited of female polar bears and so much of male polar bears I believe, following those tag numbers because of those tag numbers or tags the polar bears are increasingly more now, because there are polar bear tags and, the government and they're saying that we only, we're only allowed to harvest only so much number female polar bear. And so some, maybe all the female polar bears would have cubs, and even in those days female polar bear has cubs, they still won't to catch it in those days but today with the policies changing, that's how I see the numbers increasing polar bears. (Interpreter translating for K5, 26 May)

As of today, someone can go out polar bear hunting and come back with a polar bear in the same day. (Interpreter translating for K5, 26 May)

In the past 20 years they feel like looking for a bear for a week, sometimes come back without a bear. But now once you go out, you can see a bear right away. (Interpreter translating for N1, 16 June)

I was born in 1952. Right there there was no law, Inuit ways. Any bear they see, or any game that they see, if they needed, they'd kill it. If it's even polar bears, even when they have a cubs they shoot them anyways. They can use the cubs for something. And they say little cubs are more, taste more better than the full grown. So that's what they were hunting, any bear. If there were three bears, you see, you hunt them all. But when they put up the ‘you're not allowed to shoot’, ‘shoot the mother with a cub’. We listen, that's when it start, when the bears start coming. Well, getting more. And they put up a quota, that's when it start raising up. (N1, 16 June)

In the Boothia peninsula I used to go out polar bear hunting and you wouldn't see polar bears at all. (GH2, 17 June)

Early 1960's there was no polar bear in the Gulf of Boothia and Foxe Basin, but in the Gulf of Boothia not too many polar bears in that time, my uncle and my uncle’s hunting buddy, my uncle was pass away a long time ago, so they went for polar bear hunting by dog team. But there was no polar bear. I mean there is some, not very many. They ran out of food and they ran out of dog food. They finally went to open area, to open water, that floe edge. There under a really rough time to go down there, they have to walk to the floe edge so they shot a seal that, before maybe three days or maybe two days because they have two dog teams. On the way home, believe it or not, still down in Gulf of Boothia they saw a polar bear with a cub...they shot that with a cub and in that time there was not much of polar bears. Today it's a big difference. Last year around, I took a sport hunter, polar bear hunter I took last year. The tracks everywhere, everywhere and new ones and old ones, right now you cannot believe it's lots of polar bears. And my friend went polar bear hunting last April he said polar bears everywhere, he said lots of polar bears this year. (HB1, 23 July)

I grew up with elderly people and that like to go camping during summertime. We never see any encounter of polar bear while you are out camping, caribou hunting grounds. You never encountered any polar bears. But over the years, over the last 15 years or so we've been encountering more bears on the land, having to deal with them more. (HB2, 23 July)

When I was young, there used to be hardly any polar bears. And now today you can see them everywhere...because in the old days they didn't have a tag, polar bear tag. So they would just get them whenever they see them. Today, we only can hunt them with the tags. Unless they are a threat. (HB3, 23 July)

When we are hunting them up in Gulf of Boothia, we are seeing a lot of mother with cubs, but I don't think it's that much different than when I was younger, there are just everywhere, mother with cubs. Adults we see them both, male or mother with cubs. (I3, 27 July)

<u>Changes in distribution and behaviour</u>

Today, there are more polar bears near, you know, coming into town more every year. To me they seem to be more vicious now because they’re not afraid to go right into the community or come by the community. That's how I see the big changes. (Interpreter translating for K1, 26 May)

The only time that we notice that when we get polar bears nearby or going to town is ['cause they're] especially around the fall season, especially around September, October, November. (Interpreter translating for K1, 26 May)

They’re concern about their getting too many out there, is that they start attacking. Like they're getting too many. The population is for polar bears, is getting too much so that's,

they start attacking. I mean, they're more aggressive. (Interpreter translating for N1, 16 June)

In the old days they shoot a polar bear they have to be very careful taking care to get the polar bear. If the polar bear notice that there's a man or a human, the polar bears right away they go get away and they don't go to community or a campsite or something like that. Right now, it's different they don't scare much anymore. (HB1, 23 July)

The only difference from many years up to today. Seems like they're more aggressive towards humans. Many years ago, they, as if like see people they would run away right away. Today it seems like it's not that way anymore. (Interpreter translating for T3, 21 May; Ekaluktutiak et al., 2020)

He has a big concern in this area because starting in the 1980s with the tagging system, if you're out camping at your outpost camp, don't matter what time of the year, you don't have a tag and you're trying to follow the rules of the HTO as well as the government. And if a bear were to get into the camp or the outpost camp and you don't have a tag and you have children with you and you're out on your outing, enjoying your time out on a land camping, it's you know, what are you really to do? You don't have a tag and you're told not to hunt. That is a very big concern for him today. (Interpreter translating for T1, 21 May; Ekaluktutiak et al., 2020)

Before there was a polar bear regulation, policy and procedure, they could catch the polar bear any time, even though it had cubs. Today there's so many polar bears and nobody, like we cannot catch them unless, you know, they're [totally] attacking. Trying to camp in the summer, spring and summer with your family and polar bear policy in place. He's afraid for his family, especially children, because the polar bear can attack any time, he's got no law or anything. The polar bear can attack the children any time he wants, the family any time he wants. But us, we've got a law that you know from that he's afraid, the polar bears keep coming into the camps nowadays. Destroying cabins nowadays. There's so many that he think it was, it's not, he knows that they will come into camps and all we have to do is try to scare them away. But if they're determined to come in, they will come in. (Interpreter translating for T1, 21 May; Ekaluktutiak et al., 2020)

It seems like the younger ones are more aggressive now, because even as mother bears with cubs too, a lot of time we’re camping, hunting a few miles from Naujaat, from my hometown and we notice cubs that weren't get mothers or family, weren't sort of [tense] anymore. Last time I went out, when I woke up there was a mother bear with cubs, we had some meat, raw meat with blood fat on it and the meat like at night ate up, a mother or cubs ate up the fat with the cubs, and of course she tried going under my tent ropes, so we never woke up, but seems like there's more, not scared of people anymore. (N2, 15 June)

Even though it's not just polar bears there's also other concerns that we have to deal with is like, you know, the climate change, the sea ice...the way I see it impact on all animals, not just polar bears, it could be any animal including the people the human

beings. The way that I see this, concerns me is the climate change. It's that the climate change is affecting everything. (Interpreter translating for K1, 26 May)

Disturbances to polar bears

Today we have many planes flying over, jets, prospecting helicopters, planes flying over and hunters using snowmobiles with that sound of machinery. He thinks that they're a lot used to hearing that. Once, many years ago, once they hear something, they would run away right away. (Interpreter translating for T3, 21 May; Ekaluktutiak et al., 2020)

Due to machinery with the snowmobiles, jets flying over, planes and all this because polar bears have a very keen ear. They can hear from many miles, they hear machinery and they get spooked and it's as if harder to find [them] in a way, because of the machinery, the sound and smell. (Interpreter translating for T4, 21 May; Ekaluktutiak et al., 2020)

If that had gone through, the seismic, seismic testing perhaps that would have impacted our polar bear, polar bears numbers and statistics. (Interpreter translating for K1, 26 May)

As soon as they hear any type of machinery, snowmobiles, for example, they'd start to run. Even before you see them, once they hear you they'll run. (GH2, 16 June)

Changes in sea ice

Over these last few years, we get thinner ice, but we're still get lots of ice when it the floe edge is still the same spot where it is, if not a little bit further. There's not much change in the ice, the sea ice...it gets easier for them to get their prey. (K2, 13 May)

The ice condition has changed. It's not too long ago, I think that started back in the 2002, 2004, somewhere in that area. Before that ice condition was...normal. Like, when I say normal, it tends to freeze earlier in the fall time. And tends to melt later in the springtime. Today, ice condition will melt very quickly in the springtime. It will be gone like without you knowing it's going. And tends to freeze up later in the fall time like October, November. (Interpreter translating for K3, 19 May)

Unable to see icebergs up in Gulf of Boothia area many years ago. But seems like you see icebergs every so often after a few years, it might got to do with maybe the sea ice getting thinner that we started to see some icebergs up in Gulf of Boothia area. That might be a fact that true, the ice conditions and changes, that might be the reason why we see icebergs every so often in Gulf of Boothia. (Interpreter translating for T3, 21 May)

The sea ice right now is different I think everywhere in the Arctic. In the old days, back in 1960s, we have very cold weather. And there was no warm weather, and I don't know why the oceans right now the ocean, the whole ocean from south to north it's a lot warmer now that's why the broken ice melted very fast. Because of the ocean's a lot warmer than the past 40 years or more. (HB1, 23 July)

It's a lot more thinner than it used to be. Some areas you normally have an idea where the floe edge would be but it's for some reason it's not consistent these days. It's not the same edge where the floe edge used to be. It gets there but it's broken off usually now. And it's a lot thinner the way I see it. (HB2, 23 July)

And our summer is more longer. And sea ice is not forming fast enough these days. Our weather has changed I guess due to climate change, they say. Warmer weather, sea ice not forming, well by the time it's usually hard enough by December, back then, but it's not like that anymore. Sea ice, solid ice disappearing fast, early July. And so these are the factors. (HB5, 27 July)

Impacts of sea ice changes

I don't any very much effect on polar bear of sea ice change because polar bears will adapt to any season, just like we'll will adapt their home summer, fall or winter or spring. They'll adapt to any changes in the sea ice or anywhere. (Interpreter translating for K3, 19 May)

Us hunters don't have a concern about the bears of this ice condition changing. Bears are known to be great swimmers, divers. They're known to be good on ice. They're known to be on the land in the wintertime. They go denning up on the land. They're able. It's really not a big concern because they're adaptable, they adapt to the climate, whatever it may be, in the ocean, water, on land, on ice or snow. It's not much of a concern. They're very adaptable, unique creatures. (Interpreter translating for T2, 21 May; Ekaluktutiak et al., 2020)

Polar bears easy [to adapt to] environment. Whether there's lots of sea ice and whatnot, or if you don't have much sea ice, of course they go on the land. They just adapt to their environment. It's like a weather pattern they're following. (Interpreter translating for T3, 21 May; Ekaluktutiak et al., 2020)

I cannot say that polar bears being affected by sea ice changes because the polar bears can be on the sea ice, they can swim, and they can be on the land. I don't see any major issues. (Interpreter translating for K1, 26 May)

I don't think it's a big concern to me about how polar bears with their environment. Whether there you know traffic here or there by sea ice, water or by air. That area is very important to me because after the tags were placed in, that's where my concern was, is that when the tags were placed in, after the tags were placed in, then we start following those policies. There are more polar bears now, numbers of polar bears now, there are more polar bears now. With traffic and this environment around the polar bears, I don't have a big concern whether even if the ice is melted, even if there is no more ice, I don't think that's really a concern to me. That's how I, you know [that's what] I think about that area. (Interpreter translating for K5, 26 May)

They think the bears are going to become extinct or what not. But then for us living in the north, they're not. Where we live here. Well, I do. I've been following bears

population for when I was a kid, so I have no concern about them vanishing or getting extinct. And people down south think they won’t survive because of global warming. The ice that has warmed, they are going to become extinct. I don't believe that. So to me there's no concern about bears getting extinct. (N2, 15 June)

<u>Management considerations</u>

More polar bear tags increase because of the population of polar bears that you know has increased dramatically. Most harvesters would like to see tags increase because 20, you're only allowed 25 tags in a year. It would be nice, like a lot of harvesters out there like he's not a regular polar bear hunter but he would like to see more tags. Tags given. (Interpreter translating for K5, 26 May)

There are so many bears now that it doesn't matter. You catch one now, the fur pelt is so small now, it's very cheap now...I like to go camping in springtime with my family. And they’re so many bears now...our hometown that dangerous to stay in a tent or a cabin, even a cabin is dangerous. I wish there would be more tags given out to the HTO or to the people. (N2, 15 June)

I never heard of any surveys in Gulf of Boothia and I don't think Hall Beach ever been part of it. There have been discussion in QWB—Qikiqtaaluk Wildlife Board annual meetings with NWMB before about the surveys being done in Gulf of Boothia but it was mainly focused on Kitikmeot regions communities. We didn't really get to be a part of it. (HB2, 23 July)

Appendix 2. Map of the Gulf of Boothia polar bear subpopulation

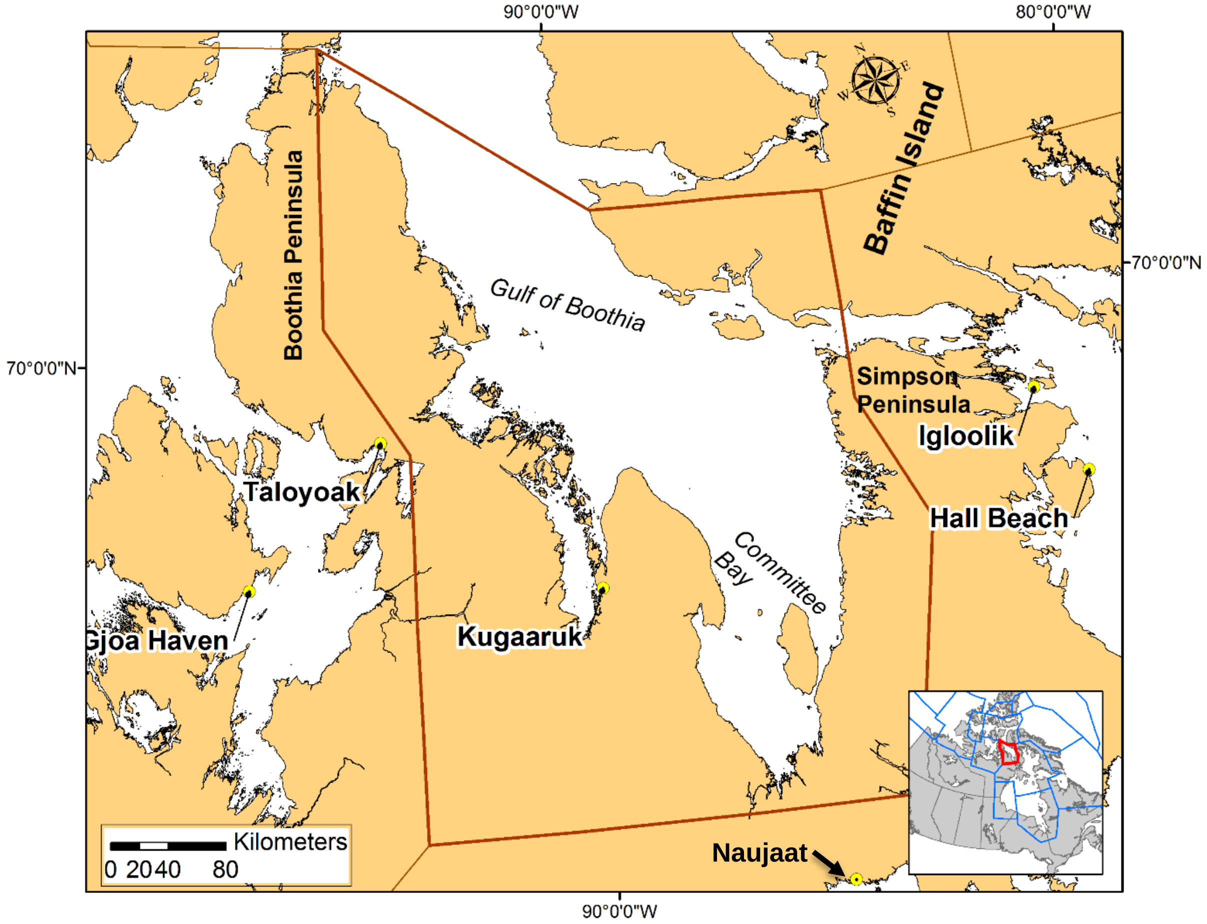

Fig. 1. Gulf of Boothia polar bear subpopulation (red border in bold) in Nunavut and the communities that harvest from there. The M'Clintock Channel subpopulation is located directly to the west.

Appendix 3. Description of polar bear management

Gjoa Haven and Taloyoak communities harvest both M'Clintock Channel and Gulf of Boothia polar bears. Gjoa Haven community members began harvesting from Gulf of Boothia after harvesting opportunities for M'Clintock Channel were limited. This year, Gjoa Haven received five tags for Gulf of Boothia. Once a hunter receives a tag, they are given up to five days in the community to prepare before going out on the land, where there is no time limit to harvest.

> Usually, the HTO would give us about five days to pack up and get ready. But once you're actually hunting out there, there's really no time limit until you come back home with or without a bear. And then when you do get back, usually we pull another name from the draw. (GH2, 16 June)

Interviewees indicated that overharvesting results in a reduction in the number of tags for subsequent years.

> When we overharvest—for defence kill or something, around the community—one tag is taken out from our quota. You know, if it's a female that's been caught in the community it might cost us two tags. So, we can't overharvest what is given to the community in terms of quotas. Today that's the only way we could hunt polar bears using quotas from the government (GH1, 3 June; Ekaluktutiak et al., 2020)

Taloyoak community members received 25 tags for Gulf of Boothia. To avoid overharvesting, the HTO allocates portions of tags at a time. There are usually more interested hunters than the number of tags that are available.

> The HTO open five tags at a time because they don't want to overharvest. They're trying to manage in a way that they don't overharvest so the next year won't be, some years they don't even have enough tags. There are a lot of people like to go polar bear hunt and once the five tags that are introduced, five polar bears were caught and then they'd introduce another five to open. And there are many people that like to go polar bear hunting, even though they have these many tags. Hunters are waiting in line to get a bear tag and other years, there is just never enough polar bear tags. There are a lot of people. These communities are growing. Especially today. We have a lot of people that like to have the opportunity to go out polar bear hunt and catch their first bear. But they're unable to do that because of the tagging system. (Interpreter translating for T2, 21 May)

Kugaaruk received 24 tags this year. The HTO distributes tags to hunters after their harvest and are distributed through a lottery system when tags are running low.

> Early in the season in October anyone may want to go out after polar bear to hunt. Do not required a draw to be done in the community but whoever want to go polar bear hunting will get a tag. That's how it goes all through the winter, spring. But when a tag is two, three tags left, the industry tag, then that's when the draws will start being done. (Interpreter translating for K3, 19 May)

Naujaat, Hall Beach, and Igloolik harvest from the Foxe Basin population in addition to Gulf of Boothia. These communities received 5, 4, and 11 tags for Gulf of Boothia, respectively. Gulf of Boothia bears are usually harvested on the west side of Melville Peninsula in Committee Bay. Interviewees indicated they usually receive a tag after the bear is harvested.

> They would announce on the local radio that there’s about so many tags for Foxe Basin and Committee Bay (Gulf of Boothia). And they would announce how many there are. And people just go out on the first opening day and catch some bears. It doesn't matter who, you can just go out and catch them without getting the tags I think, and then if you catch one, you can just go get the tag from the HTO...later on when the tags are not many in spring, the HTO would announce there's so many tags to go. (N2, 15 June)

> The Hunters and Trappers host a annual general meeting with polar bear tags in October and we decide when to open it. It's usually open in October but you can't go up in early fall or some days too dark, so usually March is people start traveling over there. And it's open, like whenever they, community members, approve of the opening date. It's open for public. Anyone can go up there, we don't usually get a tag for it, it's after we get a polar bear we will, anyone can go up to the conservation officer and pay him the tag. (HB2, 23 July)

> Going up to Gulf of Boothia it's usually straight out to Committee Bay area. Come around the island, Committee Bay area, and around that. Once I gone...towards the south and up the Gulf of Boothia...usually takes me about five to six, seven hours, depending on the speed I'm travelling and the snow, how smooth it is. (HB2, 23 July)

> There is always rules for polar bears. You can't just catch polar bears [if] you want to catch one, unless you have a quota or a tag. You can catch it or unless they tell you you can catch a female, they'll pick one. Or there is one thing that you can just go and kill the polar bear is when it goes to town and you have no choice to kill it. So, there is three options, and we can't use any option we want. It has to be by the government quota to use, how to kill it. They tell us to do it, we did it. So, we can't just shoot one if we want one. But if we can get it, we share. (Interpreter translating for N3, 4 July)

INUIT QAUJIMAJATUQANGIT OF M'CLINTOCK CHANNEL POLAR BEARS

FINAL REPORT

23 February, 2021

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Report for Department of Environment
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1. Summary

In Nunavut, there is a need for both scientific data and Inuit *Qaujimajatuqangit* on polar bears to support co-management decision-making. The Government of Nunavut Department of Environment recently completed a scientific survey of the M'Clintock Channel polar bear subpopulation and is planning to submit the results for consideration by the Nunavut Wildlife Management Board. To complement these results, the Government of Nunavut contracted Trailmark Systems Inc. consultants to conduct an Inuit Qaujimajatuqangit study led by communities who harvest polar bears from this subpopulation. In May and June 2020, we interviewed active hunters and elders from Cambridge Bay, Gjoa Haven, and Taloyoak remotely to document their knowledge of polar bear ecology, population changes (including human-animal relationships), and management perspectives and recommendations. In-person interviews were not possible due to social distancing and travel restrictions resulting from the COVID-19 pandemic. Interviewees voiced concerns over changing human-bear relationships that have led to more aggressive bears and increasing bear numbers in M'Clintock Channel, which—combined with too few hunting tags—pose a threat to human safety. Interviewees also consider the inclusion of Inuit perspectives and traditions in research and management inadequate to-date. Decision-makers and researchers need to improve their understanding of Inuit knowledge from an Inuit perspective in order to fully consider and include Inuit Qaujimajatuqangit in bear research and management. These efforts will encourage more balanced, culturally appropriate, and sustainable management practices that are supported by community members.

ᓇᐃᓈᖅᓯᒪᔪᖅ

ᓄᓇᕗᒻᒥ, ᐱᔪᓇᐊᖅᑲᒪᑦ ᑕᒪᒃᑮᓄᑦ ᖃᐅᔨᓴᖅᑎᓄᑦ ᑲᑎᖅᓱᖅᓯᒪᔪᓂᒃ ᐊᒻᒪ ᐃᓄᐃᑦ *ᖃᐅᔨᒪᔭᑐᖃᖏᑦ* ᓇᓄᓕᕆᓂᕐᓂ ᐃᑲᔪᕐᓗᒍ ᐊᐅᓚᑦᑎᖃᑎᒌᖕᓂᖅ ᐋᖅᑭᒍᑎᒃᓴᓕᕆᓂᕐᓂ. ᓄᓇᕗᒻᒥ ᒐᕙᒪᖓᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐱᔪᓈᖅᓰᓚᐅᖅᑐᑦ ᖃᐅᔨᓴᖅᑎᓄᑦ ᖃᐅᔨᓭᑎᒃᓴᓂᑦ ᐃᑦᑐᐊᖅᑑᑦ ᓇᓄᐃᑦ ᐃᓚᒃᑲᓐᓂᖏᑦ ᐅᓄᕐᓂᖏᓐᓂ ᐸᕐᓇᐃᓪᓗᑎᒃᓗ ᑐᓂᓗᒋᑦ ᖃᓄᐃᓕᖓᔾᔪᑎᑦ ᐃᓱᒪᒋᔭᐅᖁᓪᓗᒋᑦ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ. ᐱᓪᓗᐊᑕᕆᓗᒋᑦ ᑖᒃᑯᐊ ᖃᓄᐃᓕᖓᔾᔪᑎᑦ, ᓄᓇᕗᒻᒥ ᒐᕙᒪᒃᑯᑦ ᑎᑎᖅᑲᑎᒍᑦ ᐱᓕᕆᑎᑦᑎᓪᓗᑎᒃ ᐃᒡᓕᓂᕐᓄᑦ ᐊᑐᖅᑕᑦᑕᖅᑐᓕᕆᔨᓂᒃ ᐅᖅᑲᖅᑎᒌᒃᑎᓂᒃ ᐱᓕᕆᐊᖅᑲᖅᓗᑎᒃ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᓐᓂ ᖃᐅᔨᓴᕈᑎᒃᓴᓂᑦ ᓯᕗᓕᖅᑕᐅᓗᓂ ᓄᓇᓕᖕᓂᑦ ᐊᖑᓇᓱᒃᐸᒃᑐᓂ ᓇᓄᕐᓂ ᑕᕝᕙᙵᑦ ᐃᓚᒃᑲᓐᓂᖏᑦ ᐅᓄᕐᓂᖏᓐᓂ. ᒪᐃ ᐊᒻᒪ ᔫᓂ 2020-ᒥᑦ, ᐊᐱᖅᓱᓚᐅᖅᑐᒍᑦ ᐊᖑᓇᓱᒃᑎᐅᔪᓂᒃ ᐃᓐᓇᑐᖅᑲᕐᓂᓪᓗ ᐃᖃᓗᒃᑑᖅᓯᐊᒥ, ᐅᖅᓱᖅᑑᒥ, ᐊᒻᒪ ᑕᓗᕐᔪᐊᓂ ᓄᓇᖕᒥᓐᓂ ᑎᑎᕋᓚᐅᕐᓗᑎᑦ ᖃᐅᔨᒪᓂᖏᑦ ᓇᓄᐃᑦ ᐆᒪᔪᑦ ᓇᔪᒐᖅᑲᖅᑎᒌᖕᓂᖏᓐᓂᒃ ᓯᓚᖅᑲᑎᒌᖕᓂᖏᓐᓂᒃᓗ ᖃᐅᔨᓴᕐᓂᖅ, ᐅᓄᕐᓂᖏᓐᓂ ᐊᓯᔾᔨᖅᑐᓂ (ᐃᓚᐅᓪᓗᓂ ᐃᓄᐃᑦ–ᓂᕐᔪᑎᑦ

ᖃᓅᖅᑎᒌᒃᐸᖕᒪᖕᒫᑕ), ᐊᐅᓚᑦᑎᓂᕐᒧᓪᓗ ᐃᓱᒪᒋᔭᐅᔪᓂᒃ ᐱᖁᔭᐅᔪᓂᒃᓗ. ᑕᐅᑐᖅᑕᑦᑕᐅᑎᓗᒋᑦ ᐊᐱᖅᓱᕐᓂᕐᓂ ᐊᔪᕐᓇᓚᐅᕐᒪᑦ ᐱᔾᔪᑎᒋᓪᓗᒍ ᖃᓂᒃᓴᕆᐊᖅᑲᕐᓂᖅ ᐃᓅᖅᑎᒥ ᐊᐅᓪᓚᕐᓂᕐᒧᓪᓗ ᑮᓪᓕᖅᑲᖅᑎᑕᐅᔪᓄᑦ ᐱᑎᑦᑎᔪᓂᒃ ᓄᕙᒃᔪᐊᕐᓇᖅ–19 ᐊᒥᓱᓄᑦ ᖃᓂᒪᓐᓇᐅᔪᒧᑦ. ᐊᐱᖅᓱᖅᑕᐅᔪᑦ ᑐᓴᖅᑎᑦᑎᓪᓗᑎᒃ ᐃᓱᒫᓘᑎᖃᕐᓂᕐᒥᓂᒃ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᔪᓂᒃ ᐃᓄᐃᑦ–ᓂᕐᔪᑎᑦ ᖃᓅᖅᑎᒌᒃᐸᖕᒪᖕᒫᑕ ᐱᑎᑦᑎᔪᓂᒃ ᓲᖑᓂᖅᓴᐅᓕᕐᓗᑎᒃ ᓇᓄᐃᑦ ᐊᒥᓲᓂᖅᓴᐅᓕᕐᓗᑎᒃᓗ ᖃᔅᓯᐅᓂᖕᒋᓐᓂ ᐃᑦᑐᐊᖅᑑᕐᒥ, ᐃᒪᓐᓇ–ᐃᓚᖅᑲᕐᓗᓂ ᐅᓄᙱᓗᐊᖅᑐᓂᒃ ᐊᖑᓇᓱᖕᓂᕐᒧᑦ ᓂᕿᖕᒐᐅᑕᓂᒃ–ᐅᓗᕆᐊᓇᖅᑎᑦᑎᔪᖅ ᐃᓄᐃᑦ ᐊᑦᑕᕐᓇᙱᑦᑐᒦᒃᓗᑎᒃ. ᐊᐱᖅᓱᖅᑕᐅᔪᑦ ᐃᓱᒪᖅᑲᕆᓪᓗᑎᒃ ᐃᓚᐅᑎᑦᑎᓂᕐᓂ ᐃᓄᐃᑦ ᐃᓱᒪᒋᔭᖕᒋᓐᓂ ᐱᖅᑯᓯᖕᒋᓐᓂᒃᓗ ᖃᐅᔨᓴᕐᓂᕐᓂ ᐊᐅᓚᑦᑎᓂᕐᓂᒃᓗ ᓈᒻᒪᙱᓗᐊᖅᑐᓂᒃ ᐅᓪᓗᒥᒧᑦ. ᐋᖅᑭᒃᓱᐄᑦ ᖃᐅᔾᔨᓴᖅᑎᓪᓗ ᐱᐅᓯᑎᐊᖅᑎᑦᑎᔭᕆᐊᓕᑦ ᑐᑭᓯᐅᒪᓂᖕᒋᓐᓂ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᖕᒋᓐᓂ ᐃᓄᐃᑦ ᐃᓱᒪᒋᔭᖕᒋᓐᓂᒃ ᑕᒪᒃᑭᖅᓗᓂ ᐃᓱᒪᒋᖅᑯᓪᓗᒋᑦ ᐃᓚᐅᑎᓪᓗᒋᓪᓗ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖕᒋᑦ ᓇᓄᕐᓄᑦ ᖃᐅᔨᓴᕐᓂᕐᓂ ᐊᐅᓚᑦᑎᓂᕐᓂᒃᓗ. ᑖᒃᑯᐊ ᐱᓇᓱᒍᑎᑦ ᑎᓕᐅᕆᓂᐊᖅᑐᑦ ᓇᓕᒧᒌᖕᓂᖅᓴᐅᓂᕐᓂᒃ, ᐃᓕᖅᑯᓯᒃᑯᑦ ᓈᒻᒪᖕᓂᖅᓴᓂ, ᐊᒻᒪ ᑲᔪᓯᑎᑕᒃᓴᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒥᒃ ᐊᑐᕋᓱᒍᑎᓂᒃ ᐃᑲᔪᖅᓱᖅᑕᐅᔪᓂᒃ ᓄᓇᓕᐅᔪᓂᒃ.

Naittuq titriaq

Nunavutmi, piyalgit tamatkiknut naunaiyaiyit tuhagakhat tapkuatlu Inuit *Qaujimajatuqangit* nannuqnut ikayuqhiutini aulatyutiqatigit ihumaliurutit. Tapkuat Kavamatkut Nunavut Timinga Avatiliqiyikkut qangahaq iniqtai naunaiyaiyit naunaiyaqni tamna M’Clintock Tariunga nannut amigaittuqatigit parnaiyainiqlu tunini qanuritni ihumagiyauyukhat tapkunanga Nunavut Uumayuliriyiqyuat Katimayit. Ikayuqhiutininut tahapkuat qanuritni, tapkuat Kavamatkut Nunavut kanturaktitai Trailmark Systems Nanminilgit qauyimayiuyut havarini tamna Inuit Qaujimajatuqangit naunaiyaqni hivuliqtai nunaliuyunit angunahuaqpaktut nannut ukunanga amigaitninit. Talvani May tamnalu June 2020, apiqhuqtavut hulini angunahuaqtut inutuqatlu Ikaluktutiakmi, Uqhuqtuuq, tamnalu Taloyoak ungahiktumin titiqni ilihimaniqtik nannunut uumatyutai, amigaitni allanguqni (ilautitlugit inungnut-angutikhat piqatigikni), aulatyutitlu ihumagiyauni aturahuaqunilu. Tautugutiplutik apiqhuinit ayurnaqmat piplugu inungnut qaglivalaqtailinit aularniqmutlu pittailitit taphumanga Qalakyuarniq-19 aaniaqyuarniq. Apiqhuqtauyut niplirutigiyai ihumaalutit allanguqninut inungnut-nannut piqatigikni pityutauyut iqhinaqhaqnit nannut ilagiaqnilu nannut qaphiuni tahamani M’Clintock Tariunga, tapkuat – ilagipligitlu ikitpallat angutakhat haviktakhia – pityutauyuq iqhinaqni inungnut hivuranaitni. Apiqhuqtauyut ihumagikmiyai ilaliutini tapkuat Inuit ihumagini pitquhiitlu naunaiyainiqni aulatyutitlu naamangitmata ublumimun. Ihumaliuqtit naunaiyaiyitlu nakuuhivalirialgit kangiqhimanit tapkuninga Inuit ihumagiyai piyakhai tamaitnik ihumagiqahiutini ilaliutinilu Inuit Qaujimajatuqangit nannut naunaiyaqni aulataunilu.

Tahapkuat pinahuaqni pinahuaqtauniat ihuaqhivalliqlugit, ilitquhiliqutitlu naamaknit, ihuaqhihimanilu aulatyutai pitquhiit ikayuqtuiyut nunaliuyuni ilauyunit.

2. Introduction

Accurate and reliable information on polar bear population status and trends is necessary for informed decisions in polar bear management. In Nunavut, collaborative polar bear management among the Nunavut Wildlife Management Board, Government of Nunavut Department of Environment (GN DoE), Nunavut Tunngavik Inc., Regional Wildlife Organizations, and Hunters and Trappers Organizations partners, aims to ensure each subpopulation is sustainable for harvesting by Inuit (through Total Allowable Harvests [TAH] and non-quota limitations). Both conventional (scientific) and traditional knowledge forms of information are needed for this process.

Inuit traditional knowledge, or Inuit *Qaujimajatuqangit* (IQ), not only includes knowledge of wildlife trends but also Inuit values, opinions, concerns, traditional management practices, and perceived impacts on harvesting and livelihood (Wenzel, 2004). This differentiates IQ from conventional science, which tends to focus on wildlife data at the exclusion of human relationships and values. For this reason, including IQ in polar bear management also supports "Inuit harvesting rights and priorities, and recognizes Inuit systems of wildlife management that contribute to the conservation of wildlife and protection of wildlife habitat" (Nunavut Agreement, Article 5). Documenting IQ for management applications requires the direct inclusion and guidance of IQ holders in formulating research questions, analysing and validating results, and interpreting and presenting data (Wenzel, 2004). Research methods that are systematic yet informal and based on respectful communication, narrative discourses, subjective and personal engagement, and unhurried meeting styles are culturally appropriate (Ferrazzi et al., 2019).

The Government of Nunavut (GN) Department of Environment recently completed a biological survey of the M'Clintock Channel polar bear subpopulation (MC; Dyck et al., 2020). To complement this work, the GN contracted Trailmark Systems Inc. (Trailmark) Consultants to conduct an independent IQ study for Gulf of Boothia and M'Clintock Channel polar bear populations. The results from this work may contribute to recommendations to the Nunavut Wildlife Management Board—Nunavut's main instrument of wildlife co-management—and potentially shape total allowable harvests and management objectives for the populations. Below we report on polar bear IQ documented from communities that harvest M'Clintock Channel polar bears.

3. Methods

We followed a grounded theory approach to guide this work, where hypotheses and patterns in information are allowed to emerge inductively, without any pre-existing theory (Strauss & Corbin, 1994). This contrasts with the deductive approach (Lewis, 1988) used in conventional wildlife science, where hypotheses are established and tested (Johnson, 2002).

A Trailmark consultant met remotely with Ekaluktutiak (Cambridge Bay), Gjoa Haven, and Spence Bay (Taloyoak) Hunters and Trappers Organizations (HTO) as well as Kitikmeot Regional Wildlife Board staff to discuss project objectives and seek advice on methods and approach to an IQ study. HTOs suggested public community meetings be held in each community in March and April 2020 to document IQ. Trailmark staff drafted a list of guiding interview questions focusing on hunting experience, perceived population changes, knowledge of polar bear ecology, and management perspectives. This interview guide was circulated to each HTO and the GN before being finalized.

In March 2020, travel was restricted due to COVID-19 and community meetings were not possible because of social distancing. HTO staff suggested remote interviews over telephone and videoconferencing so that IQ research could continue. Because interviews took place remotely and mostly over the telephone, participatory mapping and GIS data collection were not possible. We probed for place names to identify relevant geographic locations to the best of our ability. HTO staff recruited all participants (purposeful sampling; Marshall, 1996).

We interviewed four participants in a semi-directive manner (Huntington, 1998; Huntington, 2000) from Cambridge Bay over telephone individually from 11–20 May 2020; five participants from Taloyoak individually over Zoom conferencing on 21 May 2020; five participants from Gjoa Haven as a group over telephone on 3 June 2020; and one participant from Gjoa Haven on 16 June 2020. Because of the group discussion format in Gjoa Haven, most information from Gjoa Haven represented perspectives of the entire group, rather than individuals. It was not always possible to distinguish who was speaking over the telephone, so we identified individual interviewee’s quotations where possible, and otherwise denoted quotations with “unidentifiable Elder.” We replaced participant names with alphanumeric codes (“CB”, “GH” and “T” to represent Cambridge Bay, Gjoa Haven, and Taloyoak home communities, respectively) to protect participant confidentiality.

Interviews took place in English except for four interviews in Taloyoak and the group interview in Gjoa Haven, where interpreters provided translation between English and

Inuktitut. Interviews were audio-recorded and auto-transcribed using Sonix transcription software (http://sonix.ai). We manually edited transcripts and analysed them using conventional content analysis, where common themes and categories are determined from the data (Hsieh & Shannon, 2005). We identified quotations that represented the common themes and reported them. Additional quotations are listed in Appendix 1.

Interview summaries were sent to each HTO, who reviewed and validated them for inclusion in this report. Because of travel restrictions and the limited time available for this work, HTO board members (rather than interview participants) validated the results for accuracy and representativeness for their community.

4. Results and discussion

4.1. Participant hunting experience

HTOs recommended all interview participants for their known experience, breadth of knowledge and familiarity with polar bears, bear hunting, and hunting areas. In Cambridge Bay, the four interview participants were active polar bear hunters (have visited polar bear areas [Appendix 2] within the last year and harvested an innumerable number of bears over their lifetime).

In Gjoa Haven, one interview participant was an active polar bear hunter, and the other four participants were no longer actively hunting due to age; however, these participants had harvested an innumerable number of bears over their lifetime prior to the implementation of quotas (since quotas were established, they were each only able to harvest up to five bears due to limited access). In Taloyoak, three interviewees were active polar bear hunters. Two interviewees were no longer active hunters due to age and had not visited designated polar bear hunting areas (Appendix 2) in the last 20 years but were still recommended by the HTO for their prior experience and continued knowledge of polar bears.

Because interviews took place remotely over telephone, it is likely some interview participants did not feel comfortable sharing information openly. Some interviewees expressed a preference for face-to-face interviews. Face-to-face engagement could enable additional information to be gathered, either directly from participants or through participant observation. Interviews were also validated by HTOs instead of individual participants due to logistical and project time constraints; the information reported below should be interpreted at the community level.

4.2. IQ of polar bear ecology

Interviewees indicated every individual polar bear is different. They have personalities and are considered intelligent, learning animals.

> You can't guarantee how bears [are] gonna behave. It's based on what type of animal it is, whether it's aggressive bear or it's a bear that's shy and hasn't really encountered any of the bears and fighting or anything so I mean there's dominant, there's a bunch of different bears with their attitude out there and it's always different. It's never the same. (CB1, 11 May 2020)

> Polar bears know that they are protected by something. They know. They are intelligent animals, no matter what animal you are. They, as if, know what people are doing. What guidelines, what policies and procedures, as if they know what's going on with the tagging system. (Interpreter translating for T1, 21 May 2020)

Interviewees reported bears generally prefer rough ice, especially areas that are difficult to access by hunters.

> Today we have snowmobiles and it's usually in the wintertime that we hunt them, and that the motorized snowmobile, you can hear the motor and you can hear the sleds hitting the ice. And as soon as a bear hears something like that, they start to run off right away to the rough ice, to try and get away from you. And if you see the polar bear tracks, you can notice right away that it's running away from you and it's a fast track. And sometimes you won't even see the bear because they had a head start of many miles away. 'Cause he hearing the snowmobile that had a good head start to run away into the rough ice or to the hills, rocky hills or whatever it may be, where a snowmobile won't be able to make it. (Interpreter translating for T2, 21 May 2020)

These areas include pressure ridges and open water, where it is easier for them to access prey.

> They love being around seals. Like bearded seals and ringed seals. Like pressure [ridges] and currents. Where the seals are. Breathing holes, they have a lot of breathing holes around the currents and the pressure ridges. That's their buffet, where the seals are. That's where the food is. (CB2, 16 May 2020)

Some interviewees reported bears are more active during the full or new moon.

> In the areas where you have [food] or ice pressure ridges and there's a full moon or a new moon, that's where the bears are there, after the seals, they hunt the seals. Same thing with us hunters, we go out hunting, we like to hunt in the areas in the ocean where it's a smoother area. It's easier to find the seal holes. Pretty much the same way, that's where the bears go. Where the pressure ridges and the cracks are. That's where it's easier to see the bears in a very rough area. If you are trying to find a seal hole for the hunters, it's hard to find them. Same thing with the bears. So, where you have smoother ice you have a better chance of seeing a bear. (Interpreter translating for T2, 21 May 2020)

Knowledge of polar bear habitats, behaviour, and seasons is important for hunters to be able to locate and harvest bears. Hunters also use this information to locate and harvest prey that they share with polar bears.

4.3. Description of hunting

For Inuit, knowledge of polar bears is gathered within the context of human-bear relationships. A description of hunting practices can provide insight into why polar bear IQ is important, how it is learned, and how it evolves. Understanding these contexts can also point

to the observations and considerations a hunter makes to gather information at the population level.

Participants described their knowledge of management practices and harvesting regulations that are discussed in more detail in Appendix 3. Harvest regulations have protected females and cubs, which is also supported by male-biased harvesting for the sales of hides. In the past, any kind of bear could be harvested. Hunters would only take what they needed.

> Whenever he felt like polar bear hunting, he would go. Or whatever he needs of that polar bear, he would go and catch polar bear. And it's not only one polar bear but whatever, how many he needs, he's trying to catch. (Interpreter translating for GH3, 3 June 2020)

Today, each hunter can apply for a tag distributed through their local HTO via lottery with a time limit for use before it is passed on to another hunter. The importance of and interest in polar bear hunting is evidenced by the number of hunters who enter the lottery. The number of interested hunters usually exceeds the number of tags available.

> For our community I guess it's a pretty important thing because there's a lot of people who put their names in for draws they do each year. (CB1, 11 May 2020)
>
> Hunters are waiting in line to get a bear tag and other years—there is just never enough polar bear tags. There are a lot of people. These communities are growing. Especially today. We have a lot of people that like to have the opportunity to go out polar bear hunt and catch their first bear. But they're unable to do that because of the tagging system. (Interpreter translating for T2, 21 May 2020)

Participants described some areas that polar bears can be encountered in M’Clintock Channel: Dease Strait, Prince of Wales Island, Oscar Bay and Cape Alexander. Community members can also harvest other game in the M’Clintock Channel, such as caribou and wolves, in addition to polar bears. Harvested polar bears are usually shared among community members.

> The first thing we do is we take a few pictures, give them out, take the meat, roll up the hide and call it a successful hunt and come home. Then usually what I do is usually sell the polar bear hides for income. And all the meat we use for eating, throughout the family. (CB1, 11 May 2020)

Polar bears are an important source of meat for consumption.

> They're important 'cause they’re our regular diet. And [Inuit] of course, we have polar bear meat, we [pray] for them when the season's over to have that dietary. They're

> important to us too, they're part of our diet, so, regular diet, annually it's, we do [pray] for them...we also make the hide into our clothing as well so it's quite important to our community. (T5, 21 May 2020)

Polar bears also continue to be harvested for their hide.

> Around April perhaps they have good hair. The hair is thick, and it's a good quality for selling. Seems like that's when is good time. Even though fall is a good time, but their hair is not as thick. (Interpreter translating for T4, 21 May 2020)
>
> Today's kill for polar bear hide, I think you could only sell them at a certain height. If it's 10 feet you could sell it. Otherwise, you won't make any money out of the hide. So, the use for clothing or other useful tools. (GH1, 3 June 2020)

Unfortunately, the demand for hides has declined today, in part due to species-at-risk and international trade restrictions.

> It depends on if there's people interested or the time they're not interested, so just hang on to the hide for a while and somebody decides that they want it later on and eventually sells. (CB1, 11 May 2020)
>
> At this time today, it's pretty hard to sell a polar bear hide...we are not allowed to sell any hides anymore to the States. And to certain areas like the parts of the world, so that's why it's a lot harder to sell the hides. And if you can't sell the hides to the States, even the auction where we send it first down, they don't even be bought anymore. I send a hide two years ago, I have not seen nothing yet 'cause it hasn't been bought yet. (T5, 21 May 2020)

Polar bears are usually harvested on sea ice.

> It's usually on the sea ice, ocean, that's where [polar bears are] doing the hunting from the seal [populations this] time of the year. Usually [hunters] don't really hunt the bears on land. (Interpreter translating for T1, 21 May 2020)

Timing and success of polar bear harvesting varies each year, depending on climate and population changes.

> Pretty much every animal, even if it's a polar bear or not, they go through the weather cycle. You have a good year, good weather. It's a good year for pretty much all animals. If you have crappy weather, then it's harder for hunting, even though they're—it goes with the weather. You cannot really predict on how many years cycle. It just go with the weather pattern. (Interpreter translating for T3, 21 May 2020)

Depending on experience, hunters can usually spot and return home with their harvest within a few days.

> Probably take about two, three or four days to shoot a bear. She knows that the younger generation today don't spend a lot of time out on the land so they can probably take about four days or so. (Interpreter translating for T4, 21 May 2020)

> Today, he'll [wake] up 5:00 in the morning and within the next four hours or so, especially now that the seal pups are out now in the seal pup dens and the polar bears are up for hunting for seal pups, you're pretty much guaranteed within the four hours [to] see bears if there's plenty of bear tracks, fresh bear tracks. (Interpreter translating for T2, 21 May 2020)

It is common for young hunters or hunters with little to no experience to return home without a harvest.

> A lot of names came up, a lot of them went out and tried and a lot of them came back and their [explanation] of their trip was there's no bears. They might see a track or two, but you know, they don't know where to look. They asked them and where to look but they say they go into that area and say they're just not going far enough; they're giving up after a couple hours. You know, at least we're spending a day at least in that area. So yeah, my family, all my family members, from my father's side, they're knowledgeable on polar bears and most of the prey species that they depend on just from our upbringing. [We go] on land dealing with them. Being out there all the time. (CB3, 12 May 2020)

Polar bear hunting requires dedication and work. In the past, hunters had to really understand and learn information about polar bears—how to think like them and outsmart them—in order to be able to harvest them.

> The hunters many years ago were able to think and have a clear thinking of how to catch an animal. Because that was their only way of surviving without any rifles, or back then they were catching polar bears only with a harpoon. It's totally different today. That generation...he's heard stories that the polar bear actually run slower than a hunter. A hunter can catch a polar bear that he's chasing. For many years ago, it was a very different way of hunting polar bears than today's way of hunting polar bears. So that's something he knows from many years ago, as a youngster. (Interpreter translating for GH4, 3 June 2020)

Today, that knowledge and information is still needed, but modern hunting technology has made it easier to access animals, for example, by reducing travel time to and from hunting areas. However, success is still dependent on snow and sea ice conditions and the ability to travel safely through them.

> Years ago, the hunters who been travelling by dog team, there can be obstacles like bad weather days. It would take days for them to be able to reach the polar bear area before they catch one and before they head home. And it can take days before they

> make it home. But present day, snowmobile and devices like GPS, they can make it the same day. But sometimes it can be longer because the ice conditions. Many years ago, the dog teams were able to go almost any direction, but presently it's a different way of hunting caribous and that, by snowmobile. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June 2020)

> When the ice condition is very rough it's not easy to track down a polar bear because of the difficulty travelling through rough ice. On the other hand, when the ice is too smooth it can also be hard to track down because of the smooth hard snow or ice. So, it depends how the condition is like, whether it was too rough or too smooth. Also, can be different for other hunters...they try to find easy way to try and track down polar bears as well. It's always different environment, different ice condition. So, it depends on the condition of the snow and ice. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June 2020)

The time it takes to harvest is also dependent on the equipment and resources that a hunter has.

> If you have good equipment, good weather, then you can have it in two days you know. Two or three days. But you know with poor equipment and poor weather that that's always the factor in life here. Up in the north. (CB2, 16 May 2020)

Elders described some of their traditional hunting practices on the land, that include knowledge of polar bear behaviour and tracks.

> The Inuit people, the Netsilikmiut clan, and not just them, many years ago before the white people came, they used their seal harpoons and snow knives to harvest the polar bears. And she used an example with her hands, the polar bear. You know how they're run. They have [right] paw first step and the left paw following behind. And if it has [that way] there is a certain way to harpoon from the left or the right side of the bear. And this is very important to remember because the experienced polar bear hunters are taught from generation and generations. (Interpreter translating for T4, 21 May 2020)

> That was shared from generations before, once we start to have more 24-hour daylight, longer daylights, that's when it seems like it's the easiest and to hunt the bears because you have more daylight. And they even know if they see a track, they can tell it was from yesterday or from a few hours before or from that early morning. They can tell the difference on how fresh the track is. If that track was from a day before, they might not track it down. But if it was from a few hours before they're polar bear hunting and they're track down the bear and that's the easiest time to hunt the bears, is once you start to have 24-hour daylight and because they're hunting for seal pups. (Interpreter translating for T2, 21 May 2020)

The best time to harvest animals is when they are most active, early in the morning and evening.

> He knows this for a fact, and it was passed down from many generations. The earlier in the morning you take off, the easier you see bears. Even if it's for marine mammals, caribou, birds, whatever it may be. The earlier the morning, the better chance you get an animal. And throughout the day it's like calm, quieter. And in the evening, sometimes late in the evening, are one of the better times to see the bears. (Interpreter translating for T2, 21 May 2020)

Unfortunately, Gjoa Haven elders report young hunters do not know how to harvest polar bears, despite their interest in polar bear hunting.

> There is a lot of young people that are signing up to try and get a quota to hunt bears. Part of the problem is that the young hunter that pulls a tag or is given a tag doesn't exactly know where to go because they are not sure which way to travel. That's Gulf of Boothia, they're not knowing that area. They never been there. Some could be not going because they're not able to [afford] groceries or rough day, and different reasons...although they want to go, but there's a number of reasons why they are not. (Interpreter translating for GH3, 3 June 2020)

Lack of knowledge is due in part to harvest restrictions and, as a result, few hunting and learning opportunities.

> There's always been a huge interest in polar bear hunts. But these past couple years, the interest is slowly dwindling. And there's a lot of the people that are in their late 20s, early 30s, that are openly saying that they don't hunt polar bears because they don't know how. And this is a direct impact because of the moratorium. Some of these young men say they don't know how to skin a polar bear or how to hunt in rough ice. So, I believe it's a direct impact from the moratorium that was put in about 20 years, 25 years back now. (GH2, 16 June 2020)

Hunting practices are shaped by individual knowledge of polar bear behaviour and ecology, as well as hunting areas, weather, and travel conditions. Experience and practice require the ability to access polar bear hunting. Hunting practices have shifted over time with changes in technology, environmental conditions, and harvest regulations. Understanding these changes can also provide insight into the impacts that management decisions can have on access to harvesting and land-use practices.

4.4. Changes in abundance

All interviewees reported an increase in numbers of bears compared to the distant past (1960s and 1970s) that has continued over the recent (last 10) years, evidenced by the shorter time it takes to encounter them.

> Back in those days, there was way less bears. The sightings were very few. Very hard to find, very difficult to find, you were really lucky if a group of us went out and one person caught a bear. That was really, really special to have somebody find a bear back in the 1960s, 1970s. They're really hard to find, bears, back then. But having said that, today I see bears everywhere now. So, to me the population is really healthy, and it's really boomed big time...today just about anybody that goes out on the sea ice to the mainland they'll either see tracks or see signs. (CB3, 12 May 2020)

Interviewees can tell population sizes by distinguishing individual tracks during mating season.

> When you travel to a place every year, the last 10 years, you see the amount of bears that you see while you're out there and continue to see it every year and more cubs being born and you see them while they're young. It's been a few years, you see them grown up now, with their pair or not with the mother anymore. So, I mean there's lots of tracks [that you see], more bears that are around, and can tell they're not the same bears...'cause of the size of the tracks and direction they're heading. (CB1, 11 May 2020)

> It was easy to tell by a number of polar bears during mating season, there are polar bears tracks and the females building dens. The hunters come across those kind of signs of polar bears and in their feeding grounds. When there's enough meals for the polar bears, it's easy to track down the polar bear tracks. So that's one way that the polar bears or hunters are able to tell how much is in that area. By finding polar bear tracks. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June 2020)

Some interviewees suggested that the increasing population trend corresponds to prey abundance.

> The harvest that they need to survive, the seals are just incredible, the numbers of bearded seals. The bigger bears prey only on bearded seals. (CB3, 12 May 2020)

> There's more. Some years they are not always in the same spot. It's the ice conditions, what they really [opt to] where the seals are, where the seal breathing holes are and all that. Like the way the ice forms, it helps the seals have more breathing hole. So that's where the polar bears are going to be is where the seal breathing holes are. (CB2, 16 May 2020)

However, interviewees largely attributed the increasing population to harvest limitations.

> Tagging, like they stop us from killing because, well now we have to have a tag in order to harvest the bear now. It's a rule that came from the government. It's not our rule. We live off of these animals and I think it helps us in our iron and in our health. We need to eat these because that's what we've been eating for thousands of years. (CB2, 16 May 2020)

> Since the west side [M'Clintock Channel] was closed [2001 moratorium] they're starting to see more bears, summertime when they camp close by. They're starting to spot more bears on the west side, like summertime. Whereas years ago, they didn't really spot any too much bears at that time. (T5, 21 May 2020)

Changes were linked to harvest regulations protecting cubs.

> They're so protected, you're unable to hunt the cubs or anything like that. And you're only to harvest so many a year. And that is the reason why he knows for a fact that there's many, many bears today. (Interpreter translating for T3, 21 May 2020)
>
> Before the white people came around, before the tagging system, they were able to harvest whatever they want. Anything that you see, even the cubs because they're very good eating, like a delicacy. As now, starting sometime in the '70s, you get the tagging system and you're not allowed to hunt any of the cubs. And he knows for a fact that is how they know that there's a lot of polar bears now. (Interpreter translating for T1, 21 May 2020)

Interviewees reported encountering more young bears or mothers with cubs.

> From many years ago, they would be able to go hunting for polar bears quite far away north of here, seems like the only way to get a bear is the further from town you go, the better chance you get. But now you're pretty much almost like guaranteed to get a polar bear once you go out and today when you go out polar bear hunting, you see a lot of mothers with cubs. And we know for a fact that the female bears are a lot more abundant than male bears. (Interpreter translating for T2, 21 May 2020)

Increasing numbers of cubs with mothers are also an indicator that the population is increasing.

> You see more than one cub out there with a mother and sometimes the mother has one cub, sometimes the mother has two and [various]. (CB1, 11 May 2020)
>
> So, there was more sows with cubs...They come across three, I mean one female sow with three cubs. That's a good indication that the polar bear population is increasing. That's a good sign. (CB4, 20 May 2020)

Even with male-biased harvesting, abundant males are also being encountered.

> There's a lot of males around the M'Clintock. I noticed a lot of males around there and when we all harvested our bears, one season, we even still ran into a couple more males. Which are bigger than the ones we just shot. The three of us and we were like "oh, we could have waited and got a bigger one." (CB2, 16 May 2020)

Increasing harvest success is also an indicator of population increase.

> The last 10 to 15 years in the M'Clintock Channel, between one to four days at the most to harvest two to three bears. And that's something in the early days that's just impossible to find them in that kind of numbers and that kind of health. (CB3, 12 May 2020)

> There's been more of them now. What I think is their population is way up for polar bears, way more than when I was younger with my father, stepfather that when we went out guiding it was hard to find bears. But now you get even just do day trips now and get polar bears from Cambridge Bay. Such as before, we didn't do day trips to do it right? We had to be out at least a week or two. (CB2, 16 May 2020)

The abundance in polar bears today enables harvest selection because of the range in characteristics of bears encountered.

> Now for the past 10 years, every time I go out, I bring home something. So, this time [assumption] that certainly numbers are increasing, the bears are huge. I only select the biggest males. And I would pass up the smaller males like the [rest we pass up] and then we got the big males. Now in the early days you couldn't do that. You couldn't find any bears, let alone the big...male, and today, so many of them that every time I go out after the bear on the ocean or anything but it's a fact that I see a lot of bears, see a lot of signs and I'll target the bear that I want, and I have. (CB3, 15 May 2020)

Harvest limitations and male-biased harvesting have supported polar bear population growth based on observations of indicators reported by hunters. The larger number of bears has made it easier to encounter bears and harvest them when hunters receive a tag.

4.5. Changes in distribution and behaviour

Interviewees reported polar bear distributions shift with feeding areas.

> They know from the elders, from traditional knowledge it's a cycle. And they wait until the numbers start going down. The animals aren't dying off, they're moving, they deplete the feeding areas of where they are. And they have to go to new feeding areas to survive. It's just the fact of life. (CB3, 12 May 2020)

In the past, bears were rarely encountered near settlements. Today, bears often approach camps and communities, which is indicative of their abundance.

> There was bears many years ago. They don't always see or hunt bears. But once in a great while bears will come into the camp or their outpost camp, and that's when they would harvest one, or they're on a route going from one location to another and they would get into a polar bear walking by or something and they would harvest it. Vice

> versa for today, it's like you're most likely guaranteed to see a bear, or a polar bear get into a camp, outpost camp, or within the community. (Interpreter translating for T1, 21 May 2020)

Interviewees voiced concerns about bear aggression and being unable to cache their food.

> Today there are too many bears. Especially in the summertime camping out, boating, when you're camping or at your outpost camp [you are] guaranteed for a bear to come into your camp. Because they are too plentiful and we Inuit like to do our hunting and we cache our meat, we bury it. We ferment it. And you're guaranteed if you try and pick it up in the fall time in the winter, it's gone. You're guaranteed you'll lose that fermented or buried seal that they're trying to save for the winter. It will never be there. The bears will get to it regardless. No matter where we cache our meat. (Interpreter translating for T3, 21 May 2020)

> Seems like they're more aggressive towards humans. Many years ago, they, as if like see people they would run away right away. Today it seems like it's not that way anymore. (Interpreter translating for T3, 21 May 2020)

> Since the M'Clintock Channel was closed and after that a lot more bears. So, they're more dangerous in the summertime when people are camping, because they could just if they're hungry they will attack people. That part is there seem to be a lot more bears today since the policy was in place. But before that, the bears were never around to disturb families or cabins or anything like that. But today, since there's a lot more bears and stuff like that, I guess that they are more dangerous, more aggressive. They could go into community or camp or community or break up camping gear like cabins and stuff like that. (Interpreter translating for T2, 21 May 2020)

Combined with harvest limitations, the increase in human-bear encounters is a safety concern.

> He has a big concern in this area because starting in the 1980s with the tagging system, if you're out camping at your outpost camp, don't matter what time of the year, you don't have a tag and you're trying to follow the rules of the HTO as well as the government. And if a bear were to get into the camp or the outpost camp and you don't have a tag and you have children with you and you're out on your outing, enjoying your time out on a land camping, it's you know, what are you really to do? You don't have a tag and you're told not to hunt. That is a very big concern for him today. (Interpreter translating for T1, 21 May 2020)

> Before there was a polar bear regulation, policy and procedure, they could catch the polar bear any time, even though it had cubs. Today there's so many polar bears and nobody like we cannot catch them unless, you know, they're [totally] attacking. Trying to camp in the summer, spring and summer with your family and polar bear policy in place. He's afraid for his family, especially children, because the polar bear can attack any time, he's got no law or anything. The polar bear can attack the children anytime

> he wants, the family anytime he wants. But us, we've got a law that you know from that he's afraid the polar bears keep coming into the camps nowadays. Destroying cabins nowadays. There's so many that he knows that they will come into camps and all we have to do is try to scare them away. But if they're determined to come in, they will come in. (Interpreter translating for T1, 21 May 2020)

Interviewees indicated that increasing bear encounters are also due to sea ice changes and bears searching for food.

> As everybody knows, the climate change [get] longer, longer fall seasons, faster melts in the spring. So that's a weather factor on its own...Polar bears, they move a lot from one zone to another. So they don't particularly stay unless they go back to where they came from....That could be another factor would be the polar bear being a predator, like you know, they're looking for food, all the time. (CB4, 20 May 2020)

Interviewees indicated that human-bear encounters became more frequent after the moratorium on hunting in 2001.

> Before the polar bear tag ban, it was rare that the polar bears come into town. There was hardly any coming into town. But animals do know, and after the ban was put in place, the polar bear started coming in every year. So, while all this in place they will still continue to come in every year. So, it's been happening for years now after the ban...Polar bears are still reproducing. So there's more polar bears coming into the community, and as long as this ban is in place it's still going to be a problem, always a threat to the community members. Any animals that reproduce, once they get to know that something is safe area, they will go to that area and if it's not a threat to them. And polar bear is one of them. (Interpreter translating for GH3, 3 June 2020)

Elders indicated that polar bears are no longer afraid of humans; polar bears are aware that hunting is no longer a threat to them.

> Many years ago, even before he was born and after he was born...the polar bears approaching to the camp would start running away and the hunters would try everywhere to try and catch the polar bears whether regardless if they are running away, hunters would try and catch the polar bears. But presently, the quota and the ban of the polar bears see it that the polar bears knows that they won't be threatened or hurt when they come into the community, and even local people are starting to just watch them while they're in the community. The community members know that they're not supposed to kill the polar bear, regardless if it's in the community, and it seems that that's the difference. Like the polar bears nowadays knows that they're not going to be killed so they just even walk by without running away. Seems that that's a big difference from many years ago and from today's bear. (Interpreter translating for GH5, 3 June 2020)

Elders indicated handling or interacting with polar bears without hunting them also contributes to increased aggression toward humans.

> The polar bears were not being killed by biologist or the person helping them. So, in that sense it changed that the polar bears are knowing that they're not being slaughtered so they are coming around more often and knowing that there is no danger to them. Once any animal knows that there's no danger to them, they tend to start coming around closer or start coming right into the community. (Interpreter translating for GH4, 3 June 2020)

> Collecting information from the biologist by going into the polar bear country or area and the polar bears are not being slaughtered...it seems that the polar bears know that there's no trick to them. They tend to seem to be braver, not scared. Over there, over the years, anything that's happening like that, like just collecting information and not hurting them, they tend to seem to be getting tame. Able to come in close to the community or right into the community knowing that nobody is going to be threatening them or hurting them. He may be right, he may be wrong, but it seems that that's the way it's happening. Over the years, not killing them, they seem to be coming in more because they're not afraid, like nobody is hurting them so that they tend to come in more every year. (Interpreter translating for GH4, 3 June 2020)

Elders indicated that polar bears are aware of and responding behaviourally to how human relationships to them are changing. In the past, being able to harvest any bear, especially aggressive ones, ensured a balance where humans were able to safely coexist with bears. Today, bears are less shy because of harvest limitations and non-hunting interactions.

4.6. Polar bear health

Polar bears were considered generally healthy (in good body condition), except for individuals that had previously been handled in scientific (mark-recapture) surveys, which were considered unhealthy to eat.

> Those are the ones that being tranquilized before, and they notice the taste, the difference in it, and they don't really, they wouldn't, they have a second thought of eating the bear, cooking it and eating it. And the colour of the bear doesn't look as good as another bear that never been tranquilized or doesn't have a lip tattoo. On any given day, they'd rather have a hunt a bear without a lip tattoo or anything. (Interpreter translating for T2, 21 May 2020)

> Most of the ones that were caught were nice and fat and they seem healthy. But the ones that have tattoo and that, they tend to be skinnier. It's usually the older bears that have the tattoo and that, so could be because of age or that. But our elders that passed down were reluctant to have what was studied by scientists. They have tattoos and ear tags and that. And what, if they don't have tags or ear tags, or tattoos or ear tags; they

> a lot happier and know that they're healthier and they're less reluctant to consume it. (T5, 21 May 2020)

When encountered, poor body condition and scarring was associated with male combat and considered normal.

> Healthy bear is, I mean, you can see that they're fat and they're eating lots. The only time I seen a bear that was unhealthy was when I harvested a bear that got into a fight with a bigger bear, and he was wounded. Lost of all of his, scarred and he was almost ready to die. But it was really a big bear. Just from another bear that's bigger than him to injure him pretty bad. (CB1, 11 May 2020)

Skinny bears were also associated with poor hunting ability.

> He did come across couple of times, many years ago, an unhealthy polar bear. Two polar bears, different times. Very, very skinny. Either because it's either having a hard time finding a meal to eat or if it's a sick polar bear, is very hard to tell because he's not able to determine which one's sick or starving. So, they did come across two polar bears that were very skinny...been sick or starving it was hard to tell. (Interpreter translating for GH6, 3 June 2020)

However, some interviewees reported meat quality has declined in comparison to the past, in part due to changes in diet.

> He knows the meat is really different today. He think it's mostly from the like, the fast food or [all the] food [that] we're eating from the dumps and stuff like that. The quality of the meat is more different from a long time ago. And he knows like some meat are still good, a lot of polar bears are still good. But he notice some of them, they're not as good as they used to be. (Interpreter translating for T1, 21 May 2020)

Polar bears are shifting their diets to include food from the dumps, which may be contributing to lower meat quality for consumption. Interviewees were generally not concerned about health but noted on rare occasions where unhealthy bears were sighted, poor health is associated with having been handled in bear research, combat, and reduced access to prey.

4.7. Disturbances to polar bears

Interviewees described changes in sea ice conditions. Ice conditions vary every year, but interviewees reported a general reduction in sea ice season.

> Ice conditions are different every year. Every year I've gone hunting, it's never the same. And the conditions of the ice will determine if the bears will be in the area or not.

> I mean, bears are known to be around areas where they can get seals like a pressure ridge or by open water...where there's open water. I mean, seals will be in that areas and bears will be in that area. (CB1, 11 May 2020)

> Major impact that I've witnessed in my lifetime is the ice is shrinking. You know, taking longer to freeze, thawing out earlier...The water temperature, oh my god, that's been really make a difference. That water temperature, one degree you're going to see that difference. Even in my travel routes, I see the difference in the lack of ice in some areas. Oh yeah, the ice is receding quickly with the waters, the ocean temperature rising. (CB3, 12 May 2020)

> They know this fact because hunters hunt seals and they look at the ice on how thick it is, they look in the seal hole. And today for the past, starting later, like in the '90s up to today, seems like the ice is a lot thinner and we have less multi-year ice. The ice melts earlier in the springtime and in the fall time. And it's like a late freeze up. And in the wintertime, if you look through the seal hole, the ice is a lot thinner than it used to be. (Interpreter translating for T2, 21 May 2020)

Interviewees reported these changes are unlikely to affect polar bears, which are able to adapt.

> Us hunters don't have a concern about the bears of this ice condition changing. Bears are known to be great swimmers, divers. They're known to be good on ice. They're known to be on the land in the wintertime. They go denning up on the land. They're able. It's really not a big concern because they're adaptable, they adapt to the climate, whatever it may be, in the ocean, water, on land, on ice or snow. It's not much of a concern. They're very adaptable, unique creatures. (Interpreter translating for T2, 21 May 2020)

> Polar bears easy [to adapt to] environment. Whether there's lots of sea ice and whatnot, or if you don't have much sea ice, of course they go on the land. They just adapt to their environment. It's like a weather pattern they're following. (Interpreter translating for T3, 21 May 2020)

Interviewees indicated polar bears can also shift their diet. Sea ice changes may also improve access to prey.

> They have no ice to hunt when it melts earlier and [they salvage] the fall too. You know they eat something, but they get to be long stretch of eating, they find other things to feed on, like seals or that whales' carcasses that end up on the beach. They find any way to survive. They eat a lot of seaweeds and vegetation on the little vegetation on the land. Just to get something in their bellies. (CB3, 12 May 2020)

> It helps them just having that open water there. And there are a bit more seals there. That's where the bears usually are, is where the open water is. We'll find more of them

> around open water. Because it's a lot easier for the seals to make breathing holes or to [breathe even] there. Yeah, that's their buffet. (CB2, 16 May 2020)

When asked about disturbances, interviewees reported bears are particularly sensitive to noises (e.g., snowmobiles and airplanes). In the past, they were more easily spooked.

> My grandfather, he knows these animals and he said the most sensitive part of them is their hearing. They can hear. I mean they can hear anything that doesn't sound pleasant like a helicopter or plane. (CB3, 12 May 2020)

> Due to machinery with the snowmobiles, jets flying over, planes and all this because polar bears have a very keen ear. They can hear from many miles, they hear machinery, and they get spooked and it's as if harder to find (them) in a way, because of the machinery, the sound and smell. (Interpreter translating for T4, 21 May 2020)

> Today we have many planes flying over, jets, prospecting helicopters, planes flying over and hunters using snowmobiles with that sound of machinery. He thinks that they're a lot used to hearing that. Once, many years ago, once they hear something, they would run away right away. (Interpreter translating for T3, 21 May 2020)

Interviewees cautioned these sensitivities may affect the ability of helicopter surveys to detect polar bears, especially those that have been exposed to them.

> You're not going to see them all. I mean, you can hear the chopper from 20 miles on a good day that's not windy. They're just loud, you can hear them for many, many miles and the bears have very sensitive ears and [maybe] when they hear every little sound...they know what's going on, they've experienced. Some of the older bears that were around and being handled by humans, by helicopter activity...hear the chopper they're going to vacate the area. A lot of them know that helicopter is danger to them. (CB3, 12 May 2020)

Polar bears are able to adapt to changing environmental conditions. Although polar bears may show sensitivities to disturbances, threats are more likely to impact their distribution and behaviour than population abundance.

4.8. Management considerations and comparisons with science

Community members shared unique knowledge of polar bear ecology and described ongoing management practices in their communities that have focused on male-biased and tag-based harvesting. Community members also described their traditional hunting practices and indicators of changes in population abundance, behaviour, and relationships to humans. Communities reported increasing numbers of and encounters with polar bears, which is a concern for human safety. This increasing trend was attributed to reduced harvesting and improved access to prey, which is in agreement with recent scientific data (Dyck et al.,

2020). Communities also reported bears were generally healthy, which is also in alignment with reported increases in body condition (Dyck et al., 2020). In these contexts, we describe some considerations for research and management below.

Elders cautioned that polar bears should be respected; they respond to and are aware of humans. This consideration shapes how community members conceptualize, relate to, and speak about polar bears.

> Even if we speak of polar bears, we have to speak respectful of them, even though they cannot hear us, we're not with any polar bears anywhere. It's as if they know what we are saying, what we're talking about. We cannot say hopefully a polar bear can come so we can hunt a bear, they know their well-being, they're as if they know true spirit that what we are saying. (Interpreter translating for T4, 21 May 2020)

From the elders' perspective, the inclusion of their concerns in polar bear management has been inadequate.

> With polar bear information gathering like this one going on right now, before the meetings to be held in September, it doesn't really make sense to him. It doesn't really make sense to him if the government try and come up with another excuse to keep the ban in place after hearing all these concerns from the Elders and all the information put together for the meeting that's going to be held in September. So, there's always problems and excuses or something coming up every time he try and come up with solutions. (Interpreter translating for GH5, 3 June 2020)

Although they are not always supported by community members, management practices are always followed. Harvest regulations using tags were imposed on Inuit and not considered part of their traditional way of life. This needs to be acknowledged.

> For this tagging system, before it was introduced, a hunter was able to hunt a polar bear and whether if it have one, two or three cubs and he can harvest all those, how many bears the cubs have. And it was a way of life. This who we are, we hunted. And introduce with the tagging system was really not their way of life. It was forced on us. And it's still forced on us, even up to today. We're allowed only one polar bear per person, and it's per household. And this area needs to be revisited and be fixed to a way where we can do what we used to be able to do, before the tagging system was introduced. (Interpreter translating for T2, 21 May 2020)

In the past, helicopter-based methods or surveys that involved tranquilization were also not supported by Inuit. These methods are still criticized today for having affected polar bear meat and behaviour.

> After we got biologist, polar bear biologist coming up north, and the bears that have been tranquilized or that has been tranquilized before, they don't taste as good. The meat looks a little different. It's noticeable when they talk within other hunters and elders. They can taste the difference between the bear. And it's not as fat and as tasty as a bear that has never been tranquilized. That's a known fact. (Interpreter translating for T2, 21 May 2020)

> The biggest concern for Inuit is people doing studies; scientists and that. We don't like them when they're being disturbed in that area. Other than that, choppers flying around for expedition or survey or whatever. But I think that those are the ones that mostly [disturb] within our area. (T5, 21 May 2020)

These past events have contributed to the ongoing lack of trust by community members in management and research. Community members are concerned that polar bears are being overprotected. A precautionary approach to management conflicts with harvesters' needs and their relationships to animals.

> My concern is that they're being too overprotected right now when the population is really healthy. And I would like to see less activity on the range of the bears 'cause like there's, you know, when I mentioned that their senses are really keen, their hearing. Anytime you send a helicopter, that's the worst thing you could do, send a helicopter up there into polar bear country. (CB3, 12 May 2020)

> The rules set by the government, the regulations, quotas put in place, it's a very awkward way of living. Because many years ago there was no quotas, no boundaries, no nothing like that, and they were able to hunt polar bears whenever the hunter needs to catch a polar bear. They did not have any regulations or rules to go by…If he wants to hunt an animal there is no way that he can be allowed to hunt animals because down south they have all these rules and regulations. (Interpreter translating for GH5, 3 June 2020)

An increase in polar bear abundance is a serious safety concern for community members.

> We did a bowhead whale hunt in 2013 to the same area I was in as a child. We just about got attacked from a polar bear that just about ran into, walked into the tent. And daily polar bears would come into camp on a daily basis. And this I never ever saw as a child because back in the '70s. I used to see hunters just come into town, would find polar bears on their sleds, and this was before the tag system. But then again, the Inuit did that out of fear of the polar bear, way back in the day. To keep the population down and which is not happening anymore today. So, the population is booming now. (GH2, 17 June 2020)

More tags are needed to accommodate the increase in bear numbers and encounters. More tags can also improve access to polar bear hunting opportunities.

> We can only harvest some of the polar bears, from my understanding, and it's not enough...My whole family's been hunting polar bears since, all their time, so when they grew up in this town there was no tags, so they were able to harvest polar bear when we want them 'cause they're delicacies to the community. Polar bear was harvested, and the food was used. The meat and the hides were used for clothing or whatever for family to sell the hide and make some income so that they can buy things in the community. 'Cause it brought income. So, if they can increase the amount of tags they get, or would be great for any locals to have an opportunity to harvest polar bears. Not very many are able to harvest due to the amount of tags that are available, there's not so many people that can harvest. (CB1, 11 May 2020)

> My biggest concern is people trying to scare them off and try to sleep at night. You know, if the bear is hungry it's going to come back. There should be more tags. I know it that defence kill it's no issue towards that but there seem to be a lot more bears on the west side [M'Clintock Channel] today. So, when we go out camping when we see bears more often in the areas where we go out camping summertime. (T5, 21 May 2020)

> He knows for a fact that there is a lot of bears getting into camps lately, no matter where you are. Even in Gjoa Haven and Kugaaruk they get into the community, or into people's camps. And, you know, like, what are you to do? And they're so protected by the government and you don't have a tag, well you're not able to shoot it. And, you know, what are you to do? It's almost senseless not to protect your campsite, yourself, and whatever it may be. Vice versa when he was a child, where in his parents' time, with the dog team, they haven't really seen much bears getting into their camps or their outpost camp. There is too many bears today. (Interpreter translating for T1, 21 May 2020)

Even without harvest limitations, community members have traditionally adjusted their harvest practices to prevent overharvesting, for example, shifting to a focus on other more abundant animals when polar bears are scarce.

> The problem is a major concern to any communities help with each species of animals that they survive on, they rely on over the years and definitely a large part of it is how they manage them. You know, our people always had a way of managing what they harvested. And you know, gatherers, we gathered different types of meat with us [and from when] a certain time ago we harvest [basically] other times like spring and summer and the winter, the seasons, the four seasons, you know, there's times when you can't harvest fish, there's times when you can't harvest seals and so those times we always had something to fall back on, like fermented food is a lot of what I grew up on, stashing food, all our gathering and stashing and make sure that it's healthy enough to feed on. (CB3, 12 May 2020)

Harvest management should also accommodate differences in weather and population patterns year-to-year.

> Every year is always different. We have some really good years where it's abundance of polar bears. And when it's a good year we should follow that and harvest more, be able to harvest more polar bears. For a lot of us have wife, we have children, we have daughters that would love to harvest their first polar bear. And this was shared for many, many generations. And it's our way, Inuit way of life, to try and get our family members and encourage them to harvest their first bear. And we're unable to do this because there is just never enough polar bear tags. (Interpreter translating for T2, 21 May 2020)

Some interviewees suggested removing a time limit to using tags, because of the resources and effort that are put into harvesting.

> It's not an easy hunt and you do spend a lot of money to get fuel and food and all the supplies you need to go out there in minus 50. So, for them to give you 10 days it's something that could be adjust and give the hunter a lot more time or whoever's name drawn, you can have the tag 'cause as long as they have it, they harvest it and I mean that would be great. (CB1, 11 May 2020)

> Just hopefully hoping that they're able to increase the amount of days that the hunter can receive them and there's...nowhere else or endangerment to polar bears and they're all throughout the [10] years I've been hunting, they've been in increasing. (CB1, 11 May 2020)

This adjustment can also accommodate hunters who are employed.

> Everybody signs up, there's just, you know, it's just the everybody signs up. But it's always the same people getting bears almost all the time. Because there’s most of them got jobs and the time that their time is on, it just doesn't match up with the time of their time off of work, so they don't have a choice of taking a tag or giving it up so they've got to give it up if they're not getting time off of work. So, there's a lot of working people out there that they'd like to shoot a polar bear, but it's their job is important, too, for them right. They just don't get time off at the right time...The way I've seen it here in Cambridge Bay is always most of the same people getting the bear because they're determined, and these guys are, most of them. There's not too many bear hunters here in Cambridge Bay. (CB2, 16 May 2020)

More time for hunting can also permit younger hunters to learn how to hunt.

> I've met nobody there who know what to look for and a lot of them come back with nothing. They get screwed 'cause they come back, and they don't know what they're looking for or where to look. So, I guess it's somebody like myself that's done it all the time know where to look. I've never come home without a bear in the last 10, 15 years. Because I know the areas where they hang out, where they look for the bearded seals, where the very high density of bearded seals. I hunting [there and looking for] and I find them all the time [as opposed to] a young fellow that's never been out there and doesn't know where to look. I try and share information with my younger generation

[like] going out to look for the signs. If you see a sign about the polar bear that you want one, don't give up on it, just stay on it 'cause they spend hours and hours sitting on their seal hole, waiting. (CB3, 12 May 2020)

> It’s quite the change. I think a lot of more young people are now [they like it more] to sign up. So, we have a lot more experienced young hunters that are coming through the guardian programs that the HTO done over the years. So [definitely a lot of] young hunters. They signed up and I tell you it's a long wait if you are on the bottom of the list. (CB4, 20 May 2020)

However, community members still recognize the importance of having some regulations in place to prevent overharvesting.

> He's all right with the [tagging] the system on how it's being [dealt] today. Because you know, if we don't have those in place then they can be overharvest and then we can only hunt so many bears per year. The way this management system is, supports it...having this tagging system as well as policies, procedures, laws in place. They are there for a reason. Management, no matter what it may be, in life, we have to abide by the rules. Because if there weren't...you know, things can deteriorate right away if they [weren’t] in place so he's happy that there is a loss and whatnot that we have to follow by. (Interpreter translating for T3, 21 May 2020)

> Today we have stories. We have many animals that we can hunt. There are seasons, whether it be polar bear, caribou, whatever it may be. Times has changed and we have to go with these changing times and adapt to it and create policies, procedures or laws that help us in either way. (Interpreter translating for T3, 21 May 2020)

Some interviewees were not supportive of boundaries around polar bear populations. Polar bears are known to move between M’Clintock Channel and Gulf of Boothia.

> He don't like the [tagging] system. He don't like the fact that there's boundaries. Like, for an example, we can only harvest so many in some certain area and we can only hunt in these certain boundaries with this tagging system. For us real experienced polar bear hunters it would be nice if we, you know, get a tag, and then, hunt where we want to hunt the bear and expand the territory or the boundary, you know. And you're told, okay this bear tag is only for Gulf of Boothia and that's the only area where you can hunt. We don't like that fact that, okay, to be told you can hunt this tag only this boundary. Because we know no matter the west [M’Clintock Channel] or the east side of Boothia Peninsula there is many bears. We should be able to hunt where we want. (Interpreter translating for T2, 21 May 2020)

> The way I see that the biologists and the scientists seem to be doing everything wrong, according to our knowledge. And the west side [M’Clintock Channel] was closed after they thought it was declined, well it declined in that area. But the bears usually shift to areas where there's more plentiful of what they’re prey, seal. So, we figured they went towards the east side of Boothia Peninsula. So, they were in Gulf of Boothia. And we

> tried to explain that to the biologists, but [to no avail]. Of course, we don't go by paper and that, so Inuit doesn't go, they don't go through that. And they didn't have the on hand, the scripture or the writing. So, they didn't believe us for a while but then after that, they found out that our words were true, and they migrate here and to the east, to the west of Boothia Peninsula all the time. (T5, 21 May 2020)
>
> The government boundaries and quotas, while the polar bears and animals don't have any boundaries. For example, on the map you set up a boundary or a line, and the hunters not supposed to pass that line. Well, the polar bear has no lines to cross. The polar bears are moving down south one place to another. They can either be inside the boundary and while the hunter is going after polar bears out of the boundaries, suddenly the hunter cannot catch that polar bear because of the boundary made by the government. That's something that's not very good with today's rules and regulations, is that the government sets boundaries and quotas while the polar bears and animals have no boundaries. And the number of them increases like it doesn't make sense. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June 2020)

Population mixing with Gulf of Boothia has also been scientifically suggested (Paetkau et al., 1999; Thiemann et al., 2008; Dyck et al., 2020). Gjoa Haven elders were particularly concerned for the safety of younger hunters travelling to Gulf of Boothia (due to few tags for M'Clintock Channel), which is not part of Gjoa Haven's traditional polar bear hunting area.

> It's been years now that we've been concerned about the younger generations polar bear hunting over at Gulf of Boothia. And as part of the concern, even during the HTO meeting in the past, he raised the concern in Cambridge Bay during one of the wildlife or HTO meetings, that it is not safe for the younger generation to be heading to a totally different area, Gulf of Boothia, not knowing what to expect. As of today, he's still worried about that happening for the younger generation to be heading out that way for the polar bear hunts. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June 2020)

Gjoa Haven hunters need to travel further to Gulf of Boothia, which requires more time, safety risks, and resources.

> The community is [really interested] in catching polar bears. But due to the fact that they have to go behind to Gulf of Boothia, a lot of people have hard time getting that far due to expense of gas, grub, and breaking down machines and whatnot. They have more comfortable going up to M'Clintock Channel because it's closer and they know the area. Whereas they don't know the area around Gulf of Boothia, they had different ice condition due to currents and there are some areas where it's thin, people [do] all that from here because that's not their hunting ground. (GH1, 3 June 2020)

Community members also criticized scientific methods for being inaccurate and unable to fully capture population abundance and seasonal or between-population bear movements.

> Part of his concern is that the biologist doing data information on polar bears, they are never accurate, the area never right because the polar bears are moving from one place to another. And the other thing too that the polar bears are white, white like the ice and snow, so that can be sometimes that the biologist or the polar bear counters miss a polar bear. So, the number of polar bears being counted, he know that they will never be right because they either miss or moving from one place to another. So, it's been many years the area has polar bears from many years ago, and even as of today. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June 2020)

> Inuit believe that the Boothia Channel or Boothia population and the M'Clintock polar bear populations are the same and we figured that they just moved, they just moved for more opportunity for seal and stuff. Or there's just too many big males. The smaller males tend to move away, they get bullied. There's a lot of speculation on actually why our population went down [as reported in 2001]. Another one was, we believe that researchers doing the surveys with helicopters from bad weather, we believe, and this is from experience, from watching [biologist] and them. They would do their surveys in May. And the whole month of May it's usually so white out that the helicopter is 75 percent of the time just grounded. And just weather-hampered surveys they get. And they don't take that into account. They don't do a 100 percent survey because of weather. And because I've seen this where helicopters just sit. A helicopter would sit at camp for a week and take a half a day run and then count 4 bears. And then that's what they got for the two weeks. So, I think if they change the season of when they're doing their surveys might help. (GH2, 16 June 2020)

These limitations are acknowledged in scientific reports (Dyck et al., 2020). Communities understand that there is a lack of capacity for frequent scientific surveys to collect data on and monitor polar bear population changes.

> I understand that the GN doesn't have the capacity to work in all three regions, because you only have one polar bear biologist. Isn't that a factor as well?...Even the regional wildlife boards had each hire their own biologist and that would be something of a system, and expedite a lot of, you know projects on the go and whatnot. That's my thinking anyways. If only I had a million dollars. (CB4, 20 May 2020)

One interviewee recommended conducting surveys later in the year when bears are easier to spot and count.

> I think June would be good because that's when most of the fogs lifted and it's not so white out, maybe end of June. They'd be much easier to spot on land and ocean, 'cause there's less snow out. And a helicopter can land on the ice north of the island easy right till end of July maybe. (GH2, 16 June 2020)

Traditional knowledge can be a source of invaluable and otherwise unavailable information, especially when frequent monitoring and data are needed (Dyck et al., 2020).

> Here's always Elders' groups, meetings, and they're always talking about things from the past and that's one of the topics that's always brought up is, the prey species that we depend on and polar bears are really one of the major topics. And those are really nice to listen to. You know, you get a chance to go and listen to some Elders when they're gathering. Priceless information. I mean you don't get that anywhere. You know they understand, understand what the animals are doing. (CB3, 12 May 2020)

> Oral history and I'd like to see training, more training of oral history or with IQ included. Not just, not really training but for young hunters to take that knowledge from more experienced hunters. What to expect and you know, and don't oral history is maybe vital. [It's so important] to have to carry that traditional knowledge. (CB4, 20 May 2020)

In general, an appreciation for and understanding of Inuit traditional knowledge is needed by scientists, decision-makers, and the public-at-large.

> If they were here, if a scientist was here and do studies for, say, five years, they would understand what's going on up here. But they don't. So that's what frustrates us because we understand what's going on in our area, in the north here. Matter of fact, if you tell a southerner we still live in igloos and we have running water. They'll believe that...they become biologist and they're still learning as we're learning every day, as we go on. But that's what changes the dialogue or harvest of polar bears or the way we live up here because of misunderstanding or not enough knowledge for the people that make the rules and regulations of, that we have to follow. (T5, 21 May 2020)

> We try a lot of times to make recommendations, but we were seen as people that have no knowledge because we can't keep a record. And we don't have written paper or any records of what we did and know. But what the way we do the things, the Inuit, is bring knowledge and information from generation to generation. Through our word, through our experience, with like, we go out on the land and we experience all this. That's how we keep our record up here in our head. (T5, 21 May 2020)

A lifetime over which IQ of polar bears evolves is much longer and broader than the shorter time scales of scientific studies. However, like science, IQ is continuously updated and revised as new information (experience) becomes available and comparisons with existing information are made. The knowledge of historical and cyclical changes that has been passed down from generation to generation occurs over longer time periods than most scientific studies and can guide interpretations of scientific models (e.g., extrapolating across time). Scientific models may also fail to take into account impacts to human safety and livelihood. Inuit knowledge of other ecological factors impacting polar bears (e.g., loud noises and human interactions) can also highlight variables and parameters for consideration in scientific sampling and analyses.

5. Summary

IQ offers unique insight into changes in polar bear population, behaviour, and relationships to humans. Community members who harvest from M'Clintock Channel reported increasing numbers of bears based on their observations and experience on the land, which has led to increasingly dangerous human-bear encounters. The trends reported here are in agreement with scientific data (Dyck et al., 2020). Community members recommended increasing total allowable harvests to reflect population changes, which would also encourage balance in how bears relate to humans. Communities criticized management for not adequately considering their perspectives, nor Inuit traditional hunting practices and relationships to animals. Collaborative bear research and management could improve with a better understanding and appreciation of IQ by non-IQ practitioners, and more resources and capacity to include IQ in knowledge production and decision-making processes.

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Appendices

Appendix 1. Description of polar bear management

This year, Cambridge Bay community members received four tags for M'Clintock Channel, as well as three tags for the Viscount Melville Sound population (Hadley Bay). Interviewees indicated that it is more difficult to harvest polar bears at Hadley Bay and, as a result, M'Clintock Channel tags are often used up.

> If you're going steady, about two days to get there. Because you got to carry a lot of gas, and you're so hard on your equipment if you're rushing. All that heavy gas and everything you just got to carry so much, for that run, that's too far. And it's a tough place to hunt. There's a lot of current there. A lot of these people don't know the currents over there. (CB2, 16 May)

Gjoa Haven community members traditionally harvested only from the M'Clintock Channel population. After a moratorium on hunting in 2001 and quota limitations were put in place, community members were given tags to harvest from the adjacent Gulf of Boothia population. This year, Gjoa Haven received four tags for the M'Clintock Channel.

> When I go into the M.C. Channel, like M'Clintock Channel, a lot of the times I'd head up to the cabins at Cape Sydney. That's about 95 miles north of Gjoa Haven. And from there I'd either go out directly north towards Cape Alexander. Anywhere around the area there seems to be a lot of bears. And then when I go behind Taloyoak (Gulf of Boothia) I prefer it to go further up into the islands that are about 80, 90 miles north of Taloyoak. (GH2, 16 June)

Taloyoak community members received four tags for M'Clintock Channel, as well as 25 for Gulf of Boothia. Because of the limited number of tags, the community harvests fewer bears from M'Clintock Channel overall.

> Now they're only allowed four tags each, at Cambridge [Bay] and Gjoa Haven. And we get four tags as well. So, we don't do very much hunting in that area anymore. (T5, 21 May)

One interviewee described differences between M'Clintock Channel and Gulf of Boothia polar bears, although they are known to travel across boundaries (see below).

> The bears on M'Clintock Channel area seems to be more slender, less fat. And it's always been that way, they always heard of it. And it's still like that today. And for Gulf of Boothia, you have the open floe edge area behind Astronomical Islands. The ice would close up, freeze, and then through the cycle of the strong current following the moon, the ice would open up. And there's many seals. And wherever you have a floe edge or open water, there's known to be more seals and more bears in those areas.

> And that is the difference and we've known it for a long, long time. (Interpreter translating for T2, 21 May)

Interviewees indicated that overharvesting results in a reduction in quotas in subsequent years.

> We only get so much tags to, you know, harvest polar bears. That's what we try to go by; we try not to overharvest. When we overharvest, for defence kill or something, around the community, one tag is taken out from our quota. You know, if it's a female that's been caught in the community it might cost us two tags. So, we can't overharvest what is given to the community in terms of quotas. Today that's the only way we could hunt polar bears using quotas from the government. (GH1, 3 June)

To avoid overharvesting, HTOs distribute tags through a lottery and hunters are given a time limit to use the tag. If harvesting is not successful, the tag is returned and passed on to another hunter.

> They give us 10 days to catch the bear and if it's not [used it] within the 10 days then they pass it on to the next person. (CB1, 11 May)

> Usually, the HTO would give us about five days to pack up and get ready. But once you're actually hunting out there, there's really no time limit until you come back home with or without a bear. And then when you do get back, usually we pull another name from the draw. (GH2, 16 June)

> There's usually more hunters than the tags that are open the first time. So, they draw all the names out like a lotto style. And then those first [hunters] who want to go out polar bear hunting. But they're allowed to keep their tags for three days or depending on the weather...as soon as they come back, they're asked to bring the tags back right away 'cause there's other hunters that want to go out, take a crack at catching a polar bear. (T5, 21 May)

> Here in Taloyoak, he knows for a fact that it's been like policy or procedure for many years up to today. If you grab a tag at a local HTO office or Department of Environment, they have three days to hold on to the tag. It can be due to weather or waiting for some money to buy gasoline and grub...As long as they have a tag and they are out on the land, usually the hunter can stay out as long as they want. They could be out for a day, two days. They could be out for two weeks or even a month as long as you're out on the land with the tag. (Interpreter translating for T1, 21 May)

In addition to quotas, harvest regulations also protect females and cubs.

> Can't shoot the younger bears that are with the mothers because they're still too young and so if there's a bear that by itself and no mother around then you know. You can harvest the bear cause it's shown that is the mature bear and that go out by himself, a bear that's worth harvesting. (CB1, 11 May)

> They see bears right away, but if they have cubs, they (hunters) don't bother with them at all. 'Cause we're not allowed to catch polar bears with cubs. But if they are alone and if it's a male or a female full-grown, they'll catch. (T5, 21 May)

Hunters' selection for larger males for the sale of hides also further supports this bias in hunting.

> Females out there and males, you'd see a bunch of young males growing up and you should try to stay away from the smaller ones and get the bigger ones because for some of the hides you could get a lot more income off of it. (CB1, 11 May)

> The majority of hunters hunt big bears, the bigger, the better. More money (if you are going to) sell very high, as well as whether it's a male or female, as long as they don't have cubs. And it's mainly because the cubs are protected by the government. (Interpreter translating for T4, 21 May)

Appendix 2. Map of the M’Clintock Channel polar bear subpopulation

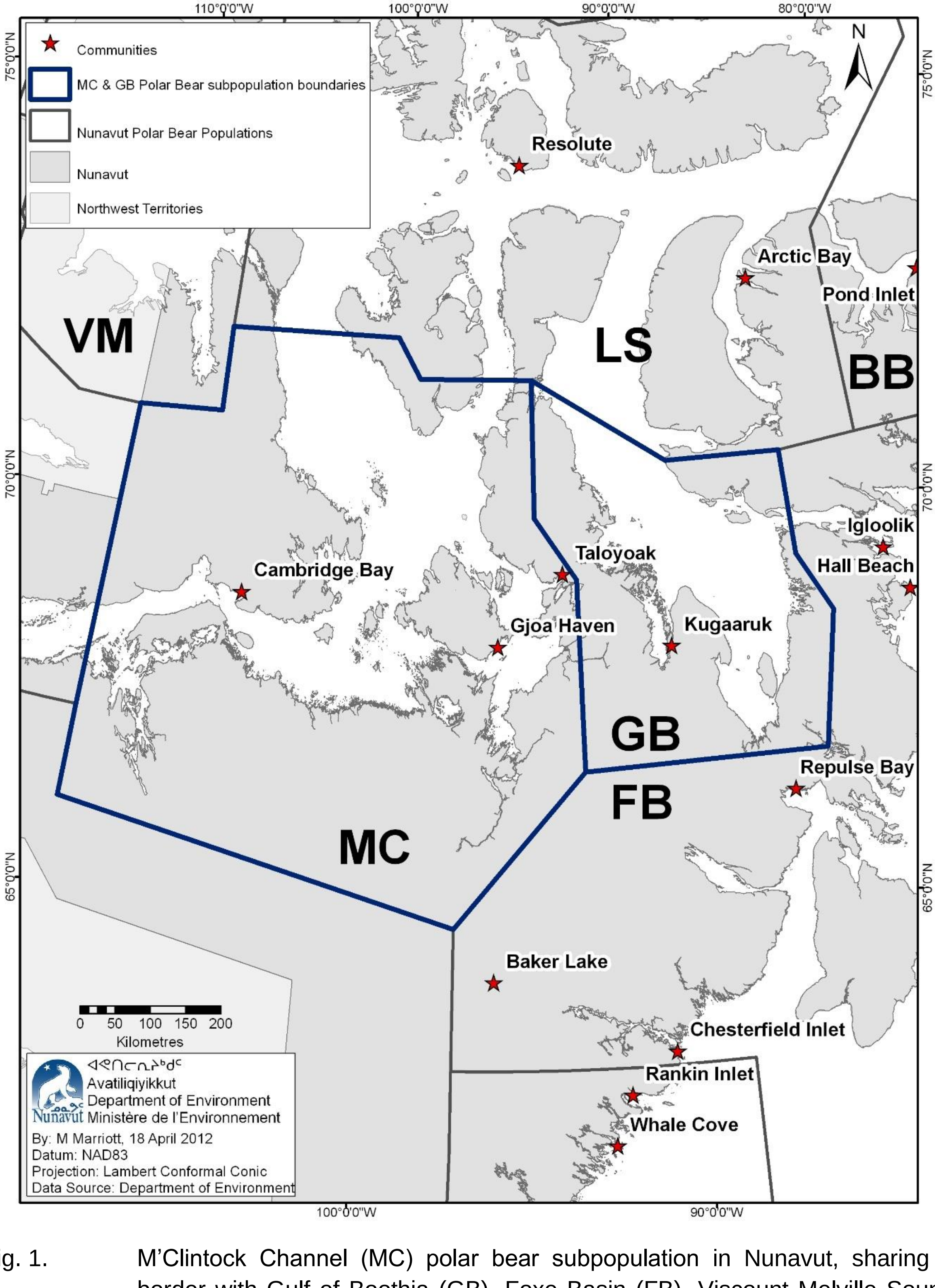


Fig. 1. M’Clintock Channel (MC) polar bear subpopulation in Nunavut, sharing a border with Gulf of Boothia (GB), Foxe Basin (FB), Viscount Melville Sound (VM), and Lancaster Sound (LS) subpopulations. The Baffin Bay (BB) subpopulation is also shown, as well as the communities in these areas.

Appendix 3. Additional quotations

IQ of polar bear ecology

> Mostly bears seem more personality than other animals. We know, we know other animals have different personalities. But the polar bears seem to have more, almost like in tune with human. (Interpreter translating for T1, 21 May)
>
> Because they know that they're being hunted by humans. Whatever the humans cannot go through, the rough ice that's where the bear likes to be, it's their environment. That's their livelihood. They're run away to those areas. If it were to be [smooth] ice and, you know, it seems like harder to see because they're out in a rough ice and trying to be away from being hunted. (Interpreter translating for T3, 21 May)
>
> When it's really cold, say March I mean, January and February they usually be in their dens, even if it's a full-grown bear, even if it's a male bear. 'Cause it's cold and bad but they, from my experience and what’s passed down to me from my dad and relatives, is when there's moonlight and the [rutting] season starts around March area, that's when they start, the big bears start roaming more. And it's a lot easier to catch bears that time. And they usually go close to the floe edge, where there's open water, where the ice is thin. But they don't go far from the land. (T5, 21 May)

Description of hunting

> Many years ago, they were able to hunt whatever they see. They see a mother and a cub there, they harvest food. They see a big boar [male bear] then they harvest that. Whatever they may, whatever they see polar bears back and then, they will harvest it. Today is totally different. You're unable to hunt whatever you want. And you have to go through the tagging system. You got to hold on to a tag in order to harvest a polar bear nowadays. (Interpreter translating for T3, 21 May)
>
> Some elders prefer to catch younger ones because they're more tender, smaller bears. Some people prefer—possibly more people prefer the large male bears. Of course, it's hard to find work up here and they do have some price in them, to sell them. (T5, 21 May)
>
> Depending on the condition of the ice, it's too thin, our community is usually opening or postponing the tags to be open...Sometimes they finish them before the hunting season is over by the 31st [of May]. But sometimes they have some more tags that we never use. They always have some leftover. Depending on the year, I guess, if there's good bear hunting. Like every season is different. Every year is different. (T5, 21 May)
>
> Most of the guys that go out polar bear hunting, depending on how much daylight there is at the time they go polar bear hunting, most of the guy that go out polar bear hunting go out in the morning and come back with a bear. And sometimes some guys go out for three to four days. (T5, 21 May)

Changes in abundance

> From the ‘60s and ‘70s, from those early time, few bears, very few sightings to sightings every time I go out on the east side of the island [M’Clintock Channel], I'll either spot them or see first signs of them. So, compared to way back, 50 years ago, the population just boomed. It exploded in this region. I hear people say otherwise. (CB3, 12 May)
>
> They used to use dog team, once in a while they see the bear out in the outpost camp or out on the sea and they'd get a polar bear every so often. But it seems like there is a lot more polar bears within the last years, like starting around ‘90s up to today, even though we have snowmobiles. Seems like they're easier to see. (Interpreter translating for T1, 21 May)
>
> I believe this moratorium has made a population boom of polar bears and the Inuit are scared now because there's too many polar bears. 'Cause way back in history as a kid growing up, even in the Boothia peninsula I used to go out polar bear hunting and you wouldn't see polar bears at all. (GH2, 17 June)
>
> When I first moved here in 1981, there was never any polar bears when you travel between here and Taloyoak, never see any polar bear tracks. You get the occasional polar bear that would wander into town. But it was very rare. But now today you go north of the (King William) island, the polar bear population is booming. (GH2, 17 June)
>
> There's much more, much more polar bear tracks. Like for example, polar bears like to use pressure ridges and cracks in the sea ice where seals may keep their blowholes open or breathing holes open. But I noticed, because I went on two trips, the first trip I went on was in April, and I noticed a lot of polar bear activity. But we didn't get any polar bear on the first trip. So, the second trip I went down I knew exactly where to go because of what I seen on a trip before. But I noticed there's a lot of polar bear tracks out there now. And the bears are very healthy. (GH2, 17 June)
>
> The population's grown. Just lots of polar bears out there and the government or I guess it's controlled. For our area anyways, we don't get very much tags now. When I go out hunting we usually see between 16 and 24 polar bears trying to tag along. (CB1, 11 May)
>
> Population's growing. I mean, the bears that are coming around, there's some that go into the ones that are coming really close to town are just young, mature bears that just left their mothers and looking for food. (CB1, 11 May)
>
> Mainly the six footers are the ones I have always had trouble with, like even the one with you (was) that size, they're all that size. The bigger ones never seem to bother. Yeah, but then there's the sows and the cubs. They come in and they try to go in the camp too. When the mother’s hungry. (CB2, 16 May).

The number of polar bears have increased dramatically. Especially seems like the smaller, younger bears are very many and easy to see. (Interpreter translating for T3, 21 May)

For the hunters that are going out, they always seem to have a success every year with the polar bears since the total allowable harvest increased to four tags. Once the HTO does their job for the tags and the hunters are gone in February, before end of February anyway. So, the four tags are always used. (CB4, 20 May)

Changes in distribution and behaviour

There was signs of them. It was four years ago, there was two bears into town. But every year since, there's polar bear tracks close by town every spring that they're walking just on the outside of town, going north or east. And last year, every year now, there's bears just in close to the town and I mean people go out there with their vehicles just to take pictures of them. (CB1, 11 May)

It was just last month that there was a polar bear coming into the communities, and it was not only once for that same polar bear coming in, right into the community. Less than a mile from here. Just uphill from this HTO. So, every year they are coming in and the last one was just last month. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June 2020)

After the ban, the polar bears are coming in every year, and even during summertime, they will come around, as opposed to the community or the town during the summertime. Most likely even through the camping grounds, where people are camping. And so, every year the polar bears are coming into the community. Even during summertime. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June)

Many years ago, the polar bear hunting, catching the polar bear there was never any problem because of no quotas in place. But after the government first started taking quotas on polar bears [he said] they have become a problem. And it became a problem with the hunters [shooting in the] community because whenever the polar bear comes into town or gets too close, and if it's killed, it's like illegal to try and kill polar bear without quota so it's a problem in today's way. Compared to many years ago 'cause many years ago there, polar bears are, show [up in the camp, because of] the campers or the community are happy to be getting meals to eat. But it's totally different today. After the quotas were put in place. (Interpreter translating for GH5, 3 June)

Many years ago, the polar bears were harder to get. But after many years of biologists collecting information, polar bears not being threatened, or not being slaughtered or killed by biologists and with limits on polar bears and requiring tags to hunt them. It's the number of polar bears being killed are way less than years ago, so it seems that the polar bears are learning that they aren't going to be killed. And it's different from many years ago. But years ago, it was not coming to town, but presently they're more

of them coming into town because they're not being in danger or like not being killed locally. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June)

Polar bear health

I've always noticed the M'Clinctock Channel's bears are not as aggressive as the bears in Boothia. But that may be due to the size of the populations because the bears I get from the M'Clintock Channel have a lot less scars. They don't look as beat up and they're healthier. They have much more fat, whereas the bears in Boothia, they tend to have a lot more scars. I guess there's too much competition for food or they seem to be a beat up a bit more in Boothia...The bears in the M.C. Channel have always been much healthier for me anyway compared to the bears in Boothia. But again, like I said, it may just be from the population size. (CB2, 17 June)

He don't know if it's because he's in his old age. But he notice a difference in polar bear fat many years ago [vice versa] for today. Seems like the fat of the polar bear looks more like seal fat in a way. And seems like the taste is different, a little. The quality of the meat is different from many years ago. (Interpreter translating for T3, 21 May)

Interactions with other animals

Big polar bear and a very big muskox were fighting each other. And this fight, they could see the tracks, the prints in the snow. And they tracked them down and they tracked down the bear was dead. It got killed by the big muskox and the muskox walked away. So clearly the muskox won this fight, even though they are both very big, a very big polar bear and a very big muskox. And that's pretty much the only thing he heard of. He hasn't seen it before, but he heard of it. And that's what happened before. And he doesn't know of any polar bears interacting with other animals. (Interpreter translating for T2, 21 May)

Sometimes the wolves are killing the cubs. And they're always looking to take their catch away. You know how a bear catches a seal. The pack of wolves are always looking to steal that from the bear. It's always food, right... Seen a pack of wolves attacking a bear for its kill, for its seal. Yeah, they don't like wolves and they don't like humans. (CB2, 16 May)

Management recommendations

That area where having the tagging system and having follow rules is not a good thing for us in a way, because that is the reason why there's too many polar bears. And then if we have less restrictions then we'll be able to hunt like we used to. And they would be the polar bear management of having too many bears coming into camps. And that would solve a lot of problems as well. (Interpreter translating for T3, 21 May)

We have rules and regulations to follow. And it is okay to follow these today. Because there are many people that would go out and do whatever they want. It is okay to have

this in place and practice these. Where many years ago, we didn't have these laws. Sometimes they would be hungry for a few days, their father is a hunter, they would go out hunting and they don't always harvest the animal they're hunting. Whether it be caribou, seal, polar bear or whatever it may be, and they would go days without eating. (Interpreter translating for T3, 21 May)

The government sets boundaries right. Polar bears don't have boundaries. They go anywhere. (GH1, 3 June)

You ran out of time your amount of days and when you spend so much money to try to harvest it and when you run out of days you're forced to give up the tag and someone else has to go. (CB1, 11 May)

Hunting to Gulf of Boothia. His main concern is the younger generation not knowing exactly what to expect because it's different from this area where they usually used to go polar bear hunting. That's one of his big concerns that something may happen to them because it's a different area, different scenery and it's different...Different ice conditions, not knowing what to expect, and this is for the younger generation, that's his main concern. (Interpreter translating for unidentifiable Gjoa Haven elder, 3 June)

My preference would be to go to the M'Clintock channel, as travelling to another community, going on the polar bear hunts not very traditional to start with...not everyone does that but going to the Boothia usually causes delays because we have to travel to another community. (CB2, 16 June)

SUBMISSION TO THE NUNAVUT WILDLIFE MANAGEMENT BOARD

FOR

Information: **Decision: X**

Walrus Sport Hunt Applications for 2022

Background

In May 1999, the Nunavut Wildlife Management Board (NWMB or The Board) approved an interim policy for evaluating requests for walrus sport hunting in Nunavut (Appendix 1). According to the policy, the NWMB shall approve plans for walrus sport hunting before licenses are issued. The Board further requires that those conducting sport hunts report their struck, lost, and landed animals at the time of application the following year.

The NWMB on August 30, 2021, issued a call for walrus sport hunt applications to all Hunters and Trappers Organizations and other interested individuals or outfitters for the 2022 harvest season. The deadline for submission of applications was November 1, 2021.

Status

Hunt applications were received for the Hudson Bay-Davis Strait (AW-05) walrus stock and the Foxe Basin stock (AW-04) (Figure 1). The following table summarizes the sport hunts requested for the 2022 season:

Applicant	Community	Walrus Stock	Sport Hunts Requested
Jonathan Emiktowt - Touring Southampton	Coral Harbour	Hudson Bay-Davis Strait (AW-05)	5
Darcy Nakoolak	Coral Harbour	Hudson Bay-Davis Strait (AW-05)	10
Aaron Emiktowt - Siku Tours	Coral Harbour	Hudson Bay-Davis Strait (AW-05)	7
Leonard Netser - Ancient Arctic Tours	Coral Harbour	Hudson Bay-Davis Strait (AW-05)	6
Luke Eetuk - E&E Outfitting	Coral Harbour	Hudson Bay-Davis Strait (AW-05)	7
Henik Lake Adventures	Arviat	Hudson Bay-Davis Strait (AW-05)	4
Hall-Beach Hunter's and Trappers	Sanirajak	Foxe Basin (AW-04)	25

Thirty-nine (39) sport hunt tags were requested by Coral Harbour and Arviat outfitters for hunting from Hudson Bay- Davis Strait- Management Unit AW-05. This management unit is shared with Nunavik and Greenland. A comprehensive, systematic science survey did not occur for this stock and there is no reliable population estimate. Currently, due to the limited amount of data over the stock's full range, it is not possible to determine the size or trend of this stock. Coral Harbour has a community quota of 60 walrus per year (*Marine Mammal Regulations*, Section 26). An individual quota of four walrus per Inuk per year applies to the community of Arviat (*Marine Mammal Regulations*, Section 6(1)(c)).

Twenty-five sport hunt tags were requested by the Sanirajak HTO for hunting within the Foxe Basin - Management Unit AW-04. Recent surveys resulted in a range of abundance estimates of 8,153–13,452. Fisheries and Oceans Canada has set a sustainable harvest level ranging from 211-422 walrus for this management unit, including subsistence and sport hunting. An individual quota of four walrus per Inuk per year applies to the community of Sanirajak (*Marine Mammal Regulations*, Section 6(1)(c)).

NWMB staff will present a decision briefing note to the Board during its In-Camera Meeting on December 10, 2021.

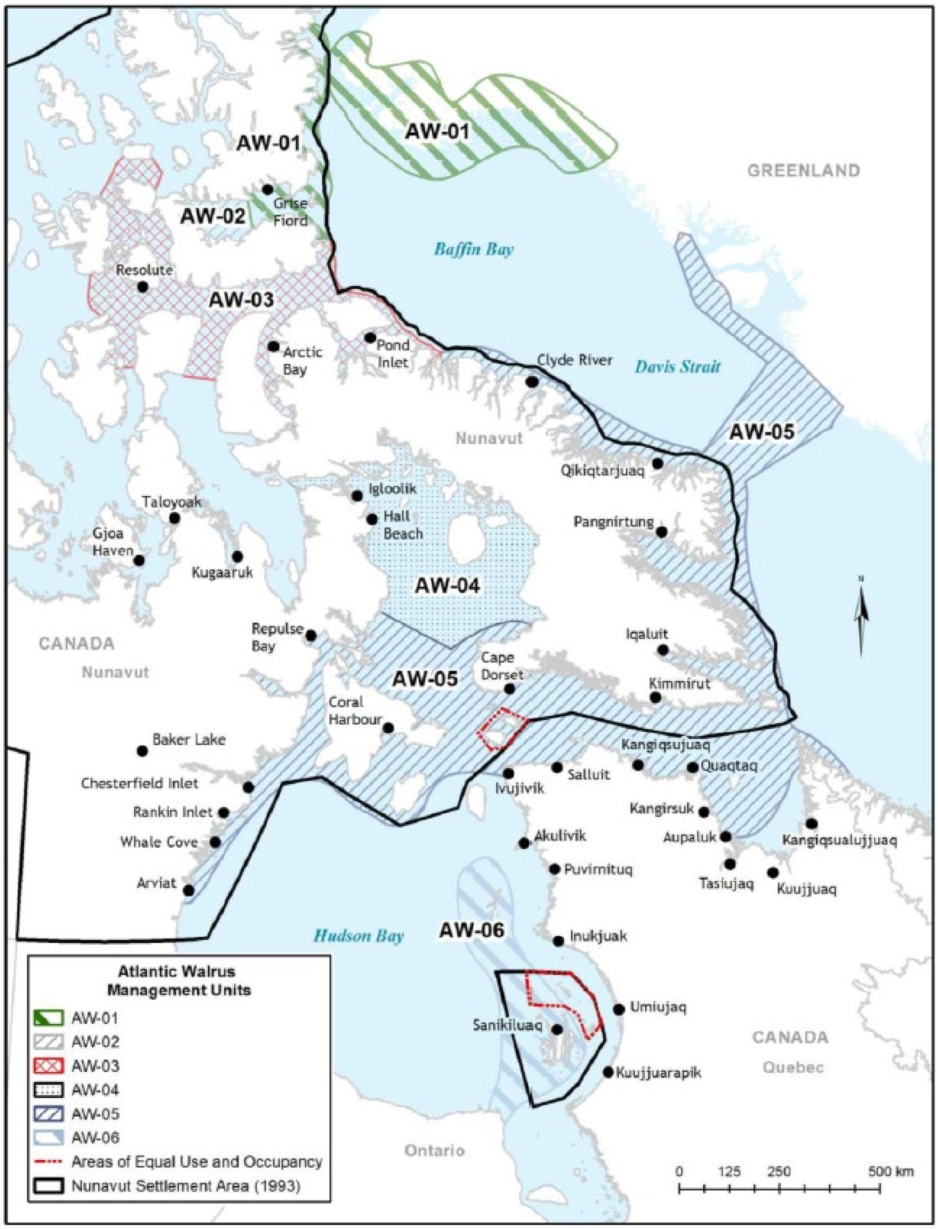


Figure 1. Map of walrus management units.

Appendix 1 - Walrus Sport Hunt Interim Policy

In deciding the number of sport hunts to approve for a particular community, it is recommended that the NWMB's policy be to ensure, to the extent reasonably possible, that sport hunting in the community develops in such a manner that the following four conditions are met:

1. (i) no conservation concern arises;
2. (ii) hunter and public safety are maintained;
3. (iii) humane harvesting takes place, and the whole animal is used; and
4. (iv) the developing industry is healthy and will continue to deliver a quality product, thus serving and promoting the long-term economic, social, and cultural interests of Inuit harvesters (See *Nunavut Agreement* Sub-section 5.1.3(b)(iii))

Accordingly, until the Walrus Working Group offers a more detailed analysis and recommendations, it is recommended that the NWMB apply the following three criteria in deciding upon the number of sport hunts for a community:

1. In a community that is not subject to a quota (beyond the individual limit of four), attempt to ensure that the combination of community and sport hunts does not exceed the average total harvest for the previous five years (condition i);

2. Ensure that a hunt plan is in place that meets the safety, humane, and other requirements necessary under the *Nunavut Agreement,* the *Fisheries Act* and the Regulations (conditions ii and iii); and

3. Ensure that the community or enterprise starts with a relatively small and closely monitored number of hunts (the 'pilot' stage), before permitting an expanded sport hunting effort (condition iv).

In addition, the NWMB may wish to consider what percentage of the overall quota or average harvest for the last five years should be allocated to sport hunts.

SUBMISSION TO THE

NUNAVUT WILDLIFE MANAGEMENT BOARD

FOR

Information: **Decision: X**

Issue: Polar Bear Harvest Administration and Credit Calculation System (HACCS)

Background:

- The Department of Environment (DOE) participated in the Nunavut Wildlife Management Board (NWMB) public hearing for the Nunavut Polar Bear Co-Management Plan in Iqaluit from November 13-16, 2018.
- The specific components of polar bear management that were criticized the most were the current practice, for all but one subpopulation, of a 2:1 harvest sex ratio (two males harvested for every female), and the flexible quota system, which were perceived to be over complicated and overly punitive in response to overharvest situations.
- DOE recommended that for all polar bear subpopulations in Nunavut, a harvest sex ratio of up to 50% females should be adopted and communities could use up to 50% of their base allocation from the Total Allowable Harvest (TAH) to harvest female bears. Along with this recommendation came a need for an updated administration framework to allow implementation of the Up to 1:1 (sex ratio) harvest.
- The NWMB decided to approve the recommended harvest sex ratio of up to 50% female bears and the Minister of Environment accepted that decision in August 2019.
- DOE drafted an initial administration system which the NWMB approved on an interim basis September 2019 and requested that the DOE consult with co-management partners to obtain feedback and re-submit to the Board once feedback was incorporated into the document.
- In the fall of 2019, the DOE provided a letter and an information package to all Regional Wildlife Organizations (RWOs) and Hunters and Trappers Organizations (HTO) and Nunavut Tunngavik Inc. (NTI) regarding the new harvest administration document with an overview of the major changes to the system. The DOE requested that co-management partners review the package with their technical advisors and provide any comments, questions, or other feedback to the DOE to help improve the new harvest administration document.

- Feedback was incorporated from both internal and external input and the resulting document was named the Harvest Administration and Credit Calculation System, or HACCS, to avoid confusion with previous harvest administration system in effect under a 2:1 male to female harvest management system.
- The HACCS document was submitted to the NWMB for the June 2020 regular meeting and the Board again requested that the DOE conduct further consultation with co-management partners before re-submitting as well as directing co-management partners (RWOs, HTOs, etc.) to engage with the DOE in this process.

Current Status:

- Another consultation package was distributed to co-management partners in December 2020 with request for feedback on the HACCS by March 19, 2021.
- The QWB indicated via letter in March 2021 that they would be unable to provide substantive feedback to the HACCS due to insufficient time, understanding, or capacity to deliver education to membership regarding the changes made between the 2005 MOUs and the HACCS.
- DOE invited all co-management partners to 2 (two) consultations hosted virtually in April and July 2021.
- DOE revised the HACCS from feedback and comments originating from these consultations.
- In August 2021, the DOE sent an additional request to all co-management partners seeking additional feedback and input on the HACCS and provided a deadline of October 1, 2021, to allow time for DOE staff to review the feedback and update the document.
- The three RWOs provided an alternative polar bear harvest administration proposal on October 1, 2021, requesting feedback from the DOE by October 22, 2021.
- The DOE submitted a letter to the three RWOs indicating the inability to respond to their proposal in 21 calendar days because the alternative proposal included major changes to polar bear harvest management, including some which would require changes to the current Polar Bear Co-Management Plan.
- Although the DOE was not able to provide a detailed response to the RWO proposed harvest administration system in the time requested, they did view it as substantive feedback and comment which could improve the HACCS. Thus, the DOE reviewed the RWO proposal before the NWMB submission deadline and incorporated points from it for improvement of the HACCS and accommodation of comments, where possible (see Appendix A for details).
- Through the entire development process of the HACCS, the DOE has repeatedly revised the document in response to feedback and comments from co-management partners.

- Communities and RWOs have relayed that there is demand to remove defence of life and property kills from the quota. The HACCS is not able to accommodate this request as it contravenes the Polar Bear Co-Management Plan and could negatively impact sustainable harvest and management.

Consultations:

- See **Appendix A** for detailed information on details of the development and consultation of the HACCS.
- In October 2019, the DOE provided a letter, the interim harvest administration document, and a summarized, plain language document on the changes to the administration of the Harvest and Credit Calculation system to all the RWOs, HTOs, and NTI. The DOE requested that the co-management partners have their technical staff review the documents and provide any comments and feedback to the DOE by January 2020. Based on internal and external feedback, the DOE made relevant changes to the document before submitting to the June 2020 NWMB regular meeting.
- In December 2020, a second letter and information package was shared with RWOs, HTOs, and NTI. This package included information outlining the changes that had been made in the HACCS that had been submitted to the NWMB in June 2020. Co-management partners were again asked to provide comments, questions, or any other feedback that could improve the HACCS going forward.
    - A follow-up letter was sent in February 2021 to remind co-management partners of the request for comment
- A virtual meeting to review the HACCS was held on April 1, 2021, and all co-management partners were invited to attend. There were many questions on the HACCS from attending co-management partners and substantive recommendations for improvements. It was evident during the meeting that a second meeting was warranted to allow further input and discussion.
- A second virtual meeting was scheduled to take place on April 26, 2021 but had to be postponed due to the tragic loss of the DOE lead Polar Bear Biologist, Markus Dyck, on April 25, 2021.
- The second virtual meeting was re-scheduled for July 27, 2021, which gave DOE staff time to review the comments made during the initial meeting and update the HACCS to reflect necessary changes to address some of the inconsistencies and weaknesses of the existing document. Examples of how the system could be applied were added to improve clarity in the document as well.
- Based on feedback during the July 27 meeting, the DOE agreed to defer the submission of the HACCS to the NWMB until the December 2021 regular meeting.
- In August 2021, the DOE sent an additional request to all co-management partners seeking additional feedback and input on the HACCS and provided a deadline of October 1, 2021.

- In October 2021, DOE staff received an alternative draft harvest administration document from the three RWOs. The DOE viewed this as substantive feedback to the HACCS and reviewed the RWO proposal before the NWMB submission deadline. From that review, the DOE was able to incorporate points from it for improvement of the HACCS and accommodation of comments, where possible (see Appendix A for details).

Recommendations:

1. DOE recommends that the NWMB approve the revised Administration and Credit Calculation system so it can be implemented effectively for the 2020/2021 harvest season.

APPENDIX A

DEVELOPMENT AND CONSULTATION OF THE POLAR BEAR HARVEST ADMINISTRATION AND CREDIT CALCULATION SYSTEM (HACCS)

2019:

- Following the Minister's acceptance of the NWMB's decision to change the Nunavut polar bear harvest sex selectivity to an Up to 1:1 male to female ratio in 2019, an updated administration framework for the new harvest management system was required.
- To allow implementation of the Up to 1:1 harvest, the DOE drafted a document detailing the harvest administration and submitted it for decision for the March 2019 regular NWMB meeting.
- The Qikiqtaaluk Wildlife Board (QWB) submitted feedback and questions to the NWMB and DOE on March 1, 2019, via email (attached document dated February 18, 2019).
- The DOE updated the document to include the QWB-suggested revisions for clarity.
- The NWMB made a decision in August 2019 to accept, on an interim basis, the Interim Flexible Quota System submitted by the DOE. This decision was accepted by the Minister in October 2019, retroactively effective starting July 1 with the 2019/2020 polar bear harvest season.
- The NWMB instructed the DOE to obtain feedback and comment on the harvest administration system document.
- The DOE solicited review and comment from technical staff and co-management partners in October 2019 through January 2020.
- No written review or comments were received.
- Through external and internal oral feedback, it became clear there was confusion around the cub harvesting protocol and the exchange and request process for credits, which prompted the DOE to add clarity in the cub harvesting clause and to create visual figures outlining the credit exchange and request processes.

2020:

- No further feedback was received by the DOE between January 2020 and June 2020.
- The DOE submitted the revised harvest administration document and to the June 2020 NWMB regular meeting for decision.
- The document was named the Harvest Administration and Credit Calculation System, or HACCS, to avoid confusion with previous harvest administration system in effect under a 2:1 male to female harvest management system.

- In July 2020, the NWMB directed the DOE to engage in further consultations and directed the co-management partners (Inuit Organizations, Regional Wildlife Organizations, and Hunters and Trappers Organizations via their RWO) to engage with the DOE on the HACCS document.
- Another consultation package was distributed to co-management partners in December 2020 with request for feedback on the HACCS by March 19, 2021.

2021:

- The QWB indicated via letter in March 2021 that they would be unable to provide substantive feedback to the HACCS due to insufficient time, understanding, or capacity to deliver education to membership regarding the changes made between the 2005 MOUs and the HACCS. The QWB requested the DOE to outline changes and provide examples.
- A virtual consultation with all co-management partners was held in April 2021.
- The major concerns raised during the April consultation were:
    - Defence of life and property harvests coming from a community annual recommended quota
    - Concern that overharvest of female bears prevented credit accumulation of male bears.
- The DOE must account for all human-caused mortality from the quota and could not accommodate that change to the HACCS. This is part of the previous MOUs and current Polar Bear Co-Management Plan.
- Fully discounting defence kills with no accounting measure directly interferes with the principles of sustainable harvest (NA sections 5.1.2(g), 5.1.5(c)).
- Defence kills have represented, on average, 7.9% of total harvests from 1981-2021 and range annually from 3.5 – 19% of the total harvest.
- Another virtual consultation occurred in July 2021 on the updated HACCS with all co-management partners.
- The major concerns during the July consultation were:
    - RWO discontent with current HACCS version in general.
    - Too much DOE involvement in credit distribution.
    - RWO wanted to use female credits to increase male allocation.
    - Desire for specific tag system for family group defence harvests.
    - The RWO, QWB, requested delay of submission to December 2021 NWMB meeting.
- The DOE agreed to defer submission to December 2021 and further revised the HACCS to incorporate feedback from the July consultation.
- Following the July consultations, the DOE requested further feedback from co-management partners by October 1, 2021.
- The three RWOs provided an alternative polar bear harvest administration proposal on October 1, requesting feedback by October 22, 2021, by the DOE.

- The proposal includes major changes to the current, legal framework of polar bear harvest management in Nunavut including:
    - Not accounting for defence of life and property kills
    - Carrying credits forward wholly, or partly, in perpetuity
- The RWO proposal is also based on as-yet ratified RWO bylaws.
- The DOE is planning on a December submission to the NWMB regular meeting for the updated HACCS.
- The DOE submitted a letter to the three RWOs indicating the inability to respond to their proposal in 21 calendar days because it would require changing the current Polar Bear Co-Management Plan.
- The HACCS has been under consultation and in revision for two years.
- The DOE has updated the HACCS in direct response to oral and consultation feedback. These changes include, but are not limited to:
    - Changes to allow for male credit accumulation even in the event of female overharvest.
    - Revised wording to explicitly indicate the RWO-held responsibility for deciding credit requests and exchanges.
    - Changed wording clarifying allocation of floating tags and their sex ratio by the RWO
    - Removed clause for automatic dispersal of credits in response to RWO feedback
    - Added clarity on cub harvest protocols in response to community feedback
    - Added calculation examples for credit accumulation and quota adjustments
    - Included figures for credit request and exchange processes to increase transparency and standardization.
    - Updated figure captions to explicitly indicate the RWO-held responsibility for deciding credit requests and exchanges.
    - Simplified figures based on consultation feedback
    - Overall revisions to wording and structure to reduce complexity in response to 2018 NWMB public hearing for the Polar Bear Co-Management Plan (e.g., math symbols, probability terminology were removed).

- Although the DOE was not able to provide a detailed response to the RWO proposed harvest administration in the time requested, they did view it as substantive feedback and comment. Thus, the DOE reviewed the RWO proposal before the NWMB submission deadline and incorporated points from it for improvement of the HACCS and accommodation of comments, including:
    - Specifically noting that the HACCS is a living co-management document that can be reviewed or amended
    - Adding in a clause based on past 2005 MOUs whereby harvests within 30 km of a subpopulation boundary can be assigned to either of the adjacent subpopulation areas per the HTOs request and the RWOs subsequent decision.

- Adding in a clause whereby the DOE automatically alternates odd-numbered base allocations annually under the implicit approval of the RWO, unless otherwise directed by the relevant RWO.
- Adding in a clause whereby survival kills are explicitly addressed in terms of their definition and accounting.

The Nunavut Polar Bear Harvest Administration and Credit Calculation System (HACCS) (Up to 1:1 Harvest System)

1. Rationale and background

During the public hearing process regarding the implementation of Nunavut's Polar Bear Co-Management Plan, by the Nunavut Wildlife Management Board (NWMB), many comments by Inuit organizations were brought forward that favoured a new harvest approach. For years, communities have expressed a desire to adopt a harvest regimen that does not penalize communities as sharply as the flexible quota system when females are overharvested, and that allows harvesting at an equal sex ratio. In response, the **up to one female for every one male harvest option (or 1:1)** was discussed and recommended by the Department of Environment (DOE). On August 26, 2019, the Minister of Environment accepted a decision from the NWMB to change the harvest sex ratio of polar bears in Nunavut to allow **up to one female bear to be harvested for every male bear (1:1).**

Each polar bear subpopulation within Nunavut has a set **Total Allowable Harvest (TAH)**, which is divided among the communities that harvest from the subpopulation by the appropriate Regional Wildlife Organization(s) (RWOs). This is termed the community **base allocation**. The relevant RWO can redistribute the base allocation annually among communities at its discretion. Each harvest season, communities are assigned an **annual recommended quota** which reflects the community's base allocation, any overharvests from previous seasons, and any credit usage. The base allocation and annual recommended quota can be the same number if there are no overharvests or credit usage by a community. Overharvests in one season result in a reduced community annual recommended quota the following season unless the community has accumulated sufficient credits to compensate for the overharvest. When a community harvests below their annual recommended quota they can accumulate sex-specific credits to be used in future harvest seasons or shared with other communities. Communities can request to increase their annual recommended quota through use of accumulated credits.

The updated harvest sex ratio, allowing up to one female bear harvested for every male bear harvested (1:1) does not constrain communities to adhere to the exact 1:1 sex ratio. Rather, it refers to the maximum number of female polar bears in the harvest that are allowed under this system. **The number of females in a community's base allocation can never exceed 50%.** However, the **annual recommended quota may exceed 50% females** depending on whether credits are used to increase the number of females in the annual recommended quota and/or if there was male overharvest in the past season(s) that resulted in a reduction of male bears in the annual recommended quota. Communities are not limited to 50% male bear harvest and communities can harvest their female bear allocation as males. Thus, **males can be harvested up to the limit of the**

annual recommended quota (100%) without going into an overharvest situation. Details are provided below.

The HACCS is a living document and can be reviewed at anytime, in whole or in part, at the request of the RWOs, the GN, or the NWMB. The organization requesting review shall notify all other parties and allow minimum 90 days for a response.

2. Overharvest situation

2.1. An overharvest situation occurs when:

2.1.1. The number of females harvested annually is greater than the number of females in the annual recommended quota, or

2.1.2. The number of males harvested annually is greater than the total annual recommended quota, or

2.1.3 A combination of the males and females harvested annually is greater than the total annual recommended quota.

3. Implementation

3.1. The implementation of the up to 1:1 harvest system begins with the 2019/2020 harvest season (July 1, 2019). The existing total annual base allocation of each community's TAH will be divided by two, to determine the sex ratio for each community. This represents the 1:1 base allocation for each community for 2019/2020. This process increases the number of females allowed in the harvest but does not constrain communities to harvest exactly a 1:1 male to female ratio. The annual base allocation will only change when there is a new allocation decision from the relevant RWO, or a new subpopulation estimate, and/or a new decision on the TAH by the NWMB (see section 5.4).

3.2. If a community's base allocation is an odd number, the RWOs give the DOE authority to alternate the base allocation such that the sex of the odd tag will alternate annually [Example: If a community's base allocation is 11 (6 males and 5 females) then the base allocation will alternate annually between 11(6 males and 5 females) and 11(5 males and 6 females)]. The DOE's authority to alternate the base allocation in these cases is superseded by the RWOs right to adjust these base allocations.

3.3. Annual recommended quotas are calculated using the previous harvest year's data.

3.4. Annual recommended quotas will be calculated based on the sections below.

4. Mortality accounting

4.1. All human-caused mortality to polar bears will count towards the annual recommended quota of the nearest community, except Sections 4.3 and 4.4.

4.2. A naturally abandoned cub or any bear found dead will be recorded as a natural death and not counted against the annual recommended quota.

4.3. Any bear that is found near death caused by starvation or injury, provided that the injury is not a result of human activity such as hunting or trapping, can be killed as a humane action where the Conservation Officer (CO) will certify that the bear was near death. After certification by the CO, the humane kill (euthanization) will not be counted against the annual recommended quota.

4.4. A bear may be killed as an emergency kill in accordance with section 97 of the *Wildlife Act* (the Act) to prevent a person's starvation. The kill will be evaluated to determined whether it was justified and necessary to prevent starvation. It must be clearly shown that the harvest occurred as a last resort, mismanagement cannot be construed as providing a lawful excuse to kill a bear without the proper authority (section 97(3) of the Act). If it is determined that the kill was justified and necessary to prevent starvation it will not be counted against the annual recommended quota, otherwise if it does not meet these criteria it will count against the annual recommended quota.

4.5. If an Inuk from Nunavut kills a bear, the tag will come from that person's home community if that community has an allocation from the TAH in the subpopulation from which the bear was harvested. Otherwise, the closest community to the harvest location must provide the tag.

4.6. For harvests within 30 km of a subpopulation boundary, the relevant HTO(s) may submit a request to the relevant RWO(s) to review and decide from which subpopulation to attribute the harvest (e.g., the subpopulation area from which the bear was harvested, or the subpopulation area bordering it). This decision will be made within the harvest year (July 1st – June 30th) of the given harvest and the RWOs will advise the Polar Bear Lab of the decision.

4.7. Harvesting of a family group or members of a family group is illegal in Nunavut; however, there are circumstances where a family group or members of a family group may be destroyed in Defence of Life and Property (DLP) circumstances.

4.7.1. When a female with cubs-of the-year (COYs), yearlings, or juveniles (2-year-old offspring) are **killed**, then:

4.7.1.1. For annual recommended quota determination purposes, the COYs and yearlings are counted as males and only ½ tag each.

4.7.1.2. The juveniles (2-year-old offspring) are counted as whole tags of whatever sex they are.

4.7.2. If the mother is killed but the COYs, yearlings or juveniles (2-year-old offspring) **run away**, then:

4.7.2.1. The COYs and yearlings are counted as ½ tag and all male (see section 4.7.1.1).

4.7.2.2. The juveniles (2-year-old offspring) that run away are considered as surviving animals. If juveniles are pursued and killed, they are counted as full tags (see section 4.7.1.2)

4.7.3. An HTO may apply to the Minister for a Wildlife Management Permit to allow COYs or yearlings to be harvested for food and cultural purposes. The permit must be issued in advance with a copy to the Wildlife Officer, and the HTO must monitor the hunt to ensure that the female (mother) is not harmed.

4.8. In a case where a community overharvests by one (1) COY or yearling, credits will be used to cover the harvest. In the event there are not enough credits to cover the overharvest of ½ male, the annual recommended quota will not be reduced by ½ tag at that time, and a record is kept with the Polar Bear Harvest Lab of these fractional reductions. The deduction will occur when there is another COY or yearling harvested to equal a full male bear reduction or, if the following year's harvest results in credit accumulation, the ½ credit deduction will be taken from the accumulated credits.

4.9. The parts that evidence the age, species, and sex of a polar bear are teeth for the age; the jaw or skull for the species; and the baculum (penis bone) of the male polar bear for the sex. When the baculum has been lost or forgotten, a hunter-signed Statutory Declaration or DNA extracted from other submitted samples shall constitute evidence of the sex. Where evidence is not provided, the kill will be counted as a female bear for annual recommended quota purposes.

5. Credits

5.1. Available credits may be used to address all types of kills, including accidental, illegal, and DLPs.

5.2. If a community is in an excess harvest situation, all available, applicable (e.g. male or female) credits accumulated by the community will be applied automatically by the Polar Bear Harvest Laboratory to cover the overharvest in order to ensure no reductions to the annual recommended quota occur for the following harvest season, if possible.

5.3. Credits are specific to a given subpopulation and cannot be used for other subpopulations.

5.4. Subpopulation credits accumulate until a TAH decision is made. This may follow a subpopulation inventory that results in a new final abundance estimate. In some circumstances, the NWMB may recommend a change in TAH for other management purposes. When a new TAH decision is made, all unused credits are set to zero because the credits have been carried forward through inclusion in the latest population estimate provided by science and/or Inuit Qaujimajatuqangit (IQ).

That is to say, bears that were unharvested (credits) have been accounted for in the updated population estimate through their contribution to population growth, or through population decline in the case of increased mortality or decreased reproduction. Thus, keeping bears as credits result in “double-counting”; they cannot be counted in credits AND the population abundance estimate. Carrying credits forward in perpetuity creates vulnerability in the sustainability of populations. Credits typically accrue over many years during which vital rates (e.g., reproductive rate, recruitment, survival) may change with the changing environment and/or population dynamics; no population of animals is static. Thus, credits accrued during a period of population growth and applied during a period of population decline would affect the population more negatively than intended, with an unknown magnitude. Resetting credits at the time of a new population estimate and TAH decision allows for managers to better adapt management targets to current population status.

5.5. Credits are accumulated as described in the following sections after the TAH decision is implemented, and during any harvest season:

5.5.1. Credits can accumulate for males and females.

5.5.2. Credits will accumulate for the number of unused males and females in the annual recommended quota.

5.5.3. No female positive credits accumulate when the number of females harvested exceeds the number of females in the annual recommended quota, or the total annual harvest equals or exceeds the annual recommended quota. [Example: if a

community's annual recommended quota is 10 bears (5 males and 5 females) and the actual harvest includes 6 female bears, the community will not accumulate any female credits. Or, if the actual harvest meets or exceeds 10 total bears, the community will not accumulate any female credits].

5.5.4. In a single harvest season, female positive credits accumulate for unharvested female bears of the annual recommended quota given that the total harvest does not exceed the annual recommended quota. [Example: if a community's annual recommended quota is 10 bears (5 males and 5 females) and the actual harvest is 8 bears (5 males and 3 females), the community will accumulate 2 positive female credits for the number of unused females in the annual recommended quota].

5.5.5. In a single harvest season, male positive credits accumulate for unharvested male bears of the annual recommended quota. [Example: if a community's annual recommended quota is 10 bears (5 males and 5 females) and the actual harvest is 8 bears (3 males and 5 females), the community will accumulate 2 male credits for the number of unused males in the annual recommended quota. Alternatively, if the harvest is 8 bears (8 males and 0 females), the community will not accumulate male credits, but will accumulate 2 female credits which represent the number of females that were unused in the annual recommended quota].

5.5.6. In the case where a community has an annual recommended quota of zero, and a total harvest of zero, the community's full base allocation will be restored the following year, unless they still have negative credits that have not been replaced with positive credits (see section 5.6).

5.6 Negative credits are possible and represent the number of bears that have been removed from the subpopulation in excess of a community's annual recommended quota.

5.6.1 Negative credits are sex-specific and can accumulate for male and female bears.

5.6.2 Negative credits occur if there are insufficient credits to cover the excess harvest, and adjustments to the following year's annual recommended quota cannot cover the excess harvest. [Example: if a community's annual recommended quota is 10 bears (5 males and 5 females) and the actual harvest is 17 bears (12 males and 5 females), and there are insufficient male credits to cover the overharvest of males, the annual recommended quota

the following year will be 5 bears (0 males and 5 females). Because there are no male credits to cover the 7 overharvested males, the 5 male tags for the following harvest season will count to cover part of the overharvest and the community will have negative 2 (-2) male credits that will still need to be replaced in subsequent harvest seasons. Alternatively, if a community's annual recommended quota is 10 bears (5 males and 5 females) and the actual harvest is 17 bears (5 males and 12 females), and there are insufficient female credits to cover the overharvest of females, the annual recommended quota the following year will be 5 bears (5 males and 0 females). The community will have negative 2 (-2) female credits that will need to be replaced in subsequent harvest seasons].

Credit exchange and request processes:

5.7 Credits can be exchanged between communities within the same subpopulation.

5.7.1 Communities that harvest from the same subpopulation can exchange credits, where needed, to restore their full annual recommended quota rather than facing a reduction when no community credits are available to cover an overharvest. The existing process for credit exchange between communities will be maintained (Figure 1).

5.7.2 Requests by communities to use credits to increase their annual recommended quota shall be made according to the process outlined in Figure 2. Credit requests are made to, and approved by, the responsible RWO. The GN will verify and confirm the number of available credits and raise any conservation concerns with the relevant co-management partners and management authorities, if warranted.

5.7.2.1 Requests for credits that are greater than 25% of the subpopulation TAH in a given harvest year will automatically be sent to the NWMB for review of a potential conservation concern.

6. Annual recommended quota adjustments

6.1. Reductions are sex-specific when there are insufficient credits to cover an overharvest.

6.2. To protect communities from years of reduced or no harvest opportunities resulting from persistent overharvest, the 1:1 system adapts to allow restoration of the full base allocation. The annual recommended quota will be set to zero in situations in which no credits are available, and a reduction in the annual recommended quota cannot restore the allocation [Example: if a community's base allocation and annual recommended quota is 10 bears (5 males and 5 females) and the actual harvest is 20 bears (10 males and 10 females); if there are no credits to cover the overharvested bears, the annual recommended quota for the next harvest season will be 0 bears. The new annual recommended quota of 0 covers the overharvested bears and the community will have its full base allocation following the 0-harvest year].

6.3. Negative credits are possible and represent the number of bears that have been removed from the subpopulation in excess of a community's annual recommended quota. Depending on the number of negative credits, there may be continued reductions in the annual recommended quota, over multiple harvest seasons, to restore negative credits to zero and reinstate the full base allocation (see Section 5.6).

Reductions in the annual recommended quota and credit administration occur as follows:

6.4. Adjustments in Cases of Female Overharvest:

6.4.1. When females are harvested in excess of the number of females in the annual recommended quota, a reduction of next year's annual recommended quota will occur if there are not sufficient female credits to cover the overharvest. The following year's annual recommended quota will be reduced by the number of females that were overharvested and not covered by credits. The reduction will affect the number of females in the next year's annual recommended quota [Example: if a community's annual recommended quota is 10 bears (5 males and 5 females) and the actual harvest is 12 bears (5 males and 7 females), and there are no female credits to cover the 2 overharvested female bears, the annual recommended quota for the following harvest season will be 8 (5 males and 3 females)].

6.5. Adjustments in Cases of Male Overharvest:

6.5.1. When the harvest exceeds the total annual recommended quota **and** the number of females in the harvest is less than, or equal to, the number of females in the annual recommended quota, then an overharvest of males occurred. Where application of credits does not cover this overharvest, a reduction equalling the

number of overharvested males will be applied to the next year's annual recommended quota [Example: if a community's annual recommended quota is 10 bears (5 males and 5 females) and the actual harvest is 12 bears (7 males and 5 females), and there are no males credits to cover the 2 overharvested male bears, the annual recommended quota the following harvest season will be 8 (3 males and 5 females)].

6.6. Adjustments in Cases of Combination Male and Female Overharvest:

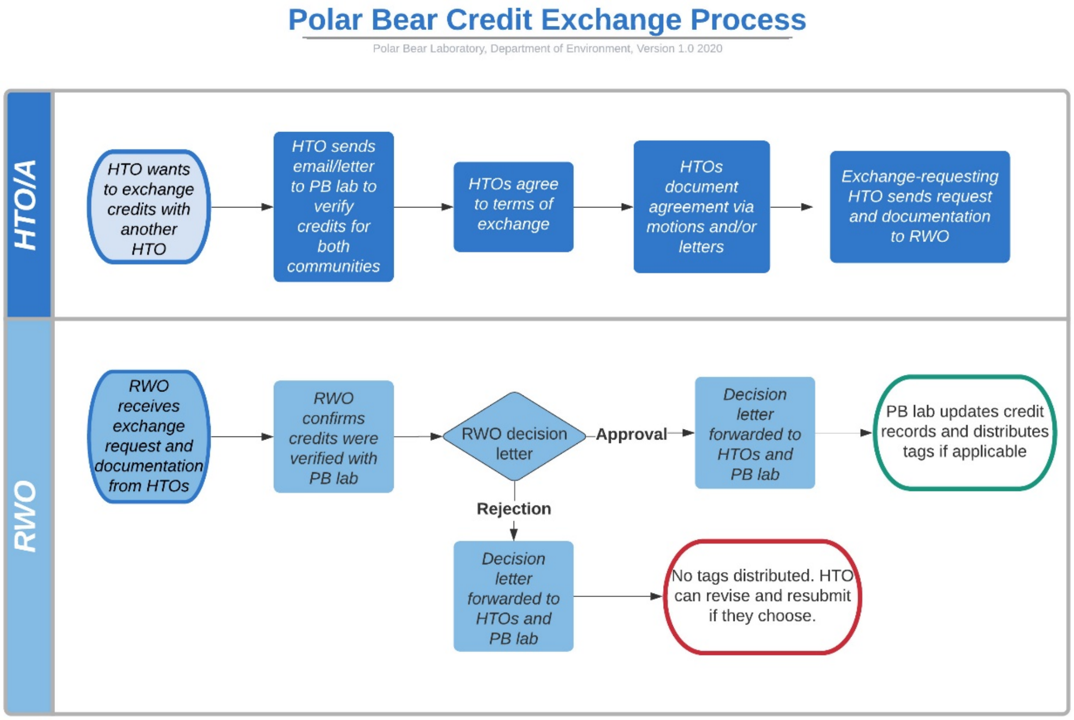
6.6.1. When females are harvested in excess of the number of females in the annual recommended quota **and** the sum of the total harvest (males and females together) exceeds the annual recommended quota, a reduction in the next year's annual recommended quota will occur for each sex, based on the number of bears overharvested [Example: if a community's annual recommended quota is 10 bears (5 males and 5 females) and the actual harvest is 13 (7 males and 6 females), and there are no credits to cover the overharvested bears, the annual recommended quota the following harvest season will be 7 bears (3 males and 4 females)].

7. Floating tags

"Floating tags" are additional tags allocated by RWOs. These floating tags are administered at the discretion of the RWOs, including the sex ratio. Once allocated by the RWOs, they are added to the total annual recommended quota for the recipient community for that year.

7.1. Unused floating tags are accumulated as credits in the sex they were allocated.

7.2. The RWO will advise the Polar Bear Laboratory annually of how they will allocate the floating tags for the next harvest season so that the tags can be attributed to the relevant communities.



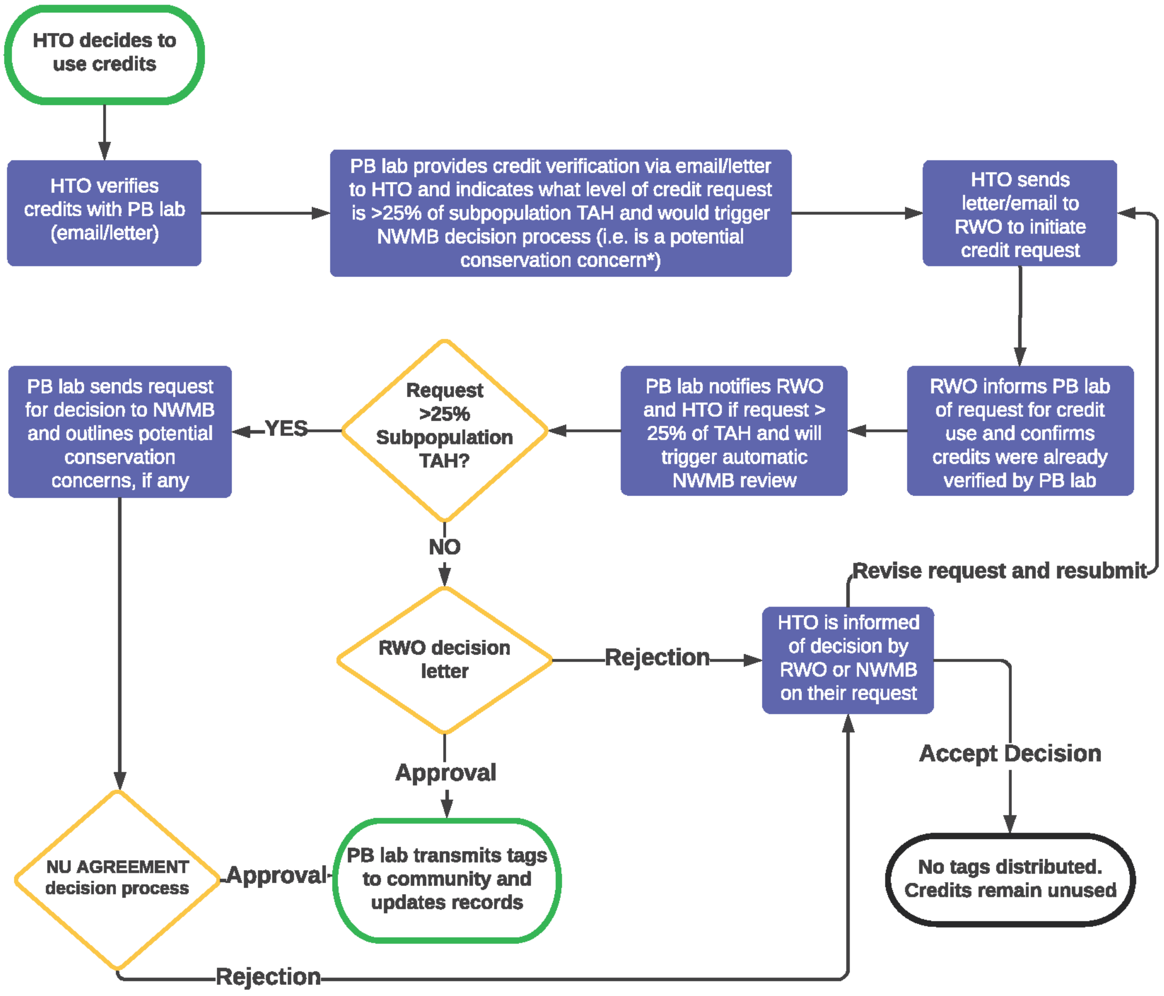
Key Points

1. Credit exchanges occur between communities within the same subpopulation.
2. Credit exchanges can be used to offset an overharvest situation.
3. Credit exchanges can be used in concert with credit usage to increase a community's annual recommended quota for a given harvest year.

Figure 1. Flow chart representing the RWO-managed decision process for credit exchange (chart designed by co-management partner GN).

Polar Bear Credit Use Process

Polar Bear Laboratory, Department of Environment, Version 2.0 2021



Key Points -- (see **Administration of Nunavut Polar Bear Up to 1:1 Harvest System: The Credit Calculation System for details)**

1. Credits are available upon request at any time to a community.
2. Community HTOs initiate credit requests, RWOs decide on requests.
3. Sex and harvest year of credits are specified by HTO in their request.
4. Requests greater than 25% of subpopualtion TAH, by 1 or more communities, automatically trigger NWMB review evaluating if request is a potential conservation concern.

*A conservation concern exists when the use of requested credits represents a substantial increase in the number of bears being harvested in a given year, or a substantial increase in number of females being harvested in a given year. There is no set number that would represent a conservation concern because this depends on the subpopulation status, the current TAH and the abundance estimate upon which the TAH is based, and the historic level of actual harvest for the subpopulation, among other things.

Figure 2. Flow chart representing the RWO-managed decision process for credit usage (chart designed by co-management partner GN).

Polar Bear co-management meeting re. HACCS – April 1, 2021

Called by: GN Department of Environment
Start: 2:05pm
End: 4:45pm

ATTENDEES:

Caryn Smith (DOE)	Michael Ferguson (QWB)
Drikus Gissing (DOE)	Denis Ndeloh (NWMB)
Jonathan Pynn (DOE)	Pamela Wong (KRWB)
Jon Neely (DOE)	Ema Qaggutaq (KRWB)
Markus Dyck (DOE)	Kolola Pitsiulak (QWB)
Jasmine Ware (DOE)	Cambridge Bay HTO
Kevin Methuen (DOE)	Kugluktuk HTO
Paul Irngaut (NTI)	Baker Lake HTO
Jason Aliqatuqtuq (NTI)	Iglulik HTO
Kyle Ritchie (NWMB)	Caroline Ipelee-Qiatsuk (Interpreter)

NOTES

DOE Staff started overview of updated HACCS document

Q1. [Michael] – Will there be a face-to-face consultation because the new system has things that communities did not ask for and there are things from the old Polar Bear MOUs that didn't get included.

[Caryn] – we are not able to do face-to-face consultation meetings with all Nunavut communities at this time. We do not have the financial or human resources to do that, and Covid-19 is still an issue.

Q2. [Paul] – Asked for clarity on 4.5.1 and 4.5.11.

[Jasmine] – explained that these are included because cubs and yearlings are not likely to survive, and they don't want to penalize communities a full tag or a female tag.

[Paul] – Some yearlings are really big, almost as big as the mother, would that still be counted as a half tag?

[Markus] – you are right, females with one cub/yearling left will put more energy into them or can get pregnant the next year if they lose their cub.

Q3. [Denis] – is it possible to change wording of 5.4.11 to not say "TAH determination", it would read better if the wording was changed.

[Caryn] – just to make sure I'm clear, you mean the wording "TAH determination purposes" should be changed to "harvest implementation"?

[Denis] – yes, something that refers to the community quota since the TAH determination has already been made and we are now dealing with the community quota or harvest. Can we change TAH to something else?

[Caryn] – yes, I think that can be changed to either quota or allocation determination, annual allocation.

Jasmine continues overview of updated HACCS document

Q4. **[Paul]** – you mentioned that communities cannot use more 50% of their annual tags for female bears. And you mentioned that a quota reduction would be equal to the number of bears overharvested. Does that mean that if you harvest more than 50% of your tags for female bears, if you harvest 4 or 5 female bears over your females, is that an overharvest, even if you have male tags?

[Jasmine] – I think you are correct, if a community exceeds more than 50% of their annual tags for females, that is an overharvest of females. In that case, if there are no female credits available, the community would be in an overharvest situation and would have a reduction for the number of bears overharvested in the following year.

[Paul] - take the number 10, according to this you have to have 50% as females. What if the community harvests 7 females, but the community still has 3 tags? Would that still be considered an overharvest, even though there are still tags available.

[Jasmine] – yes, that 7 females would exceed 50% of the community's annual quota of 10. Up to five females would be 50%. So, think of this in the 2:1 system, communities could not exceed 33% of the annual allocation as female bears. It doesn't matter what they do with the other bears. In this case, the up to one to one is communities can take up to 50% as females and no overharvest, but 7 would be 70% of a quota of 10. So that would be an overharvests situation, if they had no credits to cover that over harvest, that's an important point. It's important for everyone to understand: if we have your 10-bear quota, and the community harvests 7 females, that's an overharvest of 2 bears. So, the next year, instead of the quota being 10, it would be 5 males and 3 females. The community pays back the two females that were overharvested in the year before. Their recommended quota would be 8 for that year if there are no credits.

[Paul] – Thanks Jasmine, I understand the system but I'm not sure the other HTOs are clear on this, that's why I ask. I try and ask these questions when they may sound stupid, but I understand the system. For a community, a tag is a tag and whether it's female or male so it's kind of hard for them to understand sometimes.

Q5. [Iglulik HTO] – Some, most times a mother will have 3 cubs and sometimes the cubs are same size as the mother, and this becomes kind of complicated in terms of tagging. So, are they counted as a full polar bear like a full size or a cub?

[Jasmine] – so the offspring, the moms' babies that are counted as half tag are the ones that are born in that year, or that are one year old. If they are two years old, then their counted as a full tag, and the two-year-old are usually the ones that are quite big, bigger than the mom and those do count as full bears, and they count as the sex they are, male or female, whatever they are.

[Iglulik HTO] – Even if there are full grown in size as their mother they are counted as that, but Jasmine clarified that question.

[Paul] – I want clarification of the question that was just asked. I just want to clarify that when they were asking, even if they are yearlings, they can be the size of mom or bigger. His question is, will you still consider them as cubs with half a tag? If I remember correctly, we can't harvest family members. But if an elder wants a cub, we have that opportunity here. I appreciate the Government trying to make it easier for Inuit with that. It can get a bit confusing for Inuit, if you are not allowed to harvest family members and there is a cause that you can take a cub or yearling.

[Jasmine] – You pointed out an important point. Harvesting a family group or members of a family group is illegal and that has not changed. The size of a cub isn't really a determination of whether it's a half tag or a full tag, it's the age of the bear. If a mother is very good at raising offspring and her one-year-old looks huge that one year old is still counted as a half tag, and the way we determine age is either through the teeth or what the hunter tells us. The second point, when can a family group be harvested? It is illegal but there is a procedure in which the HTO may request a special exemption from the Minister or Environment for cultural purposes..

Q6. [Cambridge Bay HTO] – When the mother does leave the yearlings, and the siblings travel together, are they still considered a family?

[Markus] – As long they are travelling together and if the juveniles are less than 3 years, they are still considered a family group at that time, especially if they are still hanging out with mom. Let's just clarify this. Are you meaning, the offspring are taking off and moving together or they are just separated from mother and traveling together?

[Cambridge Bay HTO] – clarification as when mothers leave their offspring, the siblings usually travel together until their find their own roots or their own mates. I just want to know that when they are still traveling together are they still a family like 2 males, or male and female that had just left their other or their mother had left them.

[Markus] – that's much clearer now. When the offspring travel together and they're getting mature and they're getting on their own, then they are not a family group anymore because mom is wandering off from the offspring, they're doing their own thing. They are not considered a family group.

Q7. **[Pamela]** – Something that was mentioned earlier about cub of year being similar to or larger in size than the mother. Could you clarify if a hunter takes a bear that he or she thought was an adult but is actually cub of the year because it's a fairly large bear, who gets to decide or assign the age of that harvest and how would that situation be negotiated?

[Markus] – I don't think we've ever had a cub or yearling that was the size of the mother bear. We have the hunter reporting the size and the field age to the wildlife officer and that's pretty much bang on most of the time. The age is also confirmed through the teeth, and we also have jaw measurements. So there's a lot of information that we gather to corroborate some of that information we got about field age.

Jasmine continues overview of updated HACCS document

Q8. **[Jason]** – When you are referring to credits, it says credits will only accumulate if a community harvests less than their annual allocation or their total annual allocation does not exceed 50% of female. You can accumulate female credits and male credits from unused portion. If a community exceeds 50% of their female credits, does that mean the 2 bullets beneath this are void?

[Jasmine] – You are correct. If greater than 50% of the allocation is harvested as female and there are no credits, that is considered an overharvest and no credits accumulate in an overharvest situation. This was done to provide extra protection to the female portion of the subpopulation. The 1:1 was put into place with no changes to community TAH and thus essentially represented an increase in the female proportion of the take and so if you overharvest females, no credits are going to accumulate to reduce the potential of any further female overharvest.

[Jason] – I just wanted to point that out so that everyone is clear on that. A lot of the HTOs with the 2:1 when they know they are going to overharvest females, they would stop the hunts. In this case, the overharvest of one female in a TAH of 10 and the HTO does their due diligence in halting the hunts to prevent further harvest of females. They are still going to get penalized because they are not going to get any credits for that year. Am I correct?

[Jasmine] – Yes Jason, essentially you are correct. If they don't have credits, they will be penalized by one bear the next year which is a drastic change from the 2:1 where they could have been penalized by any number of bears, a larger number because it accounts for the loss and reproductive potential of the females that were taken. The HTO can elect to continue hunting and, say, end up with this quota of 10 and they had overharvested females by one. If the HTO says no more females but they accidentally take one more female and they fill the rest of their quota with 3 males. They have a quota of 7 females and 3 males. No credits accumulate because the females were overharvested but the next year, they will have an annual recommended quota of eight. They will pay back those two females and they still get their full allocation of

males (5 males and 3 females). The system results in a less punitive quota reduction, but we have to protect females somewhere.

[Denis] – Further to Jason's point, if we go back to the allocation of 10, if all what the community harvest from that year from their allocation is 6 females and zero males, the next year allocation will be 9 and they will not accumulate any male credits. So given that, which is what I think Jasmine explained, the bullet point that says male credits accumulate for the unused male portion of their allocation, could be revised to read male credits accumulate for the unused portion of the male allocation if the female were not overharvested. There is no scenario where male credits accumulate if females are overharvested.

Q9. [Iglulik HTO] – If [the community] were allocated 10 tags and all 10 tags were filled with male bears, for the next year would they be given different or their full allocation because they did not catch 50% female?

[Caryn] – The answer to this is yes, if you took all 10 males as your quota, you would not be penalized at all. The next year you would be given your full allocation again.

[Jasmine] – In this system, we say UP to 1:1 very specifically because this is a system that gives more control to HTOs and community preferences. We know some communities prefer more female bears, but some communities do lots of sport hunts and would prefer male bears. You can take UP TO 50% females, but you could take more males, whatever you prefer, 70% males, 100% males, as long as 50% females is not exceeded. It's up to the community.

Q10. [Michael] – My question is regarding the same thing Jason raised. Credits will only accumulate less than the 50% female harvest. It does not say female credits will not accumulate; it says all credits will not accumulate. That is a double penalty because in the example that Paul gave earlier, if a community has a quota of 10 and they take 7 females and they stop the harvest, they have overharvested by more than 50% of the female but they have underharvested males by three. What this clause says is they won't get any credits for the three males they didn't harvest. They are going to be penalized the next year by having to give up 3 female tags on the next years quota assuming they have no female credits, and they are being penalized for being cautious by stopping the harvest and not harvesting 3 males. This is a double penalization as they are going to be penalized for the 3 females they went over and they are not going to get any credit for the three males they didn't harvest, or two males if they went 3 over on the females. They should specify that female credits will only accumulate if a community harvests less than the annual allocation and does not exceed 50% harvest or you have to change where female credits accumulate and male credits accumulate because they are not independent. The first clause means that the male credit accumulation depends on what happens with the female harvest. I was confused by

Jasmine's explanation. It sounded like it was going one way in one part of her explanation and in a different way in another part of the explanation. I find it confusing.

[Drikus] – We made a note of that. I agree that this something, and that's the value of these consultations, is for people to bring these things up that we will look into. I think it needs a bit more clarification and if you guys can come up with a new recommendation on that, we will consider it.

[Michael] – I would just add the word female in front of credits in the first bullet that we were discussing and that would solve the problem.

Q11. [Paul] – These 1:1, want to make sure it's not breaking the NLCA, in terms of 5.6.48 of our claim, is it not a limitation. These sex ratios, is that going against the Nunavut Agreement? 5.6.48, I'll read it, under non-quota limitations, "Subject to the terms of this article the NWMB shall have the sole authority to establish, modify or remove from time to time and as circumstances require, non-quota limitations on harvesting in the Nunavut Settlement Area." I'm just wondering if this is going against the agreement. The sex ratio, is this a non-quota limitation?

[Caryn] – Thanks for your question, I think the easy answer to that is that this sex ratio that has been applied within the Nunavut Settlement Area was a decision that was made by the NWMB, so it follows the Nunavut Agreement decision process, and the onus is on the government of Nunavut to properly implement that decision made by the Board.

Q12. [Iglulik HTO] – Females are normally what causes overharvesting and going over tags, particularly females with cubs coming into the communities. Was there ever any considerations or thoughts into allocating special tags just for the purpose of females and females with cubs coming into the community? Before something bad happens like a mauling.

[Drikus] – There's never been consideration of additional tags but the increase of females in the harvest will hopefully offset that. What we've heard during consultation is that people were really upset about the 2:1 because a lot of females were harvested as defense of life and property kills, exactly as just mentioned. So, people wanted to go to a 1:1 harvest because it resulted in a significant reduction in their quota the next year, and it was usually, as I say, because of females harvested in defense of life and property. Hopefully, the increase in females in the quota will offset that. It has never been a consideration of setting additional tags aside for defense of life and property because under the management plan, all human caused mortality comes off the quota.

Q13. [Cambridge Bay HTO] – Using Viscount Melville credits, I want to know how you are going to put credits together, for instance, we have 3.15 male credits and 4.85 female credits. Can the .15 and the .85 be put together as one credit? If that would be possible, could it be for a male?

[Jasmine] – The .15 and .85 that you speak of, of course those were accumulated in the 2:1 system and under the Polar Bear Management Plan, communities have the option, if they so choose, to go back to that system, so we did not alter the credits and those decimals. At this time, male and female credits accumulate separately and are considered sex specific, so we don't have any plans to merge credits in any way.

Q14. [Kugluktuk HTO] – I want to throw this out there for quick information. On page 13, 5.9. I know I have a subpopulation that's jointly used interjurisdictionally with NWT. So, I just want to know that there's no way that I could surrender my credits to the NWT. We're in a unique situation in Kugluktuk and the NWT side, along with my credits and I know I have a huge number of credits, but I know some of the other outlying NWT HTCs are already using up their credits. I want to know that our credit system is grandfathered from the signing. So, are we in no way forced to give up our credits for that subpopulation of Beaufort Sea, am I correct?

[Drikus] – You are not going to lose them because we have a new management plan in place. Yes, it's grandfathered in those credits. Everybody that's got credits now will carry them over. Credits are only zeroed when a new population estimate is calculated, when there's been a new study, and the NWMB sets a new TAH.

[Larry] – Thanks for your quick answer. I just want to make sure I do not lose my credits because I know I have a high number and I just want to thank you for that answer, Drikus.

Q15. [Denis] – When Paul was talking earlier about the non-quota limitation, I just wanted to add to what you said Caryn. The reason that the NWMB is engaged in this process is that we've been talking today about things that constitute a restriction on harvest and that is why, and it is based on that article that you read that we engage in this process. Thank you.

Q16. [Iglulik HTO] – [Question about the collecting of polar bear feces.] Was that you guys (GN) because they haven't really heard back anything.

[Markus] – We had some collaborations with various universities, and they required to collect some feces samples from polar bears on the sea ice. That occurred over the last few years, but for this harvest season we're not collecting any poop anymore.

Caryn thanked all the participants and acknowledged that the meeting was very productive. Let everyone know that a follow-up meeting will be set up to continue the conversation since everyone felt more time was needed.

Polar Bear co-management meeting re. HAACS – July 27, 2021

Called by: GN Department of Environment
Start: 2:10pm
End: 4:45pm

ATTENDEES:

Caryn Smith (DOE)	Michael Ferguson (QWB)
Drikus Gissing (DOE)	Daniel Dylan (QWB)
Samantha-Shae Smuk (DOE)	Cambridge Bay HTO
Jon Neely (DOE)	Kugluktuk HTO
Robinson Orume (NWMB)	Baker Lake HTO
Paul Irngaut (NTI)	Cape Dorset HTO
David Lee (NTI)	Iglulik HTO
Clayton Tartak (KWB)	Resolute Bay HTO
Pamela Wong (KRWB)	Grise Fiord HTO
Ema Qaggutaq (KRWB)	Liitia Qiatsuk (Interpreter)
Kolola Pitsiulak (QWB)	

NOTES

Part 1:

Overview of changes to the HAACS document.

These changes reflect the questions and feedback received at the April 1 virtual consultation.

- Definitions regarding "Base Allocation", "Total Annual Harvest", and "Recommended Quota" were revised and clarified
- Section 1: The up to 50% (1:1) female allocation is based on the community base allocation.
- Section 2: Language was changed for consistency.
- Section 3: Details were added for clarity.
- Section 4.4: The wording was changed from "Inuit Hunters" to "…people with assigned harvesting rights".
- Section 4.5.3: This section was added as it is part of the MOU but was previously overlooked.
- Section 4.7: This section was added as it is part of the MOU but was previously overlooked. It will also be added to this section that a statutory declaration is acceptable as proof of sex where a baculum in missing and genetic material is not available for DNA testing.
- Section 5.4: Language was updated for clarity.

- Section 5.6 and below: Examples were added for clarity and understanding.
    - Language was updated to reflect that the female proportion of the recommended quota may exceed 50% if credits are added. Therefore, female overharvest occurs only if the total females harvested exceeds 50% of the base allocation or of the recommended quota for females.
- Section 6: Examples were added for clarity and understanding.
- Section 7: Language in 7.2 was replaced - “RWO advises lab or how floating tags are allocated”.

Part 2:

Feedback and Questions

Q1. [Clayton] – The GN has no authority as to how credits/TAH is allocated among communities. This is an RWO decision not a GN decision.

[Caryn] – It is an RWO decision to approve credits. Credits may be added to the credit bank to be used at a later time/in overharvest situation, OR the credits may be used to increase the TAH. It is the community’s decision as to how they want these credits allocated once they are approved.

[Clayton] – This is too complicated, the RWO should have the sole authority to distribute the credits among their HTOs as they see fit

[Caryn] – Credits are accumulated on a community-by-community basis. Credits accumulated belong to each community and should not be allocated to other communities without their permission.

[Paul] – In agreement with Clayton; RWOs should be allocating the credits to the HTOs. The NLCA does does not discriminate between regional and community allocations therefor the RWOs have the authority to distribute credits as they see fit.

[David] – In agreement

[Drikus] – [Has a different interpretation] The GN has no interest in allocating credits, if the RWOs and HTOs want to allocate credits then take it forward to the NWMB and the GN will not oppose

[James] – [Agrees with Clayton and Paul but, is asking that the communities and the HTOs have input on the RWO and TAH allocations.]

[Caryn] - Consultations are needed to allocate TAH, this is not the responsibility of the RWOs.

Q2. **[James]** – How do floating tags work in MC? Especially considering their new ratio.

[Caryn] – [Advised James to have a discussion with the KRWB.] The floating tags in FB are not allocated until the decision is made by the RWO.

Q3. **[Paul]** – Asks for rewording of section 7 to replace the word "advise" with "tell". Would like section to read:

"The RWO will **tell** the Polar Bear Laboratory annually of how they will allocate the floating tags for the next harvest season…"

[Drikus] – Is unopposed to this change. Suggests using "direct" instead of "tell" or "advise"

[Pamela] – Is in agreement with change

Q4. **[Pamela]** – Please comment on how this proposed document came to be? Should this not be under the jurisdiction of the RWOs?

[Caryn] – This document is being updated to replace the Flexible Quota system. The new Up to 1:1 harvest system was drafted after consultations with co-management partners. The flexible quota system was seen as too restrictive and complicated. This document was an improvement from the current interim document before submission to the NWMB.

Q5. **[Pamela]** – Regarding the credit process outlined in Figure 1: Does the GN have any input or is this all done between the RWOs and HTOs?

[Caryn] – There is no input from the GN. The decision is made by the RWOs and the Polar Bear Lab accounts administratively for the credits and does the tag distribution.

Q6. **[Mike]** – The QWB has 8 broad areas where they want (big) changes. Does not believe that the changes should be submitted to the NWMB because the NWMB has no jurisdiction.

[Clayton] – The GN did not accept any of the previous comments or changes suggested by the RWOs and is therefore infringing on Inuit rights. The NWMB should not have any review power. Credits should be dealt with by the RWOs and HTOs.

[Mike] – Regarding changes in the TAH, the RWOs could change this every year if they wanted to, the RWO retains power.

[Drikus] – The GN was directed at a national level to develop a PB management plan. The GN consulted with co-management partners to develop the MOUs. The key issues that were brought up were the Flexible Quota system and the restrictive 2:1 harvest ratio, and the loss of harvest opportunity due to female overharvest. Nunavut agreed to go to a up to 1:1 harvest system based on the feedback from consultations. Decisions were made with the [NWMB] and the board approved the up to 1:1. The GN is responsible for explaining how the harvest works in Nunavut through consultations like this one. The department has not received any comments from the QWB; please send them. If there are disagreements the NWMB makes the final decision.

[Mike] – The QWB offered feedback on the consultation process. They offered to complete and fund the consultations themselves. The response from the GN was either negative, or the GN did not address this offer at all. The QWB wants to work with the GN but does not feel like the offers they have made have been warmly received. The NWMB has no jurisdiction to make the final decision.

[Caryn] – Please submit these concerns and we will try to address them over the next week.

Q7. **[Resolute Bay]** – Concerned with the overharvest of males. This is a common trend for Resolute Bay, and they do not want to loose out on harvest allocation.

[Caryn] – The up to 1:1 harvest system is well suited for scenarios like this because up to 100% of the allocated can be male.

Q8. **[Mike]** – Wants to be able to change female credits to male allocation when requested by RWO.

[Caryn] – This is already addressed in the system. Once credits are added, section 3.1 applies.

[Mike] – Was not able to find this addressed in 3.1

Q9. **[Simon]** – IQ: The problem bears that were coming into town were made deaf by dogs and helicopters. They would then come into town and would not be deterred by warning shots because they were hard of hearing. He is seeing fewer problem bears and believes that they have been removed from the population for the most part.

[Caryn] – Thank you for the comment and sharing the knowledge.

Q10. [Jacob IHTO] – Regarding section 4.5.3, who is the wildlife management minister who approves this request?

[Caryn] – Applications are approved by the minister of the DoE, Joe Savikataaq. Applications are submitted through the local Conservation Officer and they will facilitate the request.

[Mike] – QWB staff is willing ang available to assist HTOs complete the application or assist in the understanding of any of the rules.

Q11. [Paul] – Will the revised document take into account these changes, and will it be shared before submission to the NWMB? When can we expect this?

[Drikus] – Yes. The document needs to be submitted by August 6, 2021, but further comments can be directly submitted to the NWMB.

[Clayton] – The GN requested comments, but this is ultimately outside of the jurisdiction of the of the GN. It should be the RWO and HTOs makes these decisions.

[Drikus] – The GN is not trying to take on the role of the RWOs and HTOs, we are just explaining how the system works. Everyone is welcome to submit comments to the NWMB.

Q12. [Arctic Bay HTO] – Are naturally abandoned cubs accounted for the in the TAH?

[Caryn] – No, they would be considered a natural death.

Q13. [James] – What is the rush? Why does the document need to be submitted by August 6? Because of the international polar bear committee?

[Caryn] – This document is not being submitted for any international purposes, it is only for the GN. The document and consultations have been ongoing for over a year. Through consultations, there was requests to replace the Flexible Quota system, and this document addresses that. This is purely for Nunavut and internal communities.

[James] – There is still room for improvement in the document and suggests that submission be delayed.

[Clayton and Mike] – Both in agreement.

[Drikus] – This had been ongoing to a long time. This is a positive change for the communities and is what they asked for. There are still NWMB consultations that need to be done as well. Will investigate his capacity to delay.

Kitikmeot Regional Wildlife Board
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November 3, 2021

Daniel Shewchuk
Chairperson
Nunavut Wildlife Management Board
P.O. Box 1379
Iqaluit, NU
X0A 0H0

Re: The Government of Nunavut's Department of Environment proposal on the Nunavut Polar Bear Harvest Administration and Credit Calculation System

It is our understanding that the Government of Nunavut Department of Environment (GN DOE) is planning to submit a proposed polar bear Harvest Administration and Credit Calculation System (HACCS) for approval by the Nunavut Wildlife Management Board's December 2021 meeting. We ask that any decision on this submission be delayed until all of our Hunters and Trappers Organizations (HTOs) have been engaged on the development of a proposal.

We submitted a letter to the Minister dated 27 July 2021 asking for a delay and our HTOs have not had additional meetings with GN DOE since. Our position has not changed. The proposal is also very technical and requires more discussion and engagement with our communities to fully understand this new system. We need opportunities to ask questions about HACCS. We would also like to discuss a plan to co-develop a system that is easier for our communities to understand and support.

Yours truly,

Paul Ikuallaq
Chairman

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C.c. Amanda Dumond, Kugluktuk Angoniatit Association
Beverly Maksagak, Ekaluktutiak HTO
Connie Kapolak, Bathurst Inlet HTO
Peter Kapolak, Burnside HTO
Enuk Pauloosie, Gjoa Haven HTO
Jimmy Oleekatalik, Spence Bay HTO
Joshua Kringorn, Kurtairojuark HTO
Amy Kaludjak, Kivalliq Wildlife Board
Kolola Pitsiulak, Qikiqtaaluk Wildlife Board
Bert Dean, Nunavut Tunngavik Inc.
Drikus Gissing, GN DOE

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Qikiqtaaluk Wildlife Board

SUBMISSION TO THE

NUNAVUT WILDLIFE MANAGEMENT BOARD (NWMB)

Regular Meeting No. RM 004-2021

FOR

Information: ☐ **Decision:** ☒

Issue: **Government of Nunavut's Polar Bear Harvest Administration and Credit Calculation System (HACCS)**

Background:

- In 2019, the Nunavut Wildlife Management Board (NWMB) provided interim approval pending consultation to a version of the Government of Nunavut's (GN) Polar Bear Harvest Administration and Credit Calculation System (HACCS). The GN did not consult the Regional Wildlife Organizations (RWOs) and the Hunters and Trappers Organizations (HTOs) on this document before submitting it to the NWMB for approval.
- The GN did consult the RWOs and HTOs in two 2-hour conference calls in April and July 2021. Most HTOs were unable to participate due to short notice and poor seasonal timing. As well, the GN did not provide enough time during these calls for both parties to resolve the concerns of the RWOs and HTOs about the HACCS.
- On August 10, 2021, the GN provided the QWB and other RWOs with an updated version of HACCS, requesting RWO feedback by October 1, 2021.
- The latest version of HACCS infringes on the powers and functions of the RWOs, as provided for in section (s.) 5.7.6 of the Nunavut Agreement (NA), infringes on other sections of the NA, and fails to address concerns raised by Inuit during and after the 2018 NWMB public hearing on the polar bear management plan.
- The staff of the Kitikmeot Regional Wildlife Board KRWB), the Kivalliq Wildlife Board (KWB) and the *Qikiqtaaluk Wildlife Board* (QWB) have collaborated to develop a draft RWO-sponsored Nunavut Polar Bear Harvest Administration System (NPB HAS), which addresses NA infringements, and other RWO and HTO concerns regarding the GN's revised HACCS.
- Through a QWB Executive motion on September 29, 2021 sent to both the GN and NWMB on October 1, 2021, the QWB did the following:

Qikiqtaaluk Wildlife Board :: P.O. Box 219 :: Rankin Inlet, NU :: X0C 0G0 :: tel. 867.645.4860 :: fax. 867.645.4861
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- The QWB advised the GN that it does <u>not</u> support the GN's revised HACCS proposal;
- The QWB invited the GN to develop a joint GN-RWO submission for the NWMB, based on the draft RWO-sponsored NPB HAS as soon as possible;
- The final NPB HAS or any other polar bear harvest system should work hand-in-hand with RWO Polar Bear Harvest Administration By-laws (PBHAB) in accordance with the NA (currently under active development);
- The QWB asked both the GN and the NWMB to conduct staff reviews of the draft RWO-sponsored NPB HAS, which was attached, and provide constructive comments on the draft NPB HAS to the QWB, KRWB and KWB on or before October 22, 2021.

- Active work by the QWB has continued on the NPB HAS and potential conditions and terms for the developing PBHAB with six of 13 individual HTO consultations completed as of October 30,2021.
- On October 19, 2021, the QWB received a letter from Drikus Gissing, Director of Wildlife Management and Research for the GN Department of Environment, indicating that the RWO's proposed NPB HAS will require extensive review, and that the review would not be completed by October 22, 2021. Mr. Gissing did not indicate when the review could eventually be completed.
- In spite of the fact that the QWB does not support the revised HACCS, Mr. Gissing stated that the GN would still submit the updated version of the Polar Bear Harvest Administration and Credit Calculation System (HACCS) for the NWMB meeting of December 08, 2021.
- The GN has not provided any urgent justification for that submission date.
- The version of HACCS given interim NWMB approval pending consultation in 2019 has functioned adequately since then, while subsequent versions of HACCS offered by the GN have generated significant and serious concerns among the RWOs and HTOs.
- The QWB and other RWOs will continue to develop RWO Polar Bear Harvest Administration By-laws, in accordance with sections 5.7.8 to 5.7.12 inclusive of the NA, and present them to NWMB together with the RWO NPB HAS. The RWOs will incorporate any appropriate comments and input that we may receive from the GN and/or NWMB.
- A letter from QWB's legal counsel addressed to the Chairperson of the NWMB is attached.

Recommendations:

In brief, the QWB's legal position is that "… the RWOs and HTOs are populated by Inuit members who are more than simply stakeholders — they are *rights* holders under the NA.

The QWB thus respectfully requests that the NWMB delay adjudicating on the GN proposed HACCS until such time that (a) the QWB and the other RWOs have satisfactorily been consulted by the GN and (b) the GN has had an appropriate amount of time to complete the "extensive review" of the RWO proposed NPB HAS to which it committed in its October 19, 2021 letter to the QWB."

In the meantime, the QWB respectfully requests that the NWMB continue to utilize the 2019 version of HACCS, which was given interim approval pending consultation, which is incomplete at this time.

Prepared by: *Michael Ferguson and Kolola Pitsiulak, Qikiqtaaluk Wildlife Board*

Date prepared: November 1, 2021

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WITHOUT PREJUDICE

Thunder Bay, Ontario
November 2, 2021

Mr. Daniel Shewchuk
Chairperson, Nunavut Wildlife Management Board
PO Box 1379 Iqaluit, NU X0A 0H0

Dear Chairperson Shewchuk:

RE: Government of Nunavut's Polar Bear Harvest Administration and Credit Calculation System (HACCS)

On September 23, 2021 the Qikiqtaaluk Wildlife Board (QWB) provided to, and requested that the Government of Nunavut (GN) review and provide comments respecting the RWO's proposed Nunavut Polar Bear Harvest Administration System (NPB HAS) by October 22, 2021. The proposed NPB HAS was jointly drafted by the QWB, the Kitikmeot Regional Wildlife Board (KRWB), and the Kivalliq Wildlife Board (KWB) — the RWOs under the *Nunavut Land Claims Agreement* (NA).

On October 19, 2021 the GN informed the QWB via a letter from Drikus Gissing, Director of Wildlife Management and Research for the GN Department of Environment, that the RWO's proposed NPB HAS "…raises a number of concerns and proposes major changes to the overall polar bear harvest management in Nunavut. This will require an extensive review before any formal discussions can take place. Due to the nature and extent of the proposed changes and review required, the GN will not be able to meet the [October 21, 2021] deadline that is proposed." Mr. Gissing added that "…the GN will continue with its plan to submit the consulted and updated version of the Polar Bear Harvest Administration and Credit Calculation System (HACCS) to NWMB during their December 08, 2021 meeting. Feedback and discussion from the April 1st, 2021, and July 27th, 2021, consultations on the HACCS will be reflected in the updated version for the December NWMB meeting."

The QWB expressed serious concerns with the GN's proposed HACCS at the April 1, 2021 and July 27, 2021 meetings among the RWOs and the GN. The QWB has continued to express those concerns to the GN as reflected in NPB HAS.

The QWB is of the position that the GN's HACCS has, in several places, exceeded its jurisdiction under the NA. For example, and perhaps of the most significant concern, the HACCS attempts to determine how annual quotas will be set for individual communities in respect of polar bear harvesting. The NA clearly provides in sections 5.7.1 to 5.7.14 that the RWOs and HTOs are responsible for the allocation and enforcement of basic needs levels and adjusted basic needs levels among HTOs, as well as generally the management of harvesting among HTOs and their members.

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The GN's HACCS, therefore, usurps the powers given to the RWOs and the HTOs in the NA, a constitutionally protected treaty which provides *rights* to Inuit.

It is the QWB's position that the HACCS remains flawed and cannot, therefore, form the basis of a lawful polar harvest management system at least and until such flaws are addressed and remedied. For greater clarity, the current HACCS proposed by the GN is unacceptable to the QWB.

Further, because of these flaws, the QWB respectfully requests that the NWMB delay adjudication on the GN proposed HACCS so that the GN will have the time to conduct—what it referred to in its October 19, 2021 communication to the QWB as—an "extensive review [of NPB HAS]."

Mr. Gissing stated in this same October 19, 2021 communication that "I would like to reaffirm that the GN Department of Environment is committed to working with all RWO's and HTO's to find a way forward that respects the concerns of stakeholders for effective polar bear management and ensures continued trade and economic benefits for Inuit while ensuring long-term population sustainability for the future of Nunavummiut." While the GN's commitment to working with RWOs and HTOs is to be commended, the absence, however, of any recognition of Inuit *rights* in Mr. Gissing's communication to the QWB, as well as any recognition of the social and cultural aspects of polar bear harvesting for Inuit is certainly problematic and epitomizes many of the concerns the QWB has with the currently proposed HACCS.

In the present case, the RWOs and HTOs are populated by Inuit members who are more than simply stakeholders — they are *rights* holders under the NA.

The QWB thus, again, respectfully requests that the NWMB delay adjudicating on the GN proposed HACCS until such time that (a) the QWB and the other RWOs have satisfactorily been consulted by the GN and (b) the GN has had an appropriate amount of time to complete the "extensive review" of the RWO proposed NPB HAS to which it committed in its October 19, 2021 letter to the QWB.

Please reach me at dwdylanlaw@gmail.com or the QWB Director of Wildlife and Environment Dr. Michael Ferguson at MFerguson@niws.ca should you have any questions or require further information.

Sincerely,

Daniel W. Dylan
Legal Counsel, Qikiqtaaluk Wildlife Board

From: Michael Ferguson <wildlifeadvisor@niws.ca>
Sent: Mar. 1, 2019 5:23 p.m.
To: Denis Ndeloh <DNdeloh@nwmb.com>
Cc: "Smith, Caryn" <CSmith@GOV.NU.CA>; "Gissing, Drikus" <DGissing@GOV.NU.CA>; Kolola Pitsiulak <kpitsiulak@niws.ca>; Jackie Price <jprice@niws.ca>; Ema Qaqqutaq <krwb@niws.ca>; Qovik Netser <kwb@niws.ca>
Subject: Questions & Suggestions re: NWMB RM-001 2019; TAB 2 Adjusting Polar Bear TAH to 1-1 Male-Female Sex-Ratio Harvest with simpler credit calculation system

Denis,

The QWB has reviewed the GN's Request for Decision under TAB 2 for NWMB RM-001 2019. We would appreciate some clarification of the proposal and have some re-wording to suggest for proposal to be incorporated before the NWMB makes a decision on this matter.

The attached document explains these requested clarifications and suggested wording changes.

If you or the Board have any questions about the attachment, please do not hesitate to contact me. FYI... we expect to send an Inuktitut translation to you early next week.

Sincerely,

Mike

Michael Ferguson
Senior Wildlife Advisor
Qikiqtaaluk Wildlife Board
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Qikiqtaaluk Wildlife Board

February 18, 2019

Requested Clarifications and Suggestions regarding

Government of Nunavut (GN) Submission to the Nunavut Wildlife Management Board (NWMB)

Issue: Adjusting Polar Bear Total Allowable Harvests to a 1:1 Male to Female Sex Ratio along with a simpler credit calculation system

1. Title:

   Does this submission propose to adjust the harvest ratio to 1:1 male to female polar bears for all communities, as suggested by the title?

   In clause 1 of Recommendations, it states that up to 50% of a TAH could be females. This implies that less than 50% of a TAH could be females, so the harvest ratio could be greater than 1:1 male to female, even 2:1 male to female.

   The current title does not seem to be clear about the apparently flexible intent of the Submission.

2, Sex-selectivity and Updated Subpopulation Information:

   Sex selectivity is used in the Recommendations of this submission since apparently a maximum of 50% of a TAH could be females.

   In the Current Status section, the following sentence appears: “Following the collection of updated subpopulation information …, the use of sex-selectivity **could** be included as part of management recommendations to address conservation concerns going forward.”

   For added certainty, are the Recommendations proposed by the GN in this submission to be implemented for all polar bear sub-populations in

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Nunavut during 2018-19, even for those for which “updated subpopulation information” is not available at this time?

3. Recommendations:

   i. Part 1 of the GN Submission would allow a community to harvest up to 50% females in a given year. As well, part 2.b appears to allow the same community to harvest more than 50% of their allocation as males.

      Assuming that is correct, minor over-harvests of females may occur inadvertently at the end of a season. If, for example, a community has a tag allocation of 40, a harvest of 21 females and 19 males in year 1 could easily occur. Since the community did not surpass their total allocation, it should be acceptable that in year 2 the community could be allowed to take 19 females and 21 males. Over the two years, the 50% female harvest would be maintained.

      We suggest the following revised wording for 2.a.:

      a. An overharvest of one female, more than 50% of the tag allocation in one year, would reduce a community’s maximum allocation of female tags by one in the subsequent year, while the community could harvest an additional male bear without changing the community’s total allocation in year 2.

   ii. Part 2.b. of the GN Submission could be clarified with the following wording, assuming that is the intent:

      b. The maximum number of males that may be harvested will be up to the limit of a community’s total tag allocation less the number of females harvested in the same year. An overharvest of the community’s total tag allocation would result in a reduction of the same amount of tags in the following year, unless the community has credits available to apply to the overharvest.

      Explanatory Note: Since the maximum number of males would be determined after subtracting the number of harvested females, then a community would have surpassed its total tag allocation if it overharvested males.

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Canada

Submission to the Nunavut Wildlife Management Board

For

Information: **Decision: X**

Issue: Request for decision on the proposed listing of Hudsonian Godwit as Threatened under the federal *Species at Risk Act*.

Nunavut distribution of Hudsonian Godwit. Image provided by Environment and Climate Change Canada.

Background:

<u>Distribution</u>

- Hudsonian Godwit breeds in sub-Arctic and Boreal regions of Canada and Alaska and overwinters in the southernmost regions of South America.
- Some local breeding sites may remain undiscovered.
- The main breeding areas in Canada are along the Hudson Bay Lowlands in Manitoba and Ontario, and in the Mackenzie Delta, Northwest Territories.
- It can be found during the breeding season in the Kivalliq region of Nunavut and can occur through the western part of the Kitikmeot region as well.
- It migrates to South America in the winter.

<u>Assessment and Threats</u>

Prepared by:
Canadian Wildlife Service, Iqaluit Hayley Roberts 867-222-0112 October 2021

- The Committee on the Status of Endangered Wildlife in Canada assessed Hudsonian Godwit as Threatened in May 2019 because of substantial population declines over the past two to three generations.
- The rate of decline is 44% over three generations (23 years).
- Systemic long-term monitoring data are lacking for this species, and estimates of population size and trends are considered imprecise.
- The most recent population estimate for Hudsonian Godwit is approximately 41,000 mature individuals.
- Threats to recovery include: climate change, habitat loss (wintering ground in South America), pollution (agricultural over the migration routes and wintering grounds, also shipping and industrial activities).

<u>Implications of the proposed listing</u>

- Hudsonian Godwit is a migratory bird that is protected under the federal Migratory Birds Convention Act, as are its nests. Prohibitions under the *Species at Risk Act* would not add additional protections to the individual birds or nests. This does not affect Inuit harvest.
- If Hudsonian Godwit are listed as Threatened under the federal *Species at Risk Act*, a national recovery strategy will be required, which will include a plan detailing how to reverse the decline of a species.
- The Recovery Strategy will be prepared in cooperation from provincial and territorial governments, wildlife management boards, and Indigenous governments and organizations.
- The Recovery Strategy will set out goals and objectives and identifies the main areas of activities to be undertaken.
- Critical habitat, habitat which is necessary for the survival or recovery of the species, will need to be identified as a component of the Recovery Strategy.
- Environment and Climate Change Canada will work with partners in Nunavut to identify critical habitat and discuss methods for protecting it from activities likely to destroy it.
- Once critical habitat is identified, it will be protected in National Parks, National Wildlife Areas and Migratory Bird Sanctuaries.

Consultation:

<u>Materials</u>

- Consultation packages were sent by email to nine Nunavut Hunters and Trappers Organizations and to the Government of Nunavut, the Kitikmeot Inuit Association, the Kitikmeot Regional Wildlife Board, the Kivalliq Inuit Association, Nunavut Tunngavik Inc and the Nunavut Wildlife Management Board in January 2020 and to the Kivalliq Wildlife Board in October 2020. Hard copies of all the documents were sent in March 2020. The packages included a letter, report summary, listing questionnaire, PowerPoint and a consultation booklet in English and Inuktitut.
- The nine communities were Aqigiq Hunters and Trappers Organization, Arviat Hunters and Trappers Organization, Baker Lake Hunters and Trappers Organization, Issatik Hunters and Trappers Organization, Aqiggiag Hunters and Trappers Organization,

Burnside Hunters and Trappers Association, Kugluktuk Hunters and Trappers Association, Omingmaktok Hunters and Trappers Association and Ekaluktutiak Hunters and Trappers Association.

- We provided a follow-up phone call to all nine Nunavut Hunters and Trappers Organizations in October 2020 and a follow-up email in December 2020, followed by four additional follow-up calls from February to April 2021.
- We provided a follow-up email to the organizations in June 2021.

<u>Results and responses</u>

- We received no response from the Aqigiq Hunters and Trappers Organization, the Arviat Hunters and Trappers Organization, the Issatik Hunters and Trappers Organization and the Aqiggiaq Hunters and Trappers Organization.
- We received no response from the Government of Nunavut, the Kitikmeot Inuit Association, the Kitikmeot Regional Wildlife Board, the Kivalliq Inuit Association, Nunavut Tunngavik Inc., the Nunavut Wildlife Management Board or from the Kivalliq Wildlife Board.
- We received a response of Do Not Support from the Baker Lake Hunter and Trapper Organization.
- We received a response of “Indifferent” from the Burnside Hunter and Trapper Organization, the Kugluktuk Hunter and Trapper Organization, the Omingmaktok Hunter and Trapper Organization and the Ekaluktutiak Hunter and Trapper Organization.

Next Steps:

We are requesting a decision from the NWMB on the proposed listing of Hudsonian Godwit as Threatened under the federal *Species at Risk Act* as per the *Nunavut Agreement* s.5.2.34(f) and 5.3.16-5.3.23.

Following the Board’s decision, the Minister will make a recommendation to the Governor in Council that takes into account the Committee on the Status of Endangered Wildlife in Canada’s assessment, consultations with wildlife management boards authorized for that species by a lands claims agreement (including the Nunavut Wildlife Management Board), and the regulatory impact analysis statement. The final decision or final decision as varied, as arrived at through 5.3.16 of the *Nunavut Agreement*, must be respected in the Minister’s recommendation to the Governor in Council.

As part of the federal regulatory process, a 30-day comment period follows the publication of the proposed decision in Canada Gazette, Part 1. The final step in the process is for the Governor in Council to make a final listing decision. If the Governor in Council decides to list a species, it is at this point that it becomes legally included on Schedule 1. The decision and the regulatory impact analysis statement will be published in the next edition of the Canada Gazette, Part II.

CONSULTATION ON AMENDING THE LIST OF SPECIES UNDER THE *SPECIES AT RISK ACT*

Terrestrial Species

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Canada

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ADDITION OF SPECIES TO THE SPECIES AT RISK ACT

THE *SPECIES AT RISK ACT* AND THE LIST OF WILDLIFE SPECIES AT RISK

The Government of Canada is committed to preventing the disappearance of wildlife species at risk from our lands. As part of its strategy for realizing that commitment, on June 5, 2003, the Government of Canada proclaimed the *Species at Risk Act* (SARA). Attached to the Act is Schedule 1, the list of the species provided for under SARA, also called the List of Wildlife Species at Risk. Extirpated, Endangered and Threatened species on Schedule 1 benefit from the protection afforded by the prohibitions and from recovery planning requirements under SARA. Special Concern species benefit from its management planning requirements.

The policy “Timeline for amendments to Schedule 1 of the Species at Risk Act” has set standardized timelines for listing decisions. These new timelines mean that the Minister will seek to have the final decision made within 24 months. The 24 months begin with the date that the Minister receives a species’ status assessment from COSEWIC. This date is published in the response statement for each species. The Minister’s receives the COSEWIC Annual Report at the same time.

The response statement can be found on the SAR Registry, on the species’ page, in the documents section. The Timeline for amendments to Schedule 1 of the Species at Risk Act policy can be viewed on the SAR Public Registry at: https://wildlife-species.canada.ca/species-risk-registry/document/default_e.cfm?documentID=3203 and the COSEWIC Annual Report can be viewed at: https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html.

The complete list of species currently on Schedule 1 can be viewed on the SAR Public Registry at: https://laws-lois.justice.gc.ca/eng/acts/s-15.3/page-17.html#h-435647.

Species become eligible for addition to Schedule 1 once they have been assessed as being at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The decision to add a species to Schedule 1 is made by the Governor in Council further to a recommendation from the Minister of Environment and Climate Change. The Governor in Council is the formal executive body that gives legal effect to decisions that then have the force of law.

COSEWIC AND THE ASSESSMENT PROCESS FOR IDENTIFYING SPECIES AT RISK

COSEWIC is recognized under SARA as the authority for assessing the status of wildlife species at risk. COSEWIC comprises experts on wildlife species at risk. Its members have backgrounds in the fields of biology, ecology, genetics, Indigenous traditional knowledge and other relevant fields. They come from various communities, including academia, Indigenous organizations, governments and non-governmental organizations.

COSEWIC gives priority to those species more likely to become extinct, and then commissions a status report for the evaluation of the species’ status. To be accepted, status reports must be peer-reviewed and approved by a subcommittee

of species specialists. In special circumstances, assessments can be done on an emergency basis. When the status report is complete, COSEWIC meets to examine it and discuss the species. COSEWIC then determines whether the species is at risk, and, if so, it then assesses the level of risk and assigns a conservation status.

TERMS USED TO DEFINE THE DEGREE OF RISK TO A SPECIES

The conservation status defines the degree of risk to a species. The terms used under SARA are Extirpated, Endangered, Threatened and Special Concern. Extirpated species are wildlife species that no longer occur in the wild in Canada but still exist elsewhere. Endangered species are wildlife species that are likely to soon become Extirpated or Extinct. Threatened species are likely to become Endangered if nothing is done to reverse the factors leading to their extirpation or extinction. The term Special Concern is used for wildlife species that may become Threatened or Endangered due to a combination of biological characteristics and threats. Once COSEWIC has assessed a species as Extirpated, Endangered, Threatened or Special Concern, it is eligible for inclusion on Schedule 1.

For more information on COSEWIC, visit the COSEWIC website at: www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html.

TERRESTRIAL AND AQUATIC SPECIES ELIGIBLE FOR SCHEDULE 1 AMENDMENTS

The Minister of Fisheries and Oceans conducts separate consultations for the aquatic species. For more information on the consultations for aquatic species, visit the Fisheries and Oceans Canada website at www.dfo-mpo.gc.ca.

The Minister of Environment and Climate Change is conducting the consultations for all other species at risk.

Species at risk also occur in national parks or other lands administered by Parks Canada; Parks Canada shares responsibility for these species with Environment and Climate Change Canada.

THE MINISTER OF ENVIRONMENT AND CLIMATE CHANGE'S RESPONSE TO THE COSEWIC ASSESSMENT: THE RESPONSE STATEMENT

After COSEWIC has completed its assessment of a species, it provides it to the Minister of Environment and Climate Change. The Minister of Environment and Climate Change then has 90 days to post a response on the Species at Risk Public Registry, known as the response statement. The response statement provides information on the scope of any consultations and the timelines for action, to the extent possible. It identifies how long the consultations will be (whether they are "normal" or "extended") by stating when the Minister will forward the assessment to the Governor in Council. Consultations for a group of species are launched with the posting of their response statements.

COMMENTS SOLICITED ON THE PROPOSED AMENDMENT OF SCHEDULE 1

The conservation of wildlife is a joint legal responsibility: one that is shared among the governments of Canada. But biodiversity will not be conserved by governments that act alone. The best way to secure the survival of species at risk and their habitats is through the active participation of all those concerned. SARA recognizes this, and that all Indigenous peoples and Canadians have a role to play in preventing the disappearance of wildlife species from our lands. The Government of Canada is inviting and encouraging you to become involved. One way that you can do so is by sharing your comments concerning the addition or reclassification of these terrestrial species.

Your comments are considered in relation to the potential consequences of whether or not a species is included on Schedule 1, and they are then used to inform the drafting of the Minister's proposed listing recommendations for each of these species.

THE SPECIES AT RISK ACT LISTING PROCESS AND CONSULTATION

The addition of a wildlife species at risk to Schedule 1 of SARA facilitates providing for its protection and conservation. To be effective, the listing process must be transparent and open. The species listing process under SARA is summarized in Figure 1.

THE PURPOSE OF CONSULTATIONS ON AMENDMENTS TO THE LIST

When COSEWIC assesses a wildlife species, it does so solely on the basis of the best available information relevant to the biological status of the species. COSEWIC then submits the assessment to the Minister of Environment and Climate Change, who considers it when making the listing recommendation to the Governor in Council. The purpose of these consultations is to provide the Minister with a better understanding of the potential social and economic impacts of the proposed change to the List of Wildlife Species at Risk, and of the potential consequences of not adding a species to the List.

LEGISLATIVE CONTEXT OF THE CONSULTATIONS: THE MINISTER'S RECOMMENDATION TO THE GOVERNOR IN COUNCIL

The comments collected during the consultations inform the Governor in Council's consideration of the Minister's recommendations for listing species at risk. The Minister must recommend one of three courses of action. These are for the Governor in Council to accept the species assessment and modify Schedule 1 accordingly, not to add the species to Schedule 1, or to refer the species assessment back to COSEWIC for its further consideration (Figure 1).

NORMAL AND EXTENDED CONSULTATION PERIODS

Normal consultations meet the consultation needs for the listing of most species at risk. The consultations last between four and nine months (known respectively as normal and extended consultation paths). Longer consultations may be needed to ensure appropriate consultations. The reasons more time may be needed include, but are not limited to, ensuring appropriate engagement with Indigenous Peoples and complex socioeconomic analyses. Consultations are also required with wildlife management boards, which are authorized under land claims agreements for functions involving a wildlife species.

The extent of consultations needs to be proportional to the expected impact of a listing decision and the time that may be needed to consult. Under some circumstances, whether or not a species will be included on Schedule 1 could have significant and widespread impacts on the activities of some groups of people. It is essential that such stakeholders have the opportunity to inform the pending decision and, to the extent possible, to provide input on its potential consequences and to share ideas on how best to approach threats to the species. A longer period may also be required to consult appropriately with some groups. For example, consultations can take longer for groups that meet infrequently but that must be engaged on several occasions. For such reasons, extended consultations may be undertaken.

Occasionally, for reasons such as these, the timelines initially set out in the response statement may not be adequate. In such cases, if Governor in

Council does not receive the assessment at the time specified in the response statement, within one month another statement is to be published on the Registry describing. It will describe the reason(s) for the delay and set out next steps.

For both normal and extended consultations, once they are complete, the Minister of Environment and Climate Change forwards the species assessments to the Governor in Council for the government's formal receipt of the assessment. The Governor in Council then has nine months to come to a listing decision.

The consultation paths (normal or extended) for the terrestrial species eligible for an Amendment to Schedule 1" are announced when the Minister publishes the response statements.

No consultations are undertaken for species already on Schedule 1 and for which no change in status is being proposed.

FIGURE 1: THE SPECIES LISTING PROCESS UNDER SARA

1	The Minister of Environment and Climate Change receives species assessments from COSEWIC at least once per year.
2	The competent departments undertake internal review to determine the extent of public consultation and socio-economic analysis necessary to inform the listing decision.
3	Within 90 days of receipt of the species assessments prepared by COSEWIC, the Minister of Environment and Climate Change publishes a response statement on the SARA Public Registry that indicates how he or she intends to respond to the assessment and, to the extent possible, provides timelines for action.
4	Where appropriate, the competent departments undertake consultations and any other relevant analysis needed to prepare the advice for the Minister of Environment and Climate Change.
5	The Minister of Environment and Climate Change forwards the assessment to the Governor in Council for receipt. This generally occurs within twelve months of posting the response statement, unless further consultation is necessary.
6	Within nine months of receiving the assessment, the Governor in Council, on the recommendation of the Minister of Environment and Climate Changemay decide whether or not to list the species under Schedule 1 of SARA or refer the assessment back to COSEWIC for further information or consideration.
7	Once a species is added to Schedule 1, it benefits from the applicable provisions of SARA.

WHO IS CONSULTED, AND HOW

It is most important to consult with those who would be most affected by the proposed changes. There is protection that is immediately in place when a species that is Extirpated, Endangered or Threatened is added to Schedule 1 (for more details, see below, "Protection for listed Extirpated, Endangered and Threatened species"). This immediate protection does not apply to species of Special Concern. The nature of the protection depends on the type of species, its conservation status, and where the species is found. Environment and Climate Change Canada takes this into account during the consultations; those who may be affected by the impacts of the automatic protections are contacted directly, others are encouraged to contribute through a variety of approaches.

Indigenous peoples known to have species at risk on their lands, for which changes to Schedule 1 are being considered, will be contacted. Their engagement is of particular significance, acknowledging their role in the management of the extensive traditional territories and the reserve and settlement lands.

A Wildlife Management Board is a group that has been established under a land claims agreement and is authorized by the agreement to perform functions in respect of wildlife species. Some eligible species at risk are found on lands where existing land claims agreements apply that give specific authority to a Wildlife Management Board. In such cases, the Minister of Environment and Climate Change will consult with the relevant board.

To encourage others to contribute and make the necessary information readily available, this document is distributed to known stakeholders and posted on the Species at Risk Public Registry. More extensive consultations may also be done through regional or community meetings or through a more targeted approach.

Environment and Climate Change Canada also sends notice of the consultations to identified concerned groups and individuals who have made their interests known. These include, but are not limited to, industries, resource users, landowners and environmental non-governmental organizations.

In most cases, it is difficult for Environment and Climate Change Canada to fully examine the potential impacts of recovery actions when species are being considered for listing. Recovery actions for terrestrial species usually have not yet been comprehensively defined at the time of listing, so their impact cannot be fully understood. Once they are better understood, efforts are made to minimize adverse social and economic impacts of listing and to maximize the benefits. SARA requires that recovery measures be prepared in consultation with those considered to be directly affected by them.

In addition to the public, Environment and Climate Change Canada consults on listing with the governments of the provinces and territories with lead responsibility for the conservation and management of these wildlife species. Environment and Climate Change Canada also consults with other federal departments and agencies.

ROLE AND IMPACT OF PUBLIC CONSULTATIONS IN THE LISTING PROCESS

The results of the public consultations are of great significance to informing the process of listing species at risk. Environment and Climate Change Canada carefully reviews the comments it receives to gain a better understanding of the benefits and costs of changing the List.

The comments are then used to inform the Regulatory Impact Analysis Statement (RIAS). The RIAS is a report that summarizes the impact of a proposed regulatory change. It includes a description of the proposed change and an analysis of its expected impact, which takes into account the results of the public consultations. In developing the RIAS, the Government of Canada recognizes that Canada's natural heritage is an integral part of our national identity and history and that wildlife in all its forms has value in and of itself.

The Government of Canada also recognizes that the absence of full scientific certainty is not a reason to postpone decisions to protect the environment.

A draft Order is then prepared, providing notice that a decision is being taken by the Governor in Council. The draft Order proposing to list all or some of the species under consideration is then published, along with the RIAS, in the *Canada Gazette*, Part I, for a comment period of 30 days.

The Minister of Environment and Climate Change will take into consideration comments and any additional information received following publication of the draft Order and the RIAS in the *Canada Gazette*, Part I. The Minister then makes a final listing recommendation for each species to the Governor in Council. The Governor in Council next decides either to accept the species assessment and amend Schedule 1 accordingly; or not to add the species to Schedule 1; or to refer the species assessment back to COSEWIC for further information or consideration. The final decision is published in the *Canada Gazette*, Part II, and on the Species at Risk Public Registry. If the Governor in Council decides to list a species, it is at this point that it becomes legally included on Schedule 1.

SIGNIFICANCE OF THE ADDITION OF A SPECIES TO SCHEDULE 1

The protection that comes into effect following the addition of a species to Schedule 1 depends upon a number of factors. These include the species' status under SARA, the type of species and where it occurs.

PROTECTION FOR LISTED EXTIRPATED, ENDANGERED AND THREATENED SPECIES

Responsibility for the conservation of wildlife is shared among the governments of Canada. SARA establishes legal protection for individuals as soon as a species is listed as Threatened, Endangered or Extirpated, and, in the case of Threatened and Endangered species, for their residences. This applies to species considered federal species or if they are found on federal land.

Federal species include migratory birds, as defined by the *Migratory Birds Convention Act, 1994*, and aquatic species covered by the *Fisheries Act*. Federal land means land that belongs to the federal government, and the internal waters and territorial sea of Canada. It also means land set apart for the use and benefit of a band under the *Indian Act* (such as reserves). In the territories, the protection for species at risk on federal lands applies only where they are on lands under the authority of the Minister of Environment and Climate Change or the Parks Canada Agency.

Migratory birds are protected by the *Migratory Birds Regulations*, under the *Migratory Birds Convention Act, 1994*, which strictly prohibits the harming of migratory birds and the disturbance or destruction of their nests and eggs. For more information, please refer to the Regulations for the complete list of prohibitions: https://laws-lois.justice.gc.ca/eng/regulations/C.R.C.%2C_c._1035/index.html.

SARA's protection for individuals makes it an offence to kill, harm, harass, capture or take an individual of a species listed as Extirpated, Endangered or Threatened. It is also an offence to damage or destroy the residence of one or more individuals of an Endangered or Threatened species or an Extirpated species whose

reintroduction has been recommended by a recovery strategy. The Act also makes it an offence to possess, collect, buy, sell or trade an individual of a species that is Extirpated, Endangered or Threatened.

Species at risk that are neither aquatic nor protected under the *Migratory Birds Convention Act, 1994*, nor on federal lands, do not receive immediate protection upon listing under SARA. Instead, in most cases, the protection of terrestrial species on non-federal lands is the responsibility of the provinces and territories where they are found. The application of protections under SARA to a species at risk on non-federal lands requires that the Governor in Council make an order defining those lands. This can only occur when the Minister is of the opinion that the laws of the province or territory do not effectively protect the species. To put such an order in place, the Minister would then need to recommend the order be made to the Governor in Council. If the Governor in Council agrees to make the order, the prohibitions of SARA would then apply to the provincial or territorial lands specified by the order. The federal government would consult before making such an order.

RECOVERY STRATEGIES AND ACTION PLANS FOR EXTIRPATED, ENDANGERED AND THREATENED SPECIES

Recovery planning results in the development of recovery strategies and action plans for Extirpated, Endangered or Threatened species. It involves the different levels of government responsible for the management of the species, depending on what type of species it is and where it occurs. These include federal, provincial and territorial governments as well as Wildlife Management Boards. Recovery strategies and action plans are also prepared in cooperation with directly affected Indigenous organizations. Landowners and other stakeholders directly affected by the recovery strategy are consulted to the extent possible.

Recovery strategies must be prepared for all Extirpated, Endangered and Threatened species. They include measures to mitigate the known threats to the species and its habitat and set the population and distribution objectives. Other objectives can be included, such as stewardship, to conserve the species, or education, to increase public awareness. Recovery strategies must include a statement of the time frame for the development of one or more action plans that will state the measures necessary to implement the recovery strategy. To the extent possible, recovery strategies must also identify the critical habitat of the species, which is the habitat necessary for the survival or recovery of the species. If there is not enough information available to identify critical habitat, the recovery strategy includes a schedule of studies required for its identification. This schedule outlines what must be done to obtain the necessary information and by when it needs to be done. In such cases, critical habitat can be identified in a subsequent action plan.

Proposed recovery strategies for newly listed species are posted on the Species at Risk Public Registry to provide for public review and comment. For Endangered species, proposed recovery strategies are posted within one year of their addition to Schedule 1, and for Threatened or Extirpated species, within two years.

Once a recovery strategy has been posted as final, one or more action plans based on the recovery strategy must then be prepared. These include measures to address threats and achieve the population and distribution objectives. Action plans also complete the identification of the critical habitat where necessary and, to the extent possible, state measures that are proposed to protect it.

PERMITS AND AGREEMENTS

For terrestrial species listed on SARA Schedule 1 as Extirpated, Endangered or Threatened, the Minister of Environment and Climate Change may authorize exceptions to the Act's prohibitions,

when and where they apply. The Minister can enter into agreements or issue permits only for one of three purposes: for research, for conservation activities, or if the effects to the species are incidental to the activity. Research must relate to the conservation of a species and be conducted by qualified scientists. Conservation activities must benefit a listed species or be required to enhance its chances of survival. All activities, including those that incidentally affect a listed species, its individuals, residences or critical habitat must also meet certain conditions. First, it must be established that all reasonable alternatives to the activity have been considered and the best solution has been adopted. Second, it must also be established that all feasible measures will be taken to minimize the impact of the activity on the listed species. Finally, it must be established that the activity will not jeopardize the survival or recovery of the species. Having issued a permit or agreement, the Minister must then include an explanation on the Species at Risk Public Registry of why the permit or agreement was issued.

PROTECTION FOR LISTED SPECIES OF SPECIAL CONCERN

While immediate protection under SARA for species listed as Extirpated, Endangered and Threatened does not apply to species listed as Special Concern, any existing protections and prohibitions, such as those provided by the *Migratory Birds Convention Act, 1994* or the *Canada National Parks Act*, continue to be in force.

MANAGEMENT PLANS FOR SPECIES OF SPECIAL CONCERN

For species of Special Concern, management plans are to be prepared and made available on the Species at Risk Public Registry within three years of a species' addition to Schedule 1, allowing for public review and comment. Management plans include appropriate conservation measures for the species and for its habitat. They are prepared in cooperation with the jurisdictions responsible for the management of the species, including directly affected Wildlife Management Boards and Indigenous organizations. Landowners, lessees and others directly affected by a management plan will also be consulted to the extent possible.

PROVIDING COMMENTS

The involvement of Canadians is integral to the listing process, as it is to the ultimate protection of Canadian wildlife. Your comments matter and are given serious consideration. ECCC will review all the comments that it receives by the deadlines provided in consultation materials.

For any information on the *Species at Risk Act*, please visit the Species at Risk Public Registry at: www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html.

GLOSSARY

Aquatic species: A wildlife species that is a fish as defined in section 2 of the Fisheries Act or a marine plant as defined in section 47 of the Act. The term includes marine mammals.

Canada Gazette: The *Canada Gazette* is one of the vehicles that Canadians can use to access laws and regulations. It has been the "official newspaper" of the Government of Canada since 1841. Government departments and agencies as well as the private sector are required by law to publish certain information in the *Canada Gazette*. Notices and proposed regulations are published in the *Canada Gazette*, Part I, and official regulations are published in the *Canada Gazette*, Part II. For more information, please visit http://gazetteducanada.gc.ca.

Canadian Endangered Species Conservation Council: The Council is made up of federal, provincial and territorial ministers with responsibilities for wildlife species. The Council's mandate is to provide national leadership and coordination for the protection of species at risk.

COSEWIC: The Committee on the Status of Endangered Wildlife in Canada. The Committee comprises experts on wildlife species at risk. Their backgrounds are in the fields of biology, ecology, genetics, Indigenous traditional knowledge and other relevant fields. These experts come from various communities, including, among others, government and academia.

COSEWIC assessment: COSEWIC's assessment or re-assessment of the status of a wildlife species, based on a status report on the species that COSEWIC either has had prepared or has received with an application.

Down-listing: A revision of the status of a species on Schedule 1 to a status of lower risk. A revision of the status of a Schedule 1 species to a higher risk status would be up-listing.

Federal land: Any land owned by the federal government, the internal waters and territorial sea of Canada, and reserves and other land set apart for the use and benefit of a band under the *Indian Act*.

Governor in Council: The Governor General of Canada acting on the advice of the Queen's Privy Council for Canada, the formal executive body that gives legal effect to those decisions of Cabinet that are to have the force of law.

Individual: An individual of a wildlife species, whether living or dead, at any developmental stage, and includes larvae, embryos, eggs, sperm, seeds, pollen, spores and asexual propagules.

Order: An order issued by the Governor in Council, either on the basis of authority delegated by legislation or by virtue of the prerogative powers of the Crown.

Response statement: A document in which the Minister of Environment and Climate Change indicates how he or she intends to respond to the COSEWIC assessment of a wildlife species. A response statement is posted on the Species at Risk Public Registry within 90 days of receipt of the assessment by the Minister, and provides timelines for action to the extent possible.

RIAS: Regulatory Impact Analysis Statement. A document that provides an analysis of the expected impact of a regulatory initiative and which accompanies an Order in Council.

Species at Risk Public Registry: Developed as an online service, the Species at Risk Public Registry has been accessible to the public since proclamation of the *Species at Risk Act* (SARA). The website gives users easy access to documents and information related to SARA at any time and location with Internet access. It can be found at www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html.

Schedule 1: A schedule of SARA, also known as the List of Wildlife Species at Risk, which presents the list of species protected under SARA.

Up-listing: A revision of the status of a species on Schedule 1 to a status of higher risk. A revision of the status of a Schedule 1 species to a lower risk status would be down-listing.

Wildlife Management Board: Established under the land claims agreements in northern Quebec, Newfoundland and Labrador, Yukon, Northwest Territories, British Columbia, and Nunavut, Wildlife Management Boards are the "main instruments of wildlife management" within their settlement areas. In this role, Wildlife Management Boards not only establish, modify and remove levels of total allowable harvest of a variety of wildlife species, but also participate in research activities, including annual harvest studies, and approve the designation of species at risk in their settlement areas.

Wildlife Species: Under SARA, a species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus. To be eligible for inclusion under SARA, a wildlife species must be wild by nature and native to Canada. Non-native species that have been here for 50 years or more can be considered eligible if they came without human intervention.

Hudsonian Godwit

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Photo: © Holly Bickerton

The Species at Risk Act (SARA)
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- SARA is federal legislation that aims to prevent wildlife from disappearing from Canada

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- SARA does not affect Inuit harvesting rights

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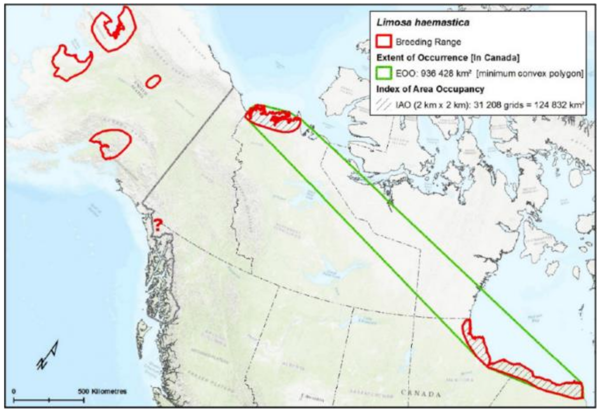
Distribution ᓇᓃᖅᑕᑦᑭᓂᖏᑦ



- Hudsonian Godwit is a large shorebird that is found during the breeding season in the Kivalliq region of Nunavut and can occur through the western part of the Kitikmeot region as well.

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- Migrates to South America in the winter.

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Conservation status

- The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed Hudsonian Godwit as a Threatened species in May 2019.
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- A threatened species is likely to become endangered if threats to its recovery are not addressed
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- This species has experienced a 44% decline in population size in the last 23 years
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Threats to recovery ᐊᑦᑕᓇᕈᑕᐅᔪᑦ ᐅᑎᖅᑎᑕᐅᓂᖏᓐᓄᑦ

Climate change ᓯᓚᐅᑉ ᐊᓯᔾᔨᕐᓂᖓ

- e.g. Warmer temperatures, rising sea levels
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Habitat loss ᓇᔪᖃᑦᑕᖅᑕᖏᑦ ᐱᑕᖃᕈᓐᓃᕐᓂᖏᑦ

- Wintering grounds in South America are threatened by habitat loss and degradation.
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Pollution

- Wintering grounds and migration routes exposed to agricultural pollution and pollution from ships and industrial activities
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We want to hear from you ᑐᓴᕈᒪᔪᒍᑦ ᐃᓕᔅᓯᓐᓂᒃ

- Consultation with partners on the proposed listing will be held between January and October 2020.
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- Your comments and input are very valuable.
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- Please complete the attached questionnaire and return to the Canadian Wildlife Service by **October 7, 2020.**
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Email: Teresa.Tufts@canada.ca
Fax: 867-975-4645

Environment and Climate Change Canada   Environnement et Changement climatique Canada

Please fax this form to 867-975-4645 or email to teresa.tufts@canada.ca by October 7, 2020. Reply by August 31, 2020 if you require more information.

Hudsonian Godwit

Proposed listing as Threatened

The following questions are intended to assist you in providing comments. They are not limiting and any other comments you may have are welcome. We also encourage you to share descriptions and estimates of costs and benefits where possible.

Questionnaire filled out by:

____
(Print name / title)

Organization:

____

Date questionnaire completed:

____

Have you seen Hudsonian Godwit in your area? ☐ Yes ☐ No

Do you have enough information to make a decision on your position/opinion on the proposed listing of Hudsonian Godwit as Threatened under the federal *Species at Risk Act*?

☐ Yes ☐ No

If you need more information let us know by August 31, 2020 *and someone will contact you to see how best to provide this information*

What is your organization's position/opinion on the proposed listing of Hudsonian Godwit as Threatened?

☐ Support the proposed listing of Hudsonian Godwit as Threatened
☐ Do not support the proposed listing of Hudsonian Godwit as Threatened
☐ Indifferent to the proposed listing of Hudsonian Godwit as Threatened

What are your reasons for this position?

Canada

Please fax this form to 867-975-4645
or email to teresa.tufts@canada.ca
by October 7, 2020. Reply by August
31, 2020 if you require more information.

Do you have any additional comments?

Some points to consider:

- How does the Hudsonain Godwit benefit you or the environment? (this can include economic, cultural, spiritual, and environmental benefits)
- What impact do you think that adding Hudsonian Godwit to the list of wildlife species at risk would have on your activities?
- What impact do you think that adding Hudsonian Godwit to the list of wildlife species at risk would have on the species?
- Do you have any other information or concerns that the federal Minister of the Environment should consider before making a decision on the listing of the species?

Canadian Wildlife Service

Environment and Climate Change Canada

PO box 1870 Iqaluit, NU X0A 0H0

January 24, 2020

Good Day,

The purpose of this package is to share information and get your feedback on the proposed listing of Hudsonian Godwit as Threatened under the federal Species at Risk Act (SARA).

Hudsonian Godwit is a large shorebird that is found during the breeding season in the Kivalliq region of Nunavut and can occur through the western part of the Kitikmeot region as well.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed Hudsonian Godwit as a Threatened species in May 2019. You are invited to submit comments on the potential impacts of amending the List of Wildlife Species at Risk according to the COSEWIC status assessment. Your comments will be considered and will inform the federal Minister of the Environment's recommendation on whether to list Hudsonian Godwit on the list of Species at Risk as Threatened. Your comments will also be shared with the Nunavut Wildlife Management Board (NWMB) when they are asked to make a decision on the listing.

We are sending you the summary of the COSEWIC status report, a Consultation booklet and a questionnaire about the proposed listing of this bird. Inuktitut materials will be sent in a separate email. The full COSEWIC status report can be found at:

https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/hudsonian-godwit-2019.html

Please review these items and complete the questionnaire with input from your board / organization members.

We hope you will review the information in this package. If you have any additional questions, concerns or information that you feel should be considered in the listing decision, please let us know and we will follow up with you as needed. If you feel this package provides enough information for you to make a decision, please respond in writing to the Canadian Wildlife Service telling us your formal position on the proposed listing of Hudsonian Godwit. You can either send us an email or you can fill in the attached questionnaire.

We request your response by October 7, 2020. If you require additional information from us before making your comments, please contact us by August 31, 2020.

If you have any questions about this process, please contact:

Teresa Tufts, Species at Risk Biologist, Canadian Wildlife Service

Environment and Climate Change Canada / Government of Canada

PO box 1870 Iqaluit, NU X0A 0H0

Teresa.Tufts@canada.ca / Tel: +1 (867) 979 7058

Sincerely,

Craig Machtans

A/Regional Director, Northern Region, Canadian Wildlife Service

Environment and Climate Change Canada / Government of Canada

SUBMISSION TO THE NUNAVUT WILDLIFE MANAGEMENT BOARD December 2021

FOR

Information: X **Decision:**

Issue: Department of Fisheries and Oceans Canada (DFO) – Fisheries Management Operational Updates

Updates:

Marine Mammals:

1) Narwhal:

- The total reported landings for Narwhal management units in the 2020/21 harvest season were: Jones Sound 38, Smith Sound 0, Northern Hudson Bay 184, Somerset Island 74, East Baffin Island 178, Admiralty Inlet 312, and Eclipse Sound 140.
- All of the 2021/22 narwhal tags (including carry-over tags) and information packages have been distributed to all harvesting communities in coordination with the Regional Wildlife Organizations (RWOs).
- DFO Fisheries Management provided briefing notes to the Kivalliq Wildlife Board (KWB), Kitikmeot Regional Wildlife Board (KRWB), and Qikiqtaaluk Wildlife Board (QWB) to be presented at their 2021 Annual General Meetings on the available information for the 2021/22 narwhal harvest season and discussed planning for the 2022/23 season.
- In mid-August 2021, the Mittimatalik Hunters and Trappers Organization (MHTO) of Pond Inlet reported low numbers of narwhal observed in Eclipse Sound, and asked DFO if Eclipse Sound Marine Mammal Tags (MMTs) could be used in the Admiralty Inlet management unit. The Narwhal Integrated Fisheries Management Plan (IFMP) specifies that stock-specific MMTs are not to be used elsewhere; additionally the Ikajutit HTO (Arctic Bay) did not support MHTO's request to harvest narwhal in Admiralty Inlet. DFO was advised that the MHTO members would not harvest narwhal in Admiralty Inlet.
- DFO continues to attempt coordination of a virtual meeting for the Nunavut Narwhal Working Group in 2021 at a time when all co-management organizations are available to participate. This meeting will involve discussing the recently published Science advice on Admiralty Inlet and Eclipse Sound narwhal stocks and initiating a review of the Integrated Fisheries Management Plan for Narwhal in the Nunavut Settlement Area, including the collective review of and potential changes to narwhal management in

Nunavut. DFO is currently proposing November 30, 2021 for this meeting, pending availability of co-management organizations.

2) Walrus:

- The total reported landings for walrus within the Nunavut Settlement Area for the 2020/21 season was 257, with all being harvested for subsistence purposes and none being harvested by sport hunters. However, a few communities did not report any subsistence harvest.
- In 2021, DFO and the Sanirajak Hunters and Trappers Association (HTA) and the Aiviit Hunters and Trappers Organization (HTO) of Coral Harbour continued the Community-Based Catch Monitoring Program for Walrus. Community Coordinators were hired in both communities for the 2021 harvest season to implement the program. DFO continues to work closely with the HTA/HTO Managers and Community Coordinators to obtain updates on the 2021 walrus harvest in these two communities.
- Of the 27 walrus sport hunts approved by the Nunavut Wildlife Management Board (NWMB) and DFO for 2021, five sport hunts occurred. Several other hunts were planned but did not occur for various reasons, with COVID-19 travel restrictions playing a role in some hunt cancellations. DFO continues to coordinate with outfitters on receipt of samples and harvest information from successful hunts.
- Due to COVID-19 and ongoing public health measures, no face-to-face meetings are planned at this time but a virtual Nunavut Walrus Working Group meeting will be proposed in the near future. Items for discussion by co-management organizations include the possible alternatives to Total Allowable Harvest (TAH) levels for walrus in Nunavut, the walrus sport hunt and potential solutions to ensure access for outfitters, and ongoing implementation of the walrus IFMP.

3) Beluga:

- The total reported landings for beluga within the Nunavut Settlement Area for the 2020/21 season was 350. However, a few communities did not report their beluga harvest.
- The Cumberland Sound Beluga Working Group continues to meet virtually while COVID-19 restrictions limit in-person meetings. In 2021, virtual meetings were held in January, February, March, June, and October. During these meetings, the Working Group Terms of Reference and the Communications Plan were completed. The next virtual meeting is being tentatively planned for late November.

4) Bowhead:

- DFO engaged communities about conducting a Bowhead Working Group meeting this fall. Response was limited, so DFO is planning to hold a virtual meeting of the Bowhead Working Group in the near future to continue to

engage on the development of the bowhead IFMP. In-person meetings will resume as soon as it is safe to do so.

5) Killer Whale – Northwest Atlantic/ Eastern Arctic (NWA/EA) Population

- The community of Pangnirtung and the QWB have each notified DFO of an increase in the presence of killer whales in Cumberland Sound, and concerns about killer whale predation on other marine mammals in the area. The Pangnirtung HTO wishes to explore licensing options for local management of this killer whale population through harvesting.
- The NWMB received a copy of DFO's written response to the HTO (September 2, 2021) which summarized two possible options and asked the HTO to provide more details required to inform next steps. On October 25, 2021 DFO provided additional information to partners regarding contaminant levels in North Atlantic killer whales sampled in Greenland and Norway, in response to a request regarding food safety. Additionally, a DFO science analysis of polychlorinated biphenyl (PCB) concentrations and diet characteristics of High Arctic killer whales sampled between 2009-2019 is underway. Publication is anticipated in the coming months and can be provided at that time to further inform the community and partners on the health of this population.
- NWMB staff attended two recent co-management calls on the subject. The first was held on October 14, 2021 to discuss killer whales in Cumberland Sound and to clarify requests, roles, and responsibilities of the co-management groups involved. The second was the Cumberland Sound Beluga Working Group (CSB-WG) meeting held on October 15, 2021. Discussions were focused on the concerns and impacts of killer whales on CSB and the community. Both meetings were also attended by Nunavut Tunngavik Inc. (NTI), the QWB, the Pangnirtung HTO, and DFO.
- DFO looks forward to the continued engagement of the NWMB, Regional Wildlife Organizations, and other partners in identifying possible approaches to address killer whale predation on traditional Inuit food sources, while accounting for additional important considerations such as alignment with Inuit Qaujimajatuqangit and local knowledge of killer whale behaviour; available scientific information on NWA/EA killer whale population; harvest plans that address human safety, processing and use of killer whale carcasses, and scientific sample collection; success of predator-control measures for killer whale; and potential implications of existing trade agreements.

6) Harvest Reporting:

- Staff from the Iqaluit DFO office will soon be in contact with HTOs/HTAs requesting mid-season harvest updates for beluga, walrus, and narwhal. Reports of total marine mammal hunting mortality (landed and lost) are essential to develop reliable advice on sustainable harvests.
- DFO urges continued reporting of unusual marine mammal occurrences and events for follow up by co-management organizations, such as beached

carcasses and ice entrapments.
- Timely and accurate reporting is required under the Fisheries Act, Marine Mammal Regulations, and the Nunavut Agreement. It is strongly recommended that co-management organizations emphasize the importance of harvest reporting and monitoring.

<u>Arctic Char</u>:

1) Pangnirtung:
   - In 2020/21, a total of approximately 17,900 kg of Arctic char was reported harvested in Pangnirtung.
   - For 2021/22, the Arctic char summer fishery in Cumberland Sound opened on July 28, 2021 and ran for about three weeks. Approximately 42 fishers participated in the summer fishery and fished 12 waterbodies.
   - Approximately 17,300 kg round weight of char was landed at the Pangnirtung fish plant in the summer of 2021.
   - Additional char fishing in Cumberland Sound is expected to occur during the upcoming winter season.
2) Kivalliq:
   - The 2021 commercial harvest of Arctic char in the Kivalliq region was approximately 13,300 lbs, harvested from around Rankin Inlet and Whale Cove.
   - The commercial plant sampling program once again occurred in 2021 thanks to the ongoing support of Kivalliq Arctic Foods. This program aims to collect biological data from commercially harvested char in the region. Specific sample sizes per location will be determined when all samples are shipped to Winnipeg.
   - A community based sampling program including six communities (Baker Lake, Chesterfield Inlet, Coral Harbour, Naujaat, Rankin Inlet, and Whale Cove) was established in 2019. Due to the interest and success in 2019, the programs have continued into 2020 and 2021 focusing on different communities. These community based sampling programs support the objectives outlined by the Kivalliq communities at the 2019 and 2020 Kivalliq Arctic Char Workshops. The aim of the programs is to collect samples that will be used to understand diet and parasites of Arctic char in the region.
   - In 2021, local fishers collected 50 samples per waterbody from eight waterbodies around Naujaat and Sanirajak areas. DFO is covering payments to local fishers for the collection of these samples.
3) Cambridge Bay:
   - The NWMB and DFO have formally approved the 2021 updated Cambridge Bay Arctic char IFMP, including the use of weirs as a modification of a Non-Quota Limitation for Jayko and Halokvik Rivers and the use of a weir spanning the whole width of the river at Halokvik river. The IFMP will be posted online this year and copies will be made available in Inuinnaqtun, Inuktitut, English, and French.
   - The 2021 commercial harvest of Arctic char in Cambridge Bay occurred at three sites [Ekalluk, Halokvik (30-Mile), and Jayko Rivers]. Lauchlan and Surrey Rivers were not harvested due to availability of float planes during the spring harvest.

- A total of 30,186 kg was harvested in 2021, reflecting 71.9% of the targeted harvest and 47% of the total commercial quota for the five waterbodies. There are no conservation concerns with any of the waterbodies.

Fishery Site (Common Name)	Commercial Quota Kg, round weight	Targeted Commercial Quota Kg, Round weight	2021 Commercial Harvest Kg, round weight
Ekalluktok (Ekalluk River)	20,000	20,000	14,803.08
Halokvik (30 Mile)	5,000	5,000	4,998.68
Jayko	17,000	17,000	6,616.18
Paliryuak (Surrey River)	9,100	Not Fished	Not Fished
Lauchlan R. (Byron Bay)	9,100 (*5,000)	Not fished	Not fished
Grand Total	**60,200**	**42,000**	**30,186**

* targeted quota

- There will be a virtual post-season fishing meeting scheduled with the IFMP Working Group in the near future.
- The Cambridge Bay commercial plant sampling program (fishery-dependent sampling) was once again successful in providing DFO with biological data and samples from 200 Arctic char from the three bodies that were commercially fished. This is the longest running program of its kind in Nunavut, spanning five decades.
- As a result of travel restrictions due to COVID-19, DFO did not conduct fishery-independent sampling of Lauchlan River Arctic char as initially planned. DFO had planned to continue the Lauchlan River sampling (year 3 of 5) in 2021, collecting biological data that will be important for completing a stock assessment of the health of the Lauchlan River fishery. Instead, DFO initiated a community-based sampling program in 2021 at an area near to the community, locally known as Gravel Pit. Local field assistants, hired through the EHTO, fished for Arctic char and took biological samples throughout the summer. The primary objective was to assess how char diet might change throughout the marine feeding season and to collect samples for contaminants, parasites, and marine microplastics work. These are topics of interest for community members that DFO has heard during recent engagements. In 2021, 151 samples were collected through this initiative. Analyses will begin this winter.
- Loosened travel restrictions did allow for a shortened field season towards the end of August. During this time, the majority of our acoustic equipment that has been monitoring char migrations since 2013 was recovered. This equipment was not redeployed, given all the uncertainties with field seasons as of late. The goal is to establish a telemetry study monitoring movements and habitat use of char, lake trout, ogacs, and kanayoks near Cambridge Bay and in the Greiner watershed.

Greenland Halibut (Turbot):

1) Cumberland Sound Turbot Management Area (CSTMA)
   - Open water turbot fishing occurred in Cumberland Sound in the summer of 2021 from late July until early September. Between the on-ice fishery during the winter and this open water summer fishery, approximately 456.25 t out of the 500 t TAH was landed in 2021.

Prepared by: Fisheries Management, Arctic Region – Fisheries and Oceans Canada

Date: October 28, 2021

SUBMISSION TO THE NUNAVUT WILDLIFE MANAGEMENT BOARD December 2021

For

Information: **X** Decision:

Issue: Bowhead Carcass Update, Kitikmeot Region

Potential Issue(s) or impact(s):

- Eleven bowhead whale carcasses have been reported in the Gulf of Boothia, near the community of Kugaaruk, Nunavut since October 2020.
- Tissue samples from eight whales have been collected and investigations into potential causes and extent of mortalities are underway.
- Cause of death is currently unknown. Given the condition of the carcasses and the inability to travel to perform a necropsy, a final determination of cause of death may be unlikely. Possible causes for these mortalities include: contaminants, starvation (poor body condition), algae poisoning, disease, and killer whale predation.

Provincial / Territorial / International communications necessary / completed

- DFO has updated co-management organizations and Regional Communications as more information becomes available.
- Alaska has recorded bowhead Unusual Mortality Events in the past and has provided recommendations on response measures.
- The International Whaling Commission will be provided with an update upon completion of the ongoing research.

Science Response:

- Due to pandemic-related travel restrictions, Science staff were unable to visit the region to perform detailed necropsies. Samples provided by the communities from eight out of the eleven carcasses have been received at the Freshwater Institute and are undergoing various analyses.
- Tissue samples from seven of the whales were sent for inspection by a veterinarian and reports indicate no obvious underlying health concerns or evidence of starvation as a cause of death.
- To test whether the stranded whales are different, DFO will compare these whales with normal hunted whales:
  1. analysis of blubber will include inspection of fat cell relative size and will measure lipid content from both stranded and harvested whales to compare body condition as a test of whether the stranded whales may have died from starvation.

2. skin samples have been analyzed using epigenetic methods to estimate age. Results indicate that six out of eight sampled whales were subadults under the age of 20. This is notable as juvenile whales are more susceptible to predation from killer whales. The age/sex composition of the stranded whales will be compared to live whales.
3. samples of skin and muscle are being analyzed for dietary biomarkers (stable isotopes and fatty acids) and results will be compared with hunted whales to see whether the stranded whales had different diets.
4. baleen plates were collected from 5 individuals and will be analyzed for stable isotopes and hormones along the length of the plates and results compared with hunted whales.

- To assess the extent of mortalities within the southern Gulf of Boothia region, DFO purchased satellite images covering approximately 3-5% of the region's coastline. Weather and technical delays with the imagery provider have postponed completion of analysis. Preliminary analysis has confirmed that stranded whales are visible in the satellite images, though no additional carcasses have been confirmed beyond those previously reported by hunters. Satellite images have also provided length measurements for stranded whales.
- To assess possible contaminants, DFO is making arrangements with ECCC to have narwhal (or beluga) hunted in 2021 by Kugaaruk and Taloyoak hunters analyzed for contaminants.
- To assess possible harmful algal bloom poisoning, DFO has requested seal stomachs be collected by Kugaaruk hunters and contents will be assessed.
- Early indications suggest killer whale predation as the key cause of mortality based on hunter observations of missing tongues, scars, and the relatively small size (young) of whales.
- Future results from analyses will be communicated to the communities as they become available.

Media Attention:

- Some media attention in November when the first whales were observed, but none since.

Next Step(s):

- Continue laboratory analyses, prepare reports and provide updates to communities as results become available.
- An in-person meeting with Kurtairojuark HTA is being planned for January 2022.

Prepared by:

Steve Ferguson and Brent Young, DFO Science, Winnipeg

Date:

22 October 2021

Table 1. Bowhead whale carcasses in the Gulf of Boothia reported between October 2020 and April 2021.

ID	Date Reported	Sampled	Length (m)	Length (m) (satellite)	Sex	Age	Age Class
BM-2020-13	1-Oct-2020	Yes	21.3		F	32	Adult
BM-2020-14	1-Oct-2020	Yes	10.3	7.2	M	18	Juvenile
BM-2020-16	1-Oct-2020		15.8	14.5			Adult
BM-2020-15	1-Oct-2020	Yes	7.8	8.3	M	12	Juvenile
BM-2020-06	10-Nov-2020	Yes		10	F	19	Juvenile
BM-2020-01	10-Nov-2020	Yes		8.9	M	8	Juvenile
BM-2020-17	10-Nov-2020			7.5			Juvenile
BM-2020-03	10-Nov-2020	Yes		7.9	M	12	Juvenile
BM-2020-12	25-Nov-2020	Yes			F	43	Adult
BM-2020-18	26-Jan-2021	Yes			M	16	Juvenile
Taloyoak 2	14-Apr-2021						

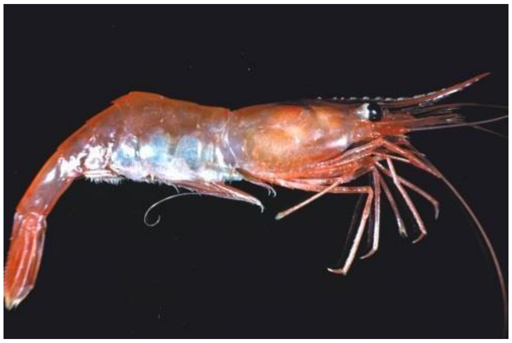
SUBMISSION TO THE

NUNAVUT WILDLIFE MANAGEMENT BOARD AND
NUNAVIK MARINE REGION WILDLIFE BOARD

FOR

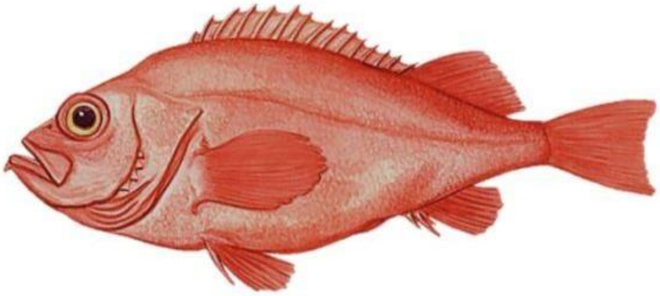
Information: X **Decision:** **Recommendation:**

Issue: Juvenile redfish (*Sebastes mentella* and *Sebastes fasciatus*) bycatch in the Northern Shrimp Fishery in the Eastern Assessment Zone



Northern shrimp (*Pandalus borealis*)

Striped shrimp (*Pandalus montagui*)



Redfish (*Sebastes mentella and S. fasciatus*)

Background

Two shrimp species (*P. borealis* and *P. montagui*) occur in the Northern shrimp fishery that takes place in the Davis Strait and eastern Hudson Strait. This fishery is managed according to two distinct stock assessment zones, the Western Assessment Zone (WAZ) and the Eastern Assessment Zone (EAZ) (Appendix 1).

In October 2020, representatives of the offshore Northern shrimp sector reported high juvenile redfish bycatches in portions of the EAZ (Davis Strait West) and Shrimp Fishing Area (SFA) 4 to the extent that it triggered move-away provisions within Conditions of Licence (COL).

These provisions require vessels to change fishing locations by a minimum of 10 nautical miles in the event that groundfish bycatch (including redfish) in any tow exceeds a pre-defined threshold (the greater of 2.5% by weight of the catch of shrimp, or 100kg) (Appendix 2).

In fall 2020, industry reported that these move-away provisions were repeatedly triggered in the EAZ and SFA 4 to the extent that they inhibited successful prosecution of the shrimp fishery, posing a serious economic viability concern for the offshore shrimp sector. The occurrence of high juvenile redfish bycatch was considered an urgent and unusual circumstance. The need for a management response to address the interruption of shrimp fishing was urgent since fishing opportunity remaining was limited and subject to ice conditions. The high prevalence of redfish bycatch has persisted into this season based on industry reports.

There is currently no open directed redfish fishery in this area. The redfish fishery in Northwest Atlantic Fisheries Organization (NAFO) Subarea 2 + Division 3K has been under moratorium since 1997.

Science Advice

Redfish stocks exhibit periodic pulse recruitment, exhibited by very small year classes in most years and occasionally extremely large year classes that can be a decade apart. These periodic large pulses of population recruitment are important to sustain the population over time.

Where redfish and Northern shrimp are found in similar environments, the first sign of a strong cohort is typically evidenced via increased bycatch rates in other fisheries with non-selective gear types like Northern shrimp. Redfish bycatch may consist of two or three species (depending on the area) that are not separated in fishery reporting or for stock assessment purposes. The relative abundance of each redfish species in bycatches changes with latitude.

The last assessment of the redfish stock in NAFO Subarea 2 + Division 3K occurred in 2016. Survey results showed that redfish biomass increased considerably from 2003 to 2010 and that biomass during 2010-2015 was approximately half of the pre-collapse (1978-1990) levels. The 2016 survey showed that redfish recruitment since 2000 was above the long term average, with a time-series high in 2014 (Appendix 3).

More recent preliminary results from the multi-species survey (not dedicated to surveying redfish) in NAFO Subarea 2 + Division 3K show an increase in juvenile redfish recruitment in 2019 (likely 2018 year-class), as well as variability in the indices since the 2016 assessment.

Given there are no recent biomass estimates for redfish populations in SFA 4 or the EAZ, it is not possible to estimate the impact of juvenile redfish bycatches in these areas on population recovery. Further, it is not yet known if these recent large recruitments will persist over time in the population.

Fisheries and Oceans Canada (DFO) Resource Management has submitted requests for peer-reviewed stock assessments for redfish in NAFO Subarea 2 + Division 3K and Subarea 0 (overlapping with the EAZ).

More recently, research was conducted regarding whether trawl modifications could potentially help address the prevalence of redfish bycatch was conducted. The purpose of the project was to evaluate the effectiveness of various Nordmøre grid bar spacings in mitigating bycatch of juvenile redfish. Two experimental grids of 17mm and 15mm were used, in comparison to the tradition 22mm grid often used by industry. This project was conducted in SFAs 4 and 5. Preliminary results indicated that a reduction in grid size reduced redfish bycatch by 28.37% for 17mm grids and 18.69% for 15mm grids. The final report is expected this fall.

In addition, a retroactive analysis of redfish bycatch in the Northern Shrimp fishery was conducted prepared for the Canadian Association of Prawn Procurers by Pisces Consulting (see Appendix 5). This report was shared with the Department in the summer of 2021 to support decision-making. It indicates that while redfish bycatch is still a concern, it has mostly remained under the adjusted limit and does not represent a worst-case scenario.

<u>Management Response</u>

In November 2020, the Department sought views from industry and Board staff on an interim management response to high redfish bycatch that allowed harvesters to successfully prosecute the remainder of the 2020-21 shrimp fishery, while taking into consideration the potential impact on redfish stocks. The use of an interim measure was intended to facilitate innovative fishing techniques by harvesters in the affected areas to reduce future redfish bycatch.

The Department carefully considered industry-proposed measures in consultation with Board staff and DFO Science. In late November, offshore shrimp COLs were amended to require vessels to move 5 nautical miles if the total bycatches of redfish over the previous six tows exceeded 10% by weight of the total catch of shrimp (Appendix 2). This measure would allow for increased redfish bycatches and reduce the frequency of move-aways. This interim measure was approved for a period of 8 weeks (November 26, 2020, to January 21, 2020). Given the persistence of the issue into 2021, the interim measure was then approved for two additional 8 week periods (May 28, 2021 to July 23, 2021 and July 30, 2021 to September 24, 2021) to allow for the successful prosecution of the fishery. Finally, an extended interim measure was approved on September 25, 2021 to account for the remainder of the year (September 25, 2021 to December 31, 2021).

This targeted, responsive approach was limited to SFA 4 and Davis Strait West management units in November. In late May, the scope was expanded to include SFA 5. Where Nunavut and Nunavik allocation holders may cross the between Davis Strait West and Nunavut / Nunavik East management units in the same tow, extension of this interim measure to Nunavut / Nunavik East was required from an operational standpoint.

Next Steps

To follow the availability of an updated stock assessment for redfish, DFO – Fisheries Resource Management has requested science advice on management measures to address the issue of redfish bycatch in the Northern shrimp fisheries that occur in SFAs 4- 6 the EAZ and WAZ. Science advice is requested in order to understand the potential impact of redfish removals on the health of the population in these areas. Scoping discussions regarding science advice are ongoing. Timelines regarding the provision of science advice are currently being discussed.

DFO - Fisheries Resource Management will continue to monitor bycatch in the Northern shrimp fishery in the EAZ and neighboring shrimp management units to better understand the potential impact to harvesters and to the conservation of redfish stocks. In addition, DFO will support further industry initiatives to test innovative fishing techniques that may reduce future redfish bycatches, and consider the possible use of these techniques in future management decisions, where appropriate.

It is not yet clear whether future circumstances may suggest a need for further interim response. At the time of this submission, no further flexibilities have been proposed or approved.

Prepared by: Erika Parrill, Fisheries Resource Management, Fisheries and Oceans Canada

Date: October 19, 2021

Appendices

Appendix 1 – Map of groundfish and shrimp administrative areas in Atlantic Canada

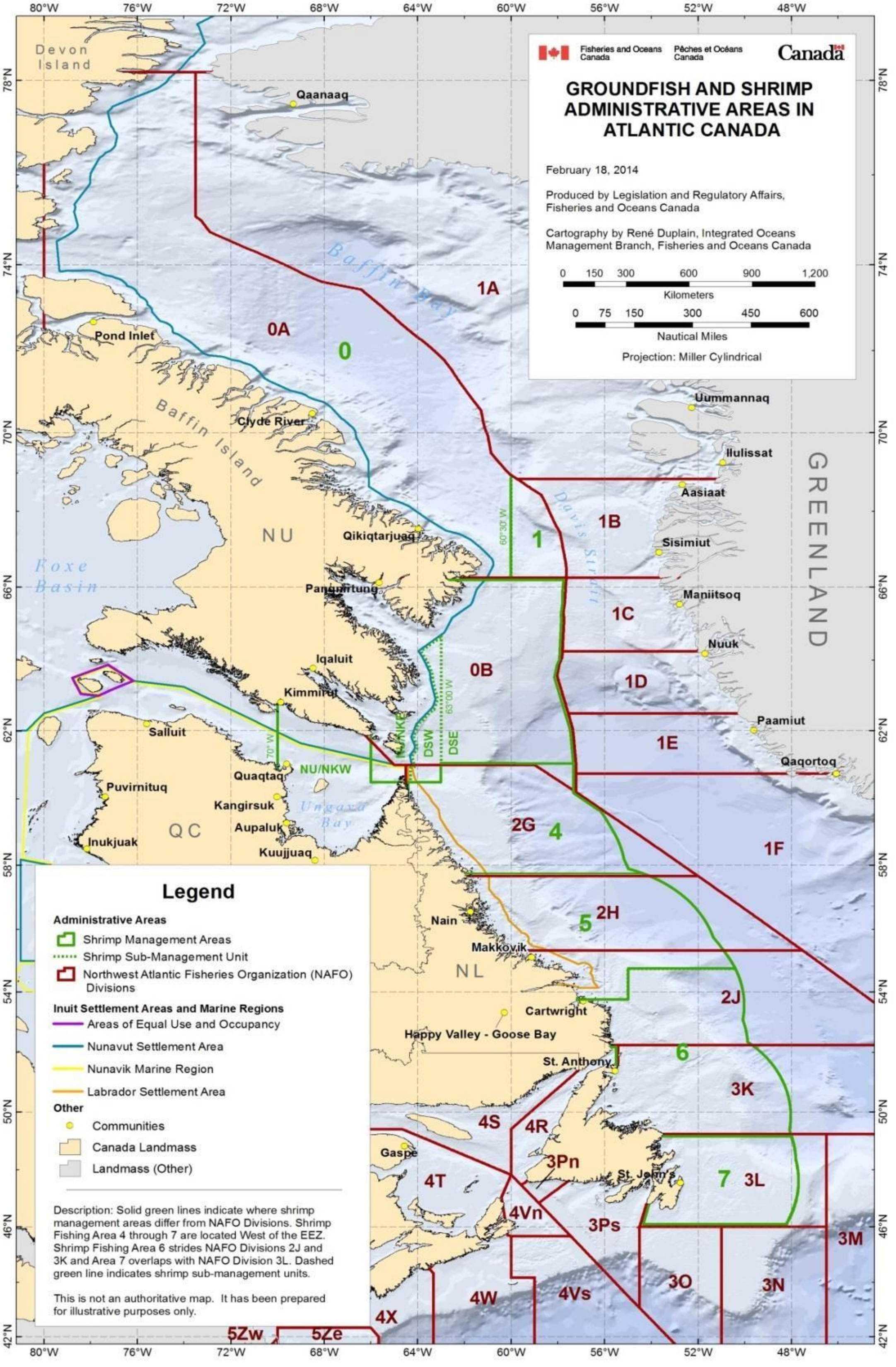
Appendix 2 – Condition of Licence amendments

Appendix 3 – Summary: Stock status of redfish in NAFO SA 2 + Divs. 3K (Science Advisory Report 2020/021)

Appendix 4 – Full publication: Stock status of redfish in NAFO SA 2 + Divs. 3K (Science Advisory Report 2020/021)

Appendix 5 – Full publication: Retroactive Analysis Redfish Bycatch in the Northern Shrimp Fishery

APPENDIX 1


Fisheries and Oceans Canada
Pêches et Océans Canada
Canada
GROUNDFISH AND SHRIMP ADMINISTRATIVE AREAS IN ATLANTIC CANADA
February 18, 2014
Produced by Legislation and Regulatory Affairs, Fisheries and Oceans Canada
Cartography by René Duplain, Integrated Oceans Management Branch, Fisheries and Oceans Canada
0 150 300 600 900 1,200
Kilometers
0 75 150 300 450 600
Nautical Miles
Projection: Miller Cylindrical
Legend
Administrative Areas
Shrimp Management Areas
Shrimp Sub-Management Unit
Northwest Atlantic Fisheries Organization (NAFO) Divisions
Inuit Settlement Areas and Marine Regions
Areas of Equal Use and Occupancy
Nunavut Settlement Area
Nunavik Marine Region
Labrador Settlement Area
Other
Communities
Canada Landmass
Landmass (Other)
Description: Solid green lines indicate where shrimp management areas differ from NAFO Divisions. Shrimp Fishing Area 4 through 7 are located West of the EEZ. Shrimp Fishing Area 6 strides NAFO Divisions 2J and 3K and Area 7 overlaps with NAFO Division 3L. Dashed green line indicates shrimp sub-management units.
This is not an authoritative map. It has been prepared for illustrative purposes only.
Devon Island
Qaanaaq
Baffin Bay
Pond Inlet
Baffin Island
Clyde River
Qikiqtarjuaq
Pangnirtung
Iqaluit
Kimmirut
Foxe Basin
NU
QC
NL
GREENLAND
Davis Strait
Uummannaq
Ilulissat
Aasiaat
Sisimiut
Maniitsoq
Nuuk
Paamiut
Qaqortoq
Salluit
Quaqtaq
Puvirnituq
Kangirsuk
Aupaluk
Ungava Bay
Inukjuak
Kuujjuaq
Nain
Makkovik
Cartwright
Happy Valley - Goose Bay
St. Anthony
Gaspe
St. John's
0A
0
1A
1B
1
1C
0B
1D
1E
1F
NU/NKE
NU/NKW
DSW
DSE
60°30'W
63°00'W
70°W
2G
4
2H
5
2J
6
3K
4S
4R
3Pn
4T
7
3L
4Vn
3Ps
3M
3O
3N
4W
4Vs
4X
5Zw
5Ze
80°W 76°W 72°W 68°W 64°W 60°W 56°W 52°W 48°W
78°N 74°N 70°N 66°N 62°N 58°N 54°N 50°N 46°N 42°N

Offshore Shrimp Condition of Licence

5.2. If total by-catches of all groundfish species in any haul exceed the greater of 2.5% by weight of the catch of shrimp or 100 kg, the licence holder or vessel operator must immediately change fishing area by a minimum of ten (10) nautical miles from any position of the previous tow in an effort to avoid further by-catches of all groundfish. If after moving and for all subsequent moves, the next haul exceeds the greater of 2.5% by weight of the catch of shrimp or 100kg, the vessel must continue to move 10 nautical miles from any position of the previous tow to avoid by-catch. The licence holder or vessel operator must record in the logbook (in the Remarks field)the active avoidance measures taken in response to any tows that contained excessive groundfish by-catch, the position (latitude and longitude) at the time of groundfish by-catch, as well as the quantity caught by weight in kilogram.

Condition of Licence amendment effective November 26, 2020, to January 21, 2021:

5.2.3 Notwithstanding section 5.2 above, while fishing within and/or across the waters of the following Management Units on a single fishing trip: Nunavut East, Nunavik East, Davis Strait West, and/or Shrimp Management Unit 4, if total by-catches of Redfish exceed 10% by weight of the total catch of shrimp over the previous six tows, the licence holder or vessel operator must immediately change fishing area by a minimum of five (5) nautical miles from any position of the previous tow. Whenever the vessel moves five (5) nautical miles or more from any position of the previous tow, the following tow is to be considered to be the first of the next six tows to be considered. The licence holder or vessel operator must record in the logbook (in the Remarks field) the active avoidance measures taken in response to any tows that contained excessive Redfish by-catch, the position (latitude and longitude) at the time of Redfish by-catch, as well as the quantity caught by weight in kilogram. The above provisions of 5.2.3 are effective between 0001 UTC on November 26, 2020, to 2400 UTC on January 21, 2021.

Condition of Licence amendment effective May 28, 2021, to July 23, 2021:

5.2.3 Notwithstanding section 5.2 above, while fishing within and/or across the waters of the following Management Units on a single fishing trip: Shrimp Management Unit 1, Nunavut East, Nunavik East, Davis Strait West, Davis Strait East, Shrimp Management Unit 4,and/or Shrimp Management Unit 5, if total by-catches of Redfish exceed 10% by weight of the total catch of shrimp over the previous six tows, the licence holder or vessel operator must immediately change fishing area by a minimum of five (5) nautical miles from any position of the previous tow. Whenever the vessel moves five (5) nautical miles or more from any position of the previous tow, the following tow is to be considered to be the first of the next six tows to be considered. The licence holder or vessel operator must record in the logbook (in the Remarks field) the active avoidance measures taken in response to any tows that contained excessive Redfish by-catch, the position (latitude and longitude) at the time of Redfish by-catch, as well as the quantity caught by weight in kilogram. The above provisions of 5.2.3 are effective between 0001 UTC on May 28, 2021, to 2400 UTC on July 23, 2021.

APPENDIX 2

Condition of Licence amendment effective July 30, 2021, to September 24, 2021:

5.2.3 Notwithstanding section 5.2 above, while fishing within and/or across the waters of the following Management Units on a single fishing trip: Shrimp Management Unit 1, Nunavut East, Nunavik East, Davis Strait West, Davis Strait East, Shrimp Management Unit 4,and/or Shrimp Management Unit 5, if total by-catches of Redfish exceed 10% by weight of the total catch of shrimp over the previous six tows, the licence holder or vessel operator must immediately change fishing area by a minimum of five (5) nautical miles from any position of the previous tow. Whenever the vessel moves five (5) nautical miles or more from any position of the previous tow, the following tow is to be considered to be the first of the next six tows to be considered. The licence holder or vessel operator must record in the logbook (in the Remarks field) the active avoidance measures taken in response to any tows that contained excessive Redfish by-catch, the position (latitude and longitude) at the time of Redfish by-catch, as well as the quantity caught by weight in kilogram. The above provisions of 5.2.3 are effective between 0001 UTC on July 30, 2021, to 2400 UTC on September 24, 2021.

Condition of License amendment effective September 25, 2021, to December 31, 2021:

5.2.3 Notwithstanding section 5.2 above, while fishing within and/or across the waters of the following Management Units on a single fishing trip: Shrimp Management Unit 1, Nunavut East, Nunavik East, Davis Strait West, Davis Strait East, Shrimp Management Unit 4,and/or Shrimp Management Unit 5, if total by-catches of Redfish exceed 10% by weight of the total catch of shrimp over the previous six tows, the licence holder or vessel operator must immediately change fishing area by a minimum of five (5) nautical miles from any position of the previous tow. Whenever the vessel moves five (5) nautical miles or more from any position of the previous tow, the following tow is to be considered to be the first of the next six tows to be considered. The licence holder or vessel operator must record in the logbook (in the Remarks field) the active avoidance measures taken in response to any tows that contained excessive Redfish by-catch, the position (latitude and longitude) at the time of Redfish by-catch, as well as the quantity caught by weight in kilogram. The above provisions of 5.2.3 are effective between 0001 UTC on September 25, 2021, to 2400 UTC on December 31, 2021.

SUMMARY: Stock status of redfish in NAFO SA 2 + Divs. 3K (Science Advisory Report 2020/02)

- Biomass increased considerably from 2003 to 2010. Biomass during 2010-2015 was approximately half of the pre-collapse (1978-1990) levels.
- Recruitment (abundance of Redfish <15 cm) since 2000 was above the long term average with a time-series high in 2014.
- A fishing mortality proxy has been very low (<1%) since 2006. The fishery remains under moratorium, and average bycatch (including discards) since 2006 has been approximately 500 t.
- The meeting was neither able to validate nor invalidate existing reference points (DFO 2012) derived from production models due to substantive concerns about input data and an incomplete documentation of the rationale for model formulation.
- Other options for Limit Reference Points (LRPs) were considered. However, considering difficulties with respect to application of the LRP concepts for Redfish including its episodic recruitment, species separation, and other data limitations, these other LRP options were not accepted.
- No LRP examined (including DFO 2012) was considered applicable at this time.
- In the absence of a LRP, it is not possible to identify what zone of the Precautionary Approach (PA) framework this stock is currently within. It is recommended that adaptive and cautious management be applied to any reopened fishery.

Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Newfoundland and Labrador Region

Canadian Science Advisory Secretariat
Science Advisory Report 2020/021

STOCK STATUS OF REDFISH IN NAFO SA 2 + DIVS. 3K

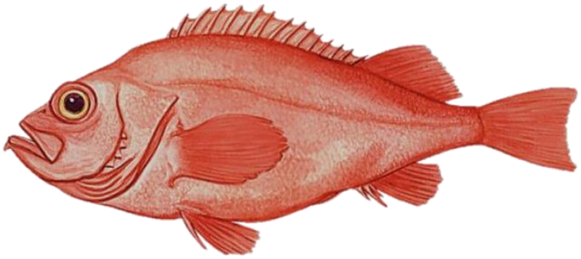


Image: Redfish

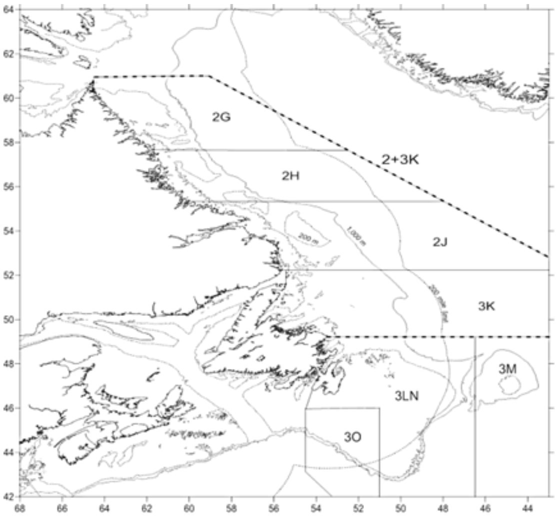


Figure 1. Map of the Northwest Atlantic indicating the SA 2 + Divs. 3K management area for Redfish.

Context:

In the Northwest Atlantic, Redfish range from Baffin Island in the north, to waters off New Jersey in the south and are managed in several discrete units. Redfish in Northwest Atlantic Fisheries Organization (NAFO) Subarea 2 (2G, 2H, and 2J) + Division 3K comprise stock complexes of two species (Sebastes mentella and S. fasciatus) recorded together in the landings because they cannot easily be distinguished visually, plus an additional less dominant species S. marinus that is visually distinct from the other species. The fishery on this stock was under Total Allowable Catch (TAC) regulation from 1974 (30,000 t) to 1996 (200 t). From 1997 to the present, the stock has been under moratorium to directed fishing. A previous assessment in 2001, of Redfish in stock status in Subarea (SA) 2 + Divs. 3K concluded that the population declined rapidly over a 10 year period from 1980-1990 and that surveys up to 2000 continue to indicate that the resource was at a low level reflecting over 25 years of recruitment failure. A Recovery Potential Assessment was conducted in a 2011 Zonal Advisory Process in which limit reference points (LRPs) were determined. During this process, stock status was updated and it was concluded that the biomass had remained stable at a low level from the mid-1990s until the mid-2000s when a period of marginal increase was evident.

This Science Advisory Report is from the October 19-21, 2016 Assessments of Redfish in Northwest Atlantic Fisheries Organization (NAFO) Subarea 0, and Subarea 2 and Division 3K. Additional publications from this meeting will be posted on the Fisheries and Oceans Canada (DFO) Science Advisory Schedule as they become available.

SUMMARY

- Biomass increased considerably from 2003 to 2010. Biomass during 2010-2015 was approximately half of the pre-collapse (1978-1990) levels.
- Recruitment (abundance of Redfish <15 cm) since 2000 was above the long term average with a time-series high in 2014.
- A fishing mortality proxy has been very low (<1%) since 2006. The fishery remains under moratorium, and average bycatch (including discards) since 2006 has been approximately 500 t.
- The meeting was neither able to validate nor invalidate existing reference points (DFO 2012) derived from production models due to substantive concerns about input data and an incomplete documentation of the rationale for model formulation.
- Other options for LRPs were considered. However, considering difficulties with respect to application of the LRP concepts for Redfish including its episodic recruitment, species separation, and other data limitations, these other LRP options were not accepted.
- No LRP examined (including DFO 2012) was considered applicable at this time.
- In the absence of a LRP, it is not possible to identify what zone of the Precautionary Approach (PA) framework this stock is currently within. It is recommended that adaptive and cautious management be applied to any reopened fishery.

INTRODUCTION

Redfish have been fished commercially in both the Atlantic and Pacific Oceans. They occur on both sides of the north Atlantic Ocean in cool waters (3 to 8°C) along the slopes of banks and deep channels generally in depths of 100-1,000 m. In the Northwest Atlantic, Redfish range from Baffin Island in the north, to waters off New Jersey in the south (Gascon 2003, Fig. 1).

Redfish found on the Northeast Newfoundland and Labrador Shelves (NAFO SA 2 + Divs. 3K) comprise a stock complex formed by three distinct species, *Sebastes mentella* (Deepwater Redfish) and *Sebastes fasciatus* (Acadian Redfish), which dominate commercial fisheries, and *Sebastes marinus* (Golden Redfish) which is much less abundant. Currently, *S. marinus* is recognized as being synonymous with *S. norvegicus* with most authorities reverting to *S. norvegicus* as the accepted binomial name. However, for consistency with previous Canadian Science Advisory Secretariat (CSAS) and Department of Fisheries and Oceans (DFO) publications, and this stock assessment, we will refer to this species as *S. marinus*. *S. mentella* and *S. fasciatus* are visually and anatomically very similar, and historically they have not been separated in commercial catches or in research vessel (RV) surveys. *S. marinus* can be distinguished by colour, eye size and the relative size of a bony protrusion on its lower jaw. These species are not separated in the fishery and are managed together. The current assessment is based upon *S. fasciatus, S. mentella,* and *S. marinus* combined.

Along the continental shelves and slopes *S. mentella* range predominantly from the Gulf of St. Lawrence northward whereas *S. fasciatus* range predominantly from the southern Grand Banks to the Gulf of Maine. Generally, *S. mentella* is distributed deeper than *S. fasciatus* (Gascon 2003).

Redfish are longlived (up to 75 years) with a slow growth rate (Campana et. al. 1990). Estimates of size at maturity vary between and within populations with lower estimates in the range of 22-24 cm (Sévigny et al. 2007) and upper estimates of 38-39 cm for deep-sea *S. mentella* (Magnússon and Magnússon 1995). Redfish produce live young that can disperse over large

distances (Valentin et. al. 2015). Recruitment is episodic and there may be decades between strong cohorts. They form aggregations throughout life and survey results for Redfish are typically dominated by one or two very large samples which has an unknown influence on survey results.

Fishery Removals

A Canadian and non-Canadian Redfish fishery has been prosecuted in SA 2 + Divs. 3K since the late 1940s. Total Allowable Catch (TAC) was established in 1974 when a 30,000 t quota was implemented (Fig. 2). The TAC was increased to 35,000 t in 1980 and remained at that amount until it was lowered to 20,000 t in 1991 (Fig. 2). The TAC decreased to 1,000 t in 1994 and was reduced to 200 t in 1995. The stock has been under moratorium since 1997 (Fig. 2).

The highest recorded removal of SA2 + 3K Redfish was 187,000 t in 1959 (Fig. 2). Removals from 1980 onwards also include discard estimates from Canadian shrimp (1980-2015) and Canadian Greenland Halibut fisheries (1995-2015) derived from fishery observer data scaled to total shrimp and Greenland Halibut landings. Reported removals fell to 56,000 t in 1961 and varied between 14,500 t and 56,000 t during the period 1962 to 1987 (Fig. 2). Removals declined after 1987 ranging from 30 t to 7,500 t up to the declaration of the moratorium in 1997 (Figs. 2 and 3). Removals from bycatch and discards have ranged between 50 t and 1,500 t since the 1997 moratorium (average of 500 t annually). From 1980 to 1996, discards ranged between 15 t to 700 t annually, averaging 200 t per year. Since the moratorium in 1997, estimates of discards ranged between 50 t and 600 t annually, averaging <300 t per year (Fig. 3). Note that Russian (2001-2008) and Lithuanian (2001-2011) catches are considered to be from the Irminger Sea and are not included in SA2 + 3K removal totals for those years.

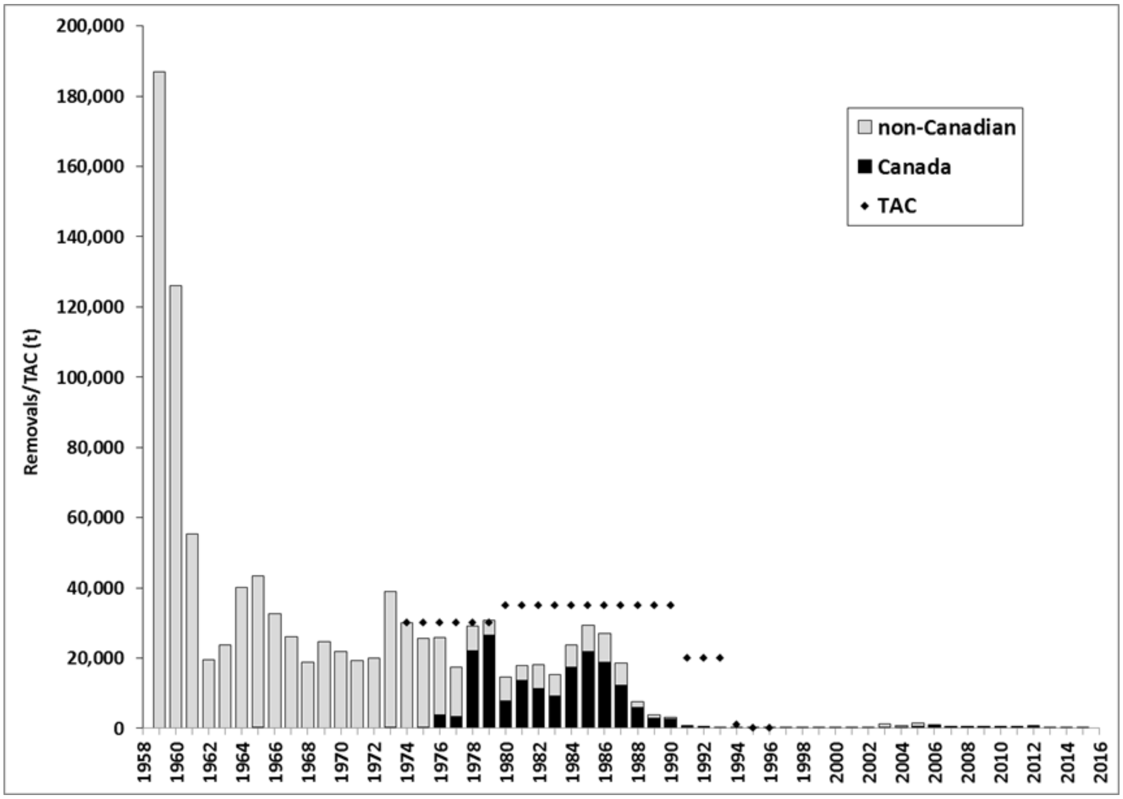


Figure 2. Redfish reported removals (t) by Canadian and non-Canadian fleets (including Canadian discard estimates from 1980-2015) and TAC in SA 2 + Divs. 3K from 1959 to 2015.

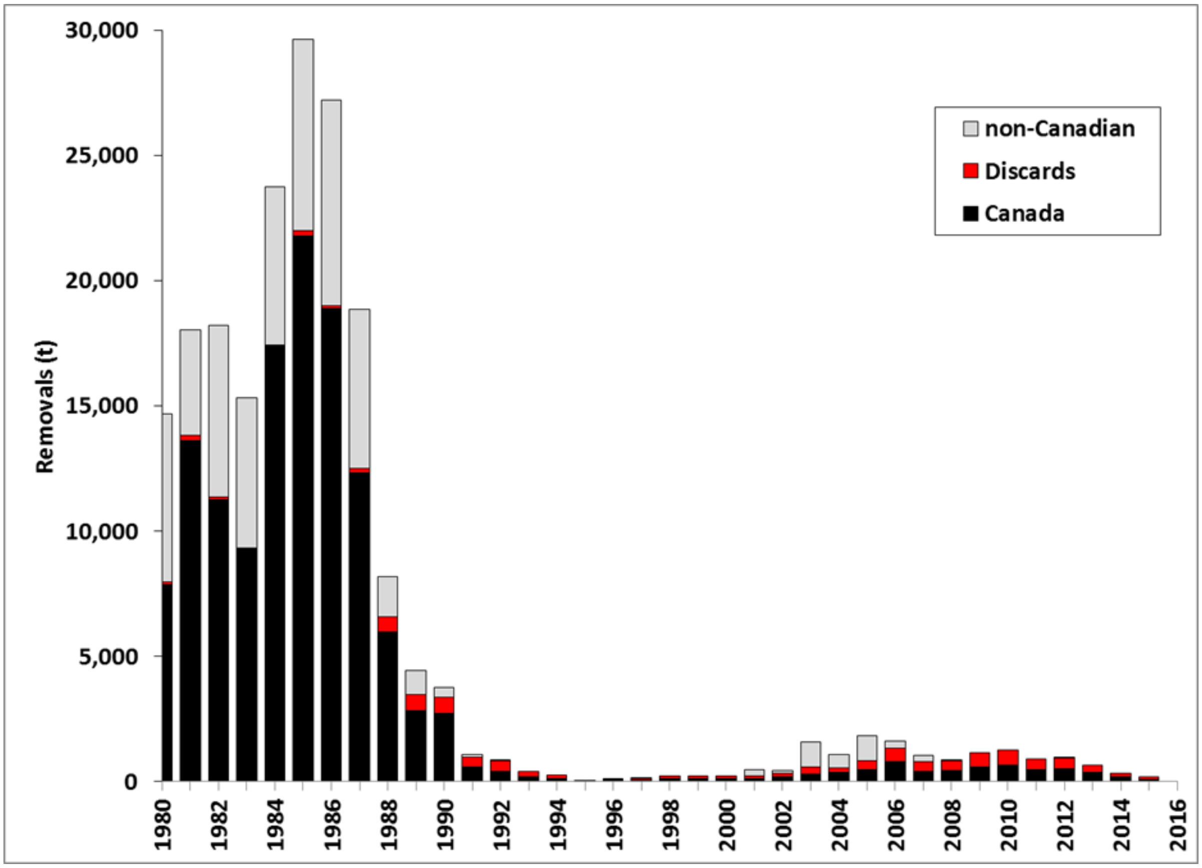


Figure 3. Redfish reported removals (t) by Canadian and non-Canadian fleets in SA 2 + Divs. 3K from 1980-2015 with Canadian discard estimates shown in red.

ASSESSMENT

This assessment considered information from landings from all countries (1959-2015) in conjunction with analyses of data from research vessel (RV) surveys conducted during autumn from 1978 to 2015.

Survey Methodology

Stratified random bottom trawl surveys were conducted in the autumn in Divs. 2J and 3K from 1977 to 1995 covering depths from 100 to 1,000 m and from 1996 to 2015 covering depths from 100 to 1,500 m. Surveys in Divs. 2G were conducted sporadically with varying spatial coverage and timing between 1978 and 1999 (the last year this Division was surveyed). Surveys were conducted sporadically in Divs. 2H between 1978 and 2010. Between 1978 and 1995 Divs. 2H surveys sampled depths from 100 to 1,000 m; in 1996 the depth range was extended to 1,500 m. Surveys have been conducted annually in Divs. 2H since 2010, although deep strata (>700 m) were not sampled in 2014 and 2015. Due to the inconsistent coverage of Divs. 2G and 2H, the primary indices for this stock are from Divs. 2J and 3K combined.

Survey Indices

Abundance and Biomass

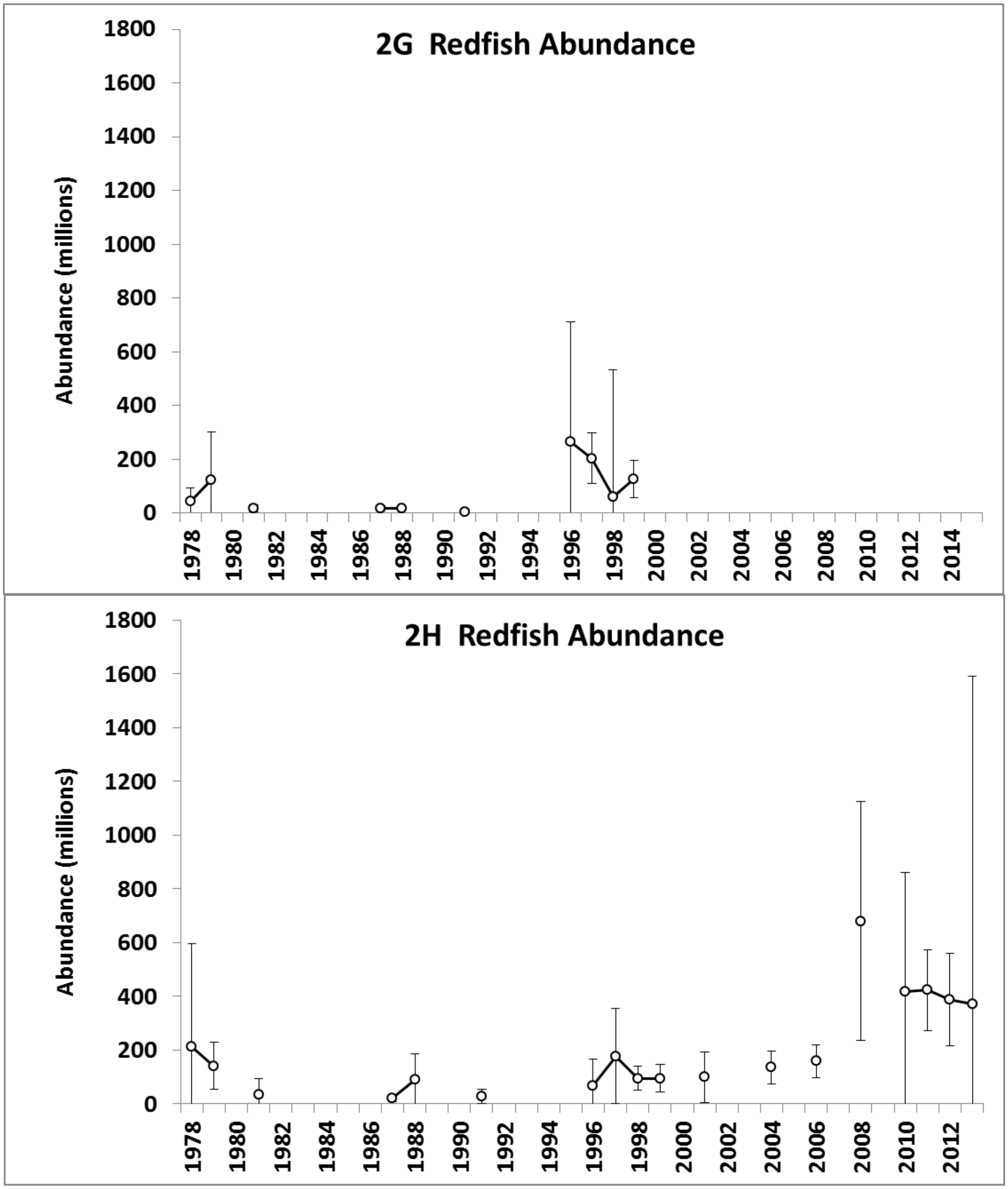


Figure 4. Abundance indices (millions) for Redfish in NAFO Divisions 2G and 2H from 1978 to 2013 (vertical lines represent 95% confidence intervals). Note that deep strata (>700 m) were not sampled in 2H in 2014 and 2015 (gaps represent years when the Division was not sampled).

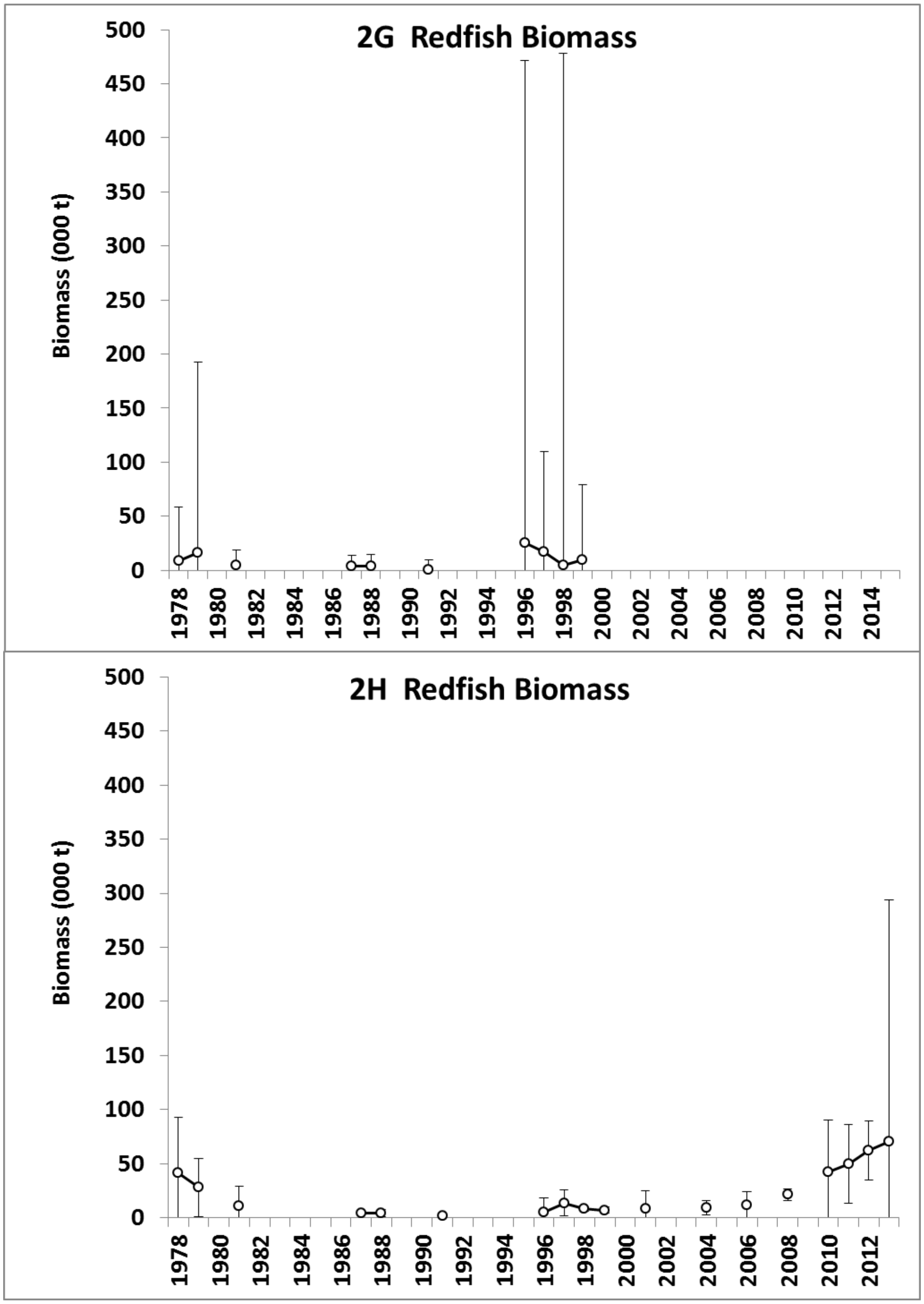


Figure 5. Biomass indices (000 t) for Redfish in NAFO Divisions 2G and 2H from 1978 to 2013 (vertical lines represent 95% confidence intervals). Note that deep strata (>700 m) were not sampled in 2H in 2014 and 2015 (gaps represent years when the Division was not sampled).

Abundance indices were relatively stable in Divs. 2H from 2010 to 2013 (Fig. 4). During this period, biomass values increased (Fig. 5) due to fish growth. In 2014 and 2015 the survey was incomplete as important areas for Redfish (depths >700 m) were not covered. Overall, both 2G and 2H represent a relatively small portion of the Redfish abundance and biomass within Divs. SA 2 + Divs. 3K.

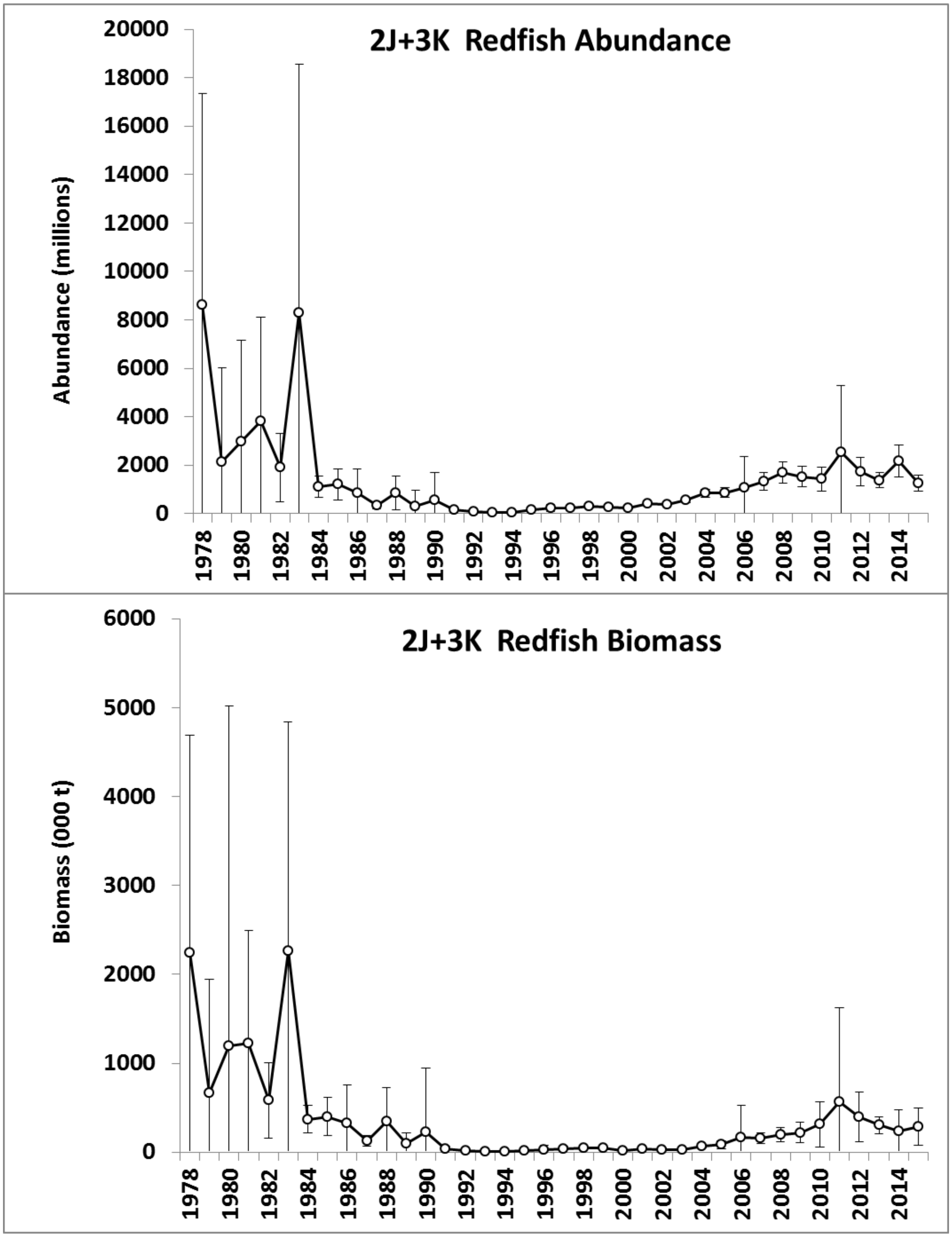


Figure 6. Abundance (millions) and biomass (000 t) indices for Divs2J3K Redfish from 1978 to 2015 (vertical lines represent 95% confidence intervals).

Abundance and biomass (Fig. 6) indices for Divs. 2J3K) were relatively high from 1978 to 1983, compared to the 1991 to 2003 collapse period. The biomass index increased by approximately a factor of 10 from 2003 to 2011. Biomass from 2011 to 2015 declined marginally but was relatively stable at approximately half of the pre-collapse (1978-1990) levels. Abundance values

from 2011 to 2015 were also relatively stable at approximately 70% of pre-collapse levels. Generally, patterns were consistent between the abundance and biomass indices.

Mortality

A proxy for fishing mortality was calculated as the ratio of total landings (including discard estimates) in a given year to the RV survey biomass index from the previous year. This proxy was variable from the 1980s to the mid-2000s but since 2006, has been low (<1%) (Fig. 7).

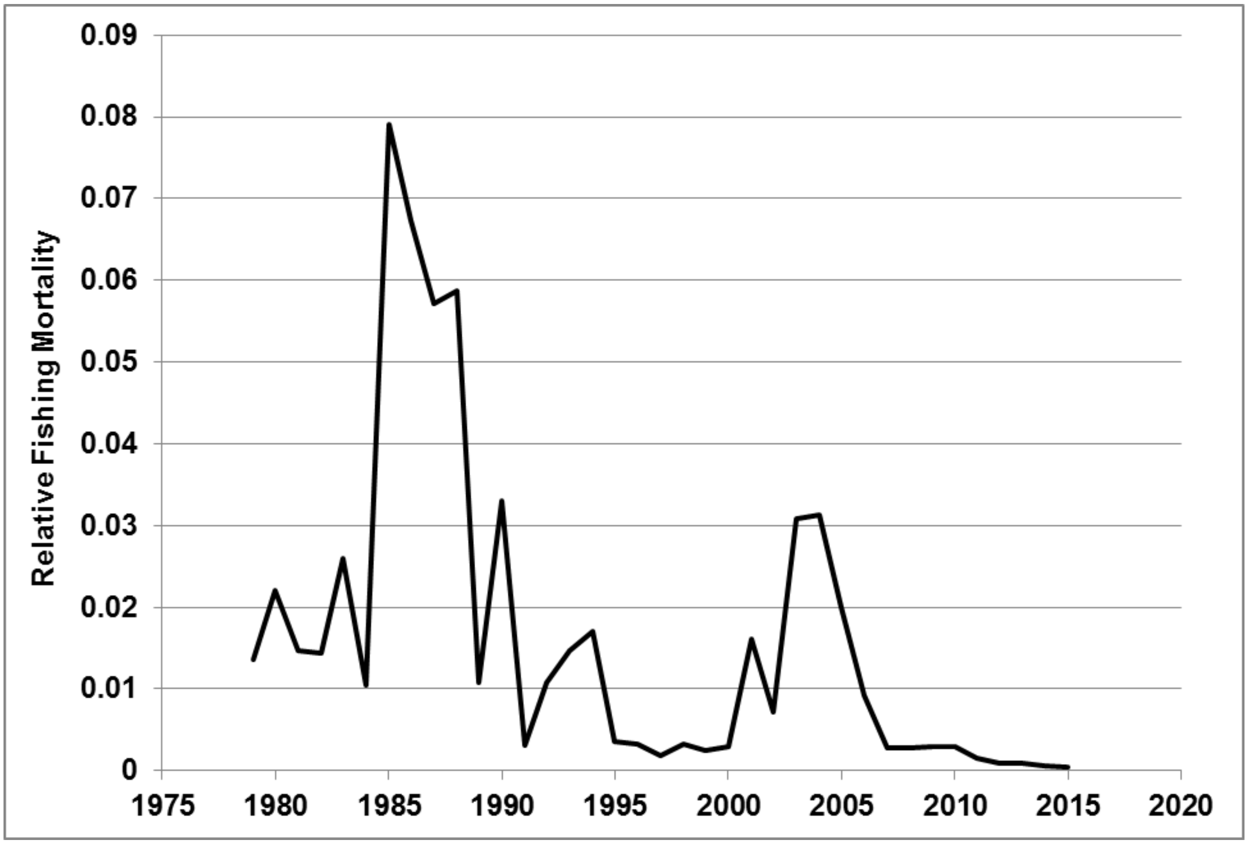


Figure 7. Proxy for Redfish fishing mortality from 1978 to 2015 in SA 2 + Divs. 3K calculated as the ratio of total landings in a given year to the survey biomass index in the previous year.

Recruitment

Length Composition

Although the Campelen trawl (1995 onward) samples small (<20 cm) Redfish more effectively than the Engel trawl, relatively few small Redfish were collected in annual sampling before 2001. From 2002 onward, one or multiple length modes were apparent in the length frequency distributions within Divs. 2H, 2J, and 3K. These modes persisted over time and some can be tracked over several years. However, few fish larger than 30 cm were sampled recently relative to the 1978 to 1983 period.

A strong length mode that first appeared in Divs. 3K during 2014 at 6 cm was apparent in both Divs. 2J and 3K at approximately 10 cm during 2015. Presently, it is unclear how these young fish will contribute to future fisheries. Previously, similar events have been observed in survey results, but modes were not tracked consistently over time.

Recruitment Index

A recruitment index, calculated as the abundance of Redfish less than 15 cm, was relatively low from 1979 to 2000 (Fig. 8). Since then, the recruitment index has generally been near or above the long term average with a time series high in 2014 (Fig. 8). As Redfish grow quite slowly, sequential index values are not independent and annual index values are comprised of multiple cohorts.

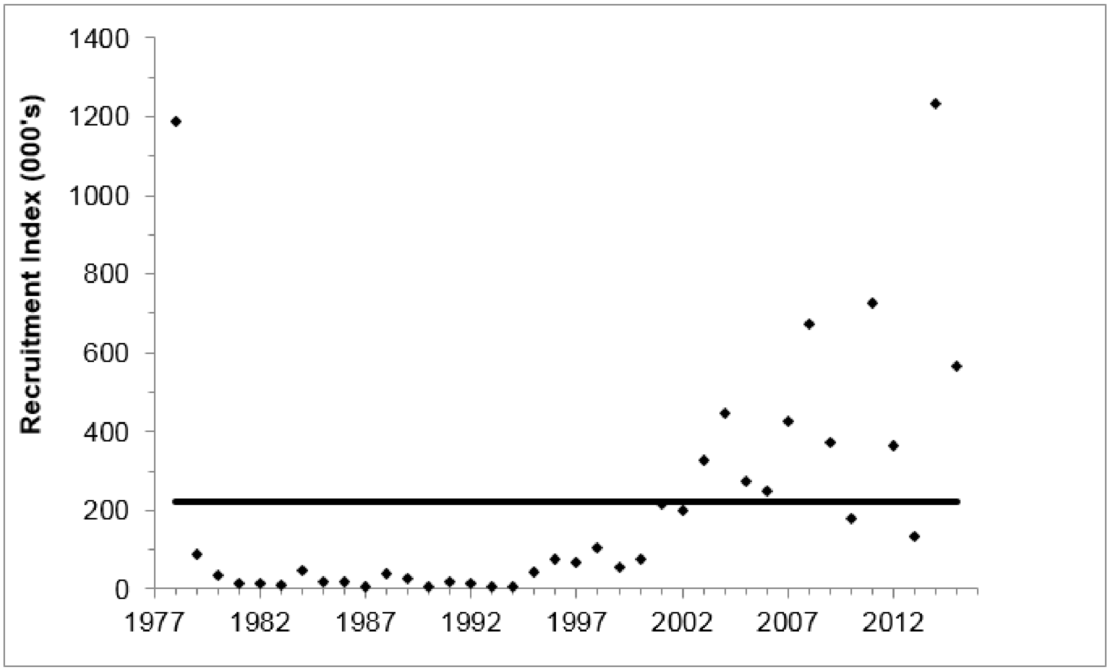


Figure 8. Recruitment index for Redfish in SA 2 + Divs. 3K based on total abundance estimates of Redfish less than 15 cm. The solid line indicates the time series average.

Reference Points

Models were developed through an external contract to explore LRPs for Redfish based on survey mature biomass (MacAllister and Duplisea 2011). Reference points for several Redfish stocks in the Northwest Atlantic were adopted by DFO based upon Bayesian production model results and various empirical methodologies (DFO 2012). This model was designed to investigate reference points but has not been applied directly to SA 2 + Divs. 3K stock assessments, nor has it been formally accepted for this purpose. Participants noted that assessments for Unit 1 and Unit 2 Redfish have discarded the production model. Prior to the current assessment of SA 2 + Divs. 3K Redfish, DFO received a critique of the existing production model and limit reference points for the stock from a former DFO Redfish biologist (GEAC [Atkinson, D.B. 2016] in Lee et al. in prep, Appendix 1[1]).

During the assessment plenary session it was agreed that there were substantive concerns about the input data and incomplete documentation of the rationale for model formulation.

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[1] Lee, E., Ings, D. Mello, L., and R. Rideout. In prep. Stock status of Redfish (*Sebastes sp.*) in NAFO SA 2 + Div. 3K. Appendix 1 – GEAC (Atkinson D. B. 2016) An investigation of inputs to the analytical model used to determine stock status and limit reference points (LRP's) for Redfish (*Sebastes sp.*) in NAFO Subarea 2 + Division 3K. CSAS Res. Doc.

Specifically, the meeting recognized issues with separating the species in the survey and commercial catch data based on preliminary results from studies in the 1980s.

The assessment model for *S. mentella* was developed for the designatable unit spanning SA 2 + Divs. 3KLNO rather than just the SA 2 + Divs. 3K stock complex. This required apportioning biomass between Divs. 2J3K and Divs. 3LNO based on area of occupancy for the determination of LRPs. The meeting identified concerns with the validity of using this approach to delineate the critical/cautious and healthy zones for the SA 2 + Divs. 3K Redfish complex. The model built for *S. fasciatus* was specific to 2J3K. In both models, survey Q was allowed to vary across time blocks informed by Bayesian posteriors. Q shifts were incorporated to improve model fit, and were not based on gear changes. The need to sub-divide the survey series into multiple time periods to produce acceptable model fit caused concern as there is no *a priori* justification to support these groupings.

Length at maturity was based on empirical results from Unit 2 (Gulf of St. Lawrence/Southeastern NL). However, it is known that L_{max} increases in more northern populations; this may lead to overestimation of the spawning stock biomass if the L_{50} applied is less than the real L_{50}. Further, index-based LRPs using both $B_{Recovery}$ and B_{MSY} concepts were also presented to the meeting but were not accepted due to difficulties with respect to applying LRP concepts to Redfish, including its episodic recruitment, species separation and other data limitations.

Due to the incomplete documentation of model formulations, resource and data limitations, the existing model was not updated during the meeting nor were the previously calculated reference points accepted. Therefore, no LRP, including the previously established values (DFO 2012), was considered applicable at this time. In the absence of a LRP, it was not possible to identify which zone of the Precautionary Approach framework the stock is currently within.

Ecosystem

Physical Oceanographic Environment

The SA 2 + Divs. 3K region extends off northern Labrador to the eastern Newfoundland Shelf with bottom topography consisting of relatively shallow banks, deep cross-shelf channels and steep continental slopes. The ocean circulation is dominated by the southward-flowing Labrador Current which transports colder relatively fresh water from the north, as well as warmer saltier Labrador Sea water along the continental slope regions. Hydrographic conditions are determined in part by these and other factors, such as local winds and air temperatures. The main features of an analysis of historical climate data show mostly above average temperature conditions during the 1960s, a brief cold period during the early 1970s and again in the mid-1980s. Temperature conditions then declined to the coldest on record in the early 1990s and remained below normal until the mid-1990s. Since then there has been a significant warming trend with temperature values reaching record highs in the late 2000s. The most recent years, notably 2014 and 2015, experienced a short term decline but data available to date in 2016 indicates a return to a warming trend.

Invertebrate and fish community

The structure of the ecosystem within NAFO Divs. 2J and 3K has undergone significant changes since the mid-1990s. The entire fish community collapsed in the late 1980s and early 1990s, with average fish size also declining during this period. After the collapse, the system became highly dominated by shellfish, with peak dominance in 2003 when more than 60% of the estimated Fall RV biomass was shellfish. Consistent signals of rebuilding of the fish community appeared in the mid-to-late 2000s; this signal was also associated with an increase

in average fish size. In the 2010s the overall biomass has remained relatively stable, but the dominance of groundfish has increased, while shellfish has decreased. Redfish is the dominant fish among plank-piscivores, having a three-fold increase in biomass between the mid-1990s and the 2010s.

Studies of diet composition of key groundfish species in Divs. 2J and 3K since 2008 indicate that Redfish is a frequent food item for Atlantic Cod and Greenland Halibut, and an occasional one for American Plaice. Despite its regular occurrence, Redfish does not appear as a dominant prey for these predators. However, long term diet data for Greenland Halibut indicate that Redfish represented up to 20% of its diet in the late 1980s, while available data from Divs. 2H shows up to a maximum of 30% of Redfish in the Greenland Halibut diet in 2010. Major diet changes in recent years involve the shift from shrimp to capelin as key prey item among fish top predators. As a predator, Redfish shows a variable diet composition between years, but amphipods, shrimp, myctophids, and euphausiids appear as consistently important prey items.

Sources of Uncertainty

Russian (2001-2015) and Lithuanian (2001-2015) catches assigned to Divs. 2J in the NAFO Statlant 21 database are fished outside the 200 mile limit and likely originate from the Irminger Sea pelagic stock (Power 2001). Subsequently, these values are omitted from the catch totals for SA 2 + Divs. 3K (2J + 3K) for the years 2001 to 2015. Prior to 2001, Russian and Lithuanian (and non-Canadian) catch are assumed to be primarily within the 200 mile limit and are included in the catch total. It is possible that a larger portion of non-Canadian catch currently assigned to SA 2 + Divs. 3K also originates within the Irminger Sea.

Redfish in SA 2 + Divs. 3K are composed of a mixture consisting primarily of *S. mentella*, lesser amounts of *S. fasciatus*, and sporadic occurrences of *S. marinus. S. mentella* and *S. fasciatus* are similar in appearance and are not separated in either the commercial or research survey catch. Despite their physical similarities the species have different depth and temperature preferences; changes in environmental conditions will not affect the three species equally, increasing the difficulty in interpreting survey indices changes in the stock complex.

Atlantic *Sebastes spp.* are known as episodically recruiting species where large year-classes may occur only once a decade or less frequently even in healthy populations.

Redfish survey catchability can vary significantly due to biological (formation of dense aggregations) or environmental (water temperature effects or depth range) reasons. This can result in inconsistent catch results within surveys, leading to high inter-annual variation at times. This is exacerbated by the combination of three species into a stock complex since the catchability of individual species can change independently in response to environmental changes.

Incomplete observer coverage of certain gear types, such as <50% coverage of trawl effort or <10% of gillnet effort, can introduce bias and/or uncertainty into analyses to determine Redfish bycatch and/or discards within commercial fisheries.

Lack of age information precludes certain types of analyses such as weight at age and cohort-based population modelling.

CONCLUSIONS AND ADVICE

Redfish biomass increased considerably from 2003-2010 with biomass during 2010-2015 reaching approximately half of the pre-collapse (1978-1990) levels. Recruitment (abundance of Redfish <15 cm) since 2000 was above the long term average with a time-series high in 2014. The fishery remains under moratorium, and average bycatch (including discards) since 2006

has been approximately 500 t. The meeting was neither able to validate nor invalidate existing reference points (DFO 2012) derived from production models due to substantive concerns about input data and an incomplete documentation of the rationale for model formulation.

In the absence of a LRP, it is not possible to identify what zone of the PA framework this stock is currently within. It is recommended that adaptive and cautious management be applied to any reopened fishery.

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SOURCES OF INFORMATION

This Science Advisory Report is from the October 19-21, 2016 Assessments of Redfish in Northwest Atlantic Fisheries Organization (NAFO) Subarea 0, Subarea 2 and Division 3K. Additional publications from this meeting will be posted on the Fisheries and Oceans Canada (DFO) Science Advisory Schedule as they become available.

DFO 2011. Recovery potential assessment of Redfish (*Sebastes fasciatus* and *S. mentella*) in the Northwest Atlantic. DFO Can Sci. Advis. Sec. Advis. Rep. 2011/044.

DFO 2012. Reference points for Redfish (*Sebastes fasciatus*, *S. mentella*) in the Northwest Atlantic. DFO Can Sci. Advis. Sec. Advis. Rep. 2012/004.

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Retroactive Analysis

Redfish Bycatch in the Northern ShrimpFishery

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August 12, 2021

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1. BACKGROUND

CAPP, and other northern shrimp harvesting groups, commenced having independent monitoring of redfish bycatch in the northern shrimp fishery in December 2020. Until late July detailed information regarding various grid sizes, angles and styles was collected and reviewed by the MI. The objective ofthis phase of the study was to determine the relationship, if any, between shrimp capture and bycatch capture using various gear configurations.

Commencing late July 2021, a simplified data collection method has been adopted by the vessels operators and observer companies, both of which provided information independently to the MI. Analysis of detailed data was inconclusive on either a spatial of temporal basis, though further analysis may be completed. Ongoing data analysis will be completed by Pisces Consulting Limited using the simplified reporting format that focuses almost exclusively on redfish bycatch for specified time periods

Data collection and analysis completed to date was transferred to Pisces in order to continue the data set until the beginning of the new contract period with Pisces. This data and analysis was reviewed and found to be quite comprehensive, though the methodology to determine the period bycatch percentages was questionable[1]. Given the potential for this questionable method to misrepresent the results, a retrospective analysis was completed. Review of line data indicates a moderate number of reporting errors and numerous data omissions (no catches reported). These errors and omissions were removed from the data set if they could not be verified from independent observer source documents.

The data limitations are that the entire data set is based on reported results, and there are likely some limited reporting omissions. For future reporting the reporting for each week will be quantified by comparing observer reports to the vessel reports. Missing vessel reports will be solicited to ensure a complete data set going forward.

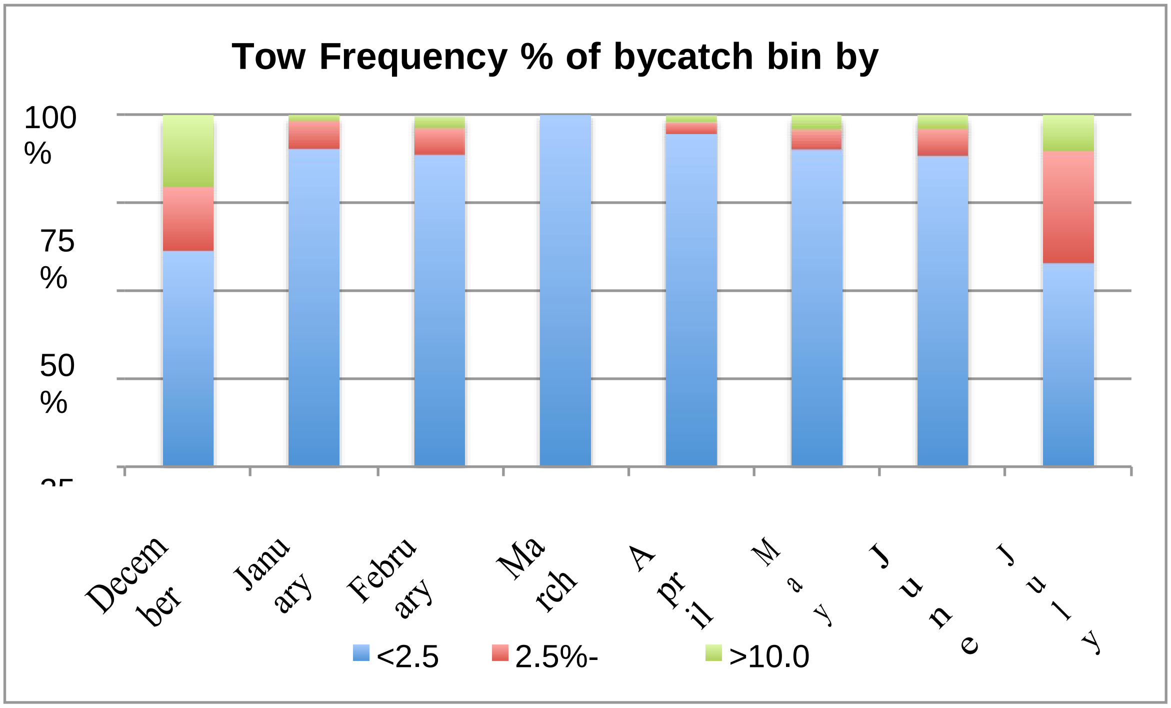
[1] The period bycatch percent was a straight average of the individual tow bycatch percent rather than a weighted average.

2.0SUMMARY RESULT

Results by month: The data set results indicate 19,132mt of shrimp were captured with 318mtof redfish bycatch. The months on highest encounters were December and July.

Month	Shrimp (kg)	Redfish (kg)	Redfish	Tow Frequency <2.5%	2.5%-10.0%	>10.0%
December	1,819,807	92,358	5.1%	213	63	71
January	3,546,167	39,707	1.1%	432	38	8
February	1,502,107	21,300	1.4%	188	16	8
March	804,573	1,398	0.2%	72	0	0
April	2,286,706	13,825	0.6%	231	8	5
May	3,316,328	45,640	1.4%	415	26	19
June	3,963,109	48,496	1.2%	464	40	21
July	1,893,360	56,227	3.0%	147	81	26
Total YTD	**19,132,157**	**318,951**	**1.7%**	**2,162**	**272**	**158**

Management measures have permitted various redfish bycatch allowances (2.5%, 10.0%). The following graph illustrates the tow frequency of when these bin thresholds occurred.



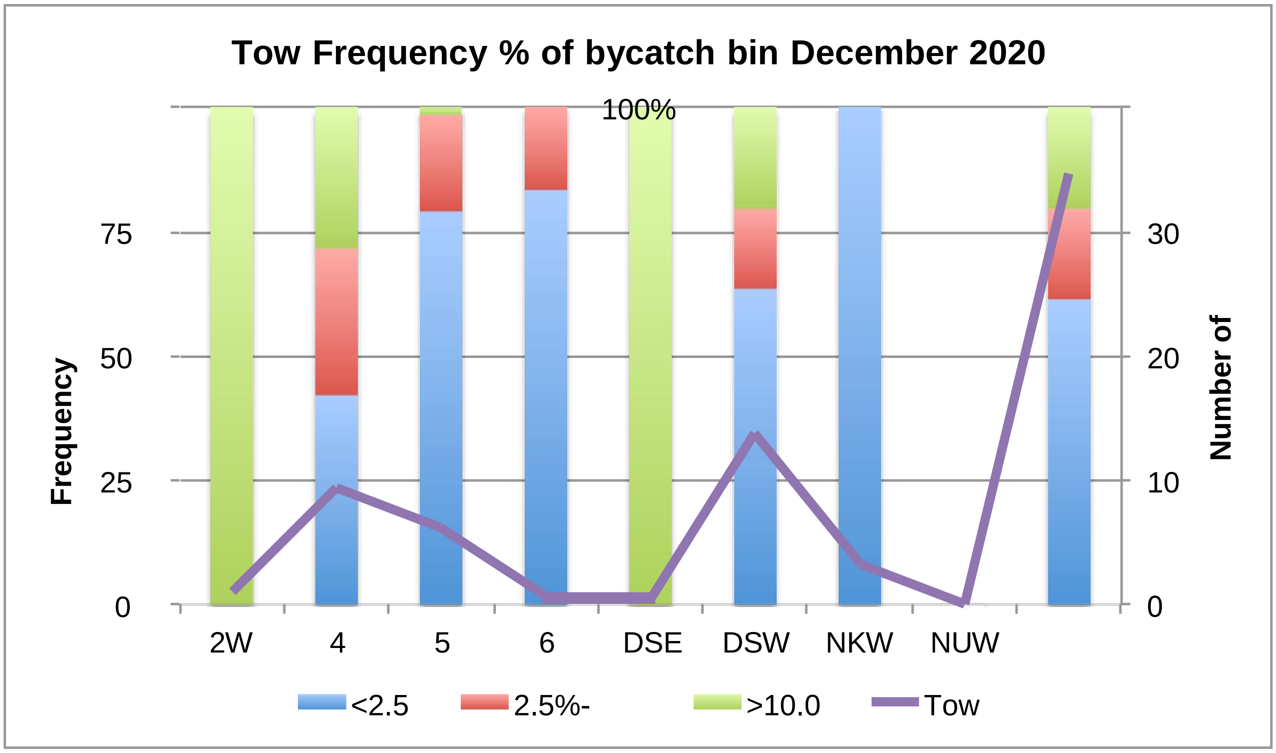
The monthly results by area are provided in the following table. Further examination of effort and bycatch levels by month are provided in Section 3.0.

Area	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
2W	535.5%							
4	6.5%	2.5%	6.2%	0.0%	0.0%	1.8%	0.9%	1.8%
5	1.9%	1.0%	0.6%	0.2%	0.8%	0.9%	1.3%	2.3%
6	0.9%	0.3%	0.3%	0.1%	0.1%	0.0%		
DSE	2002.0%						96.6%	0.0%
DSW	8.4%					1.5%	5.0%	7.8%
NKW	0.1%						1.1%	0.0%
NUW							0.3%	0.0%
Total	**5.1%**	**1.1%**	**1.4%**	**0.2%**	**0.6%**	**1.4%**	**1.2%**	**3.0%**

3.0MONTHLY RESULTS BY AREA

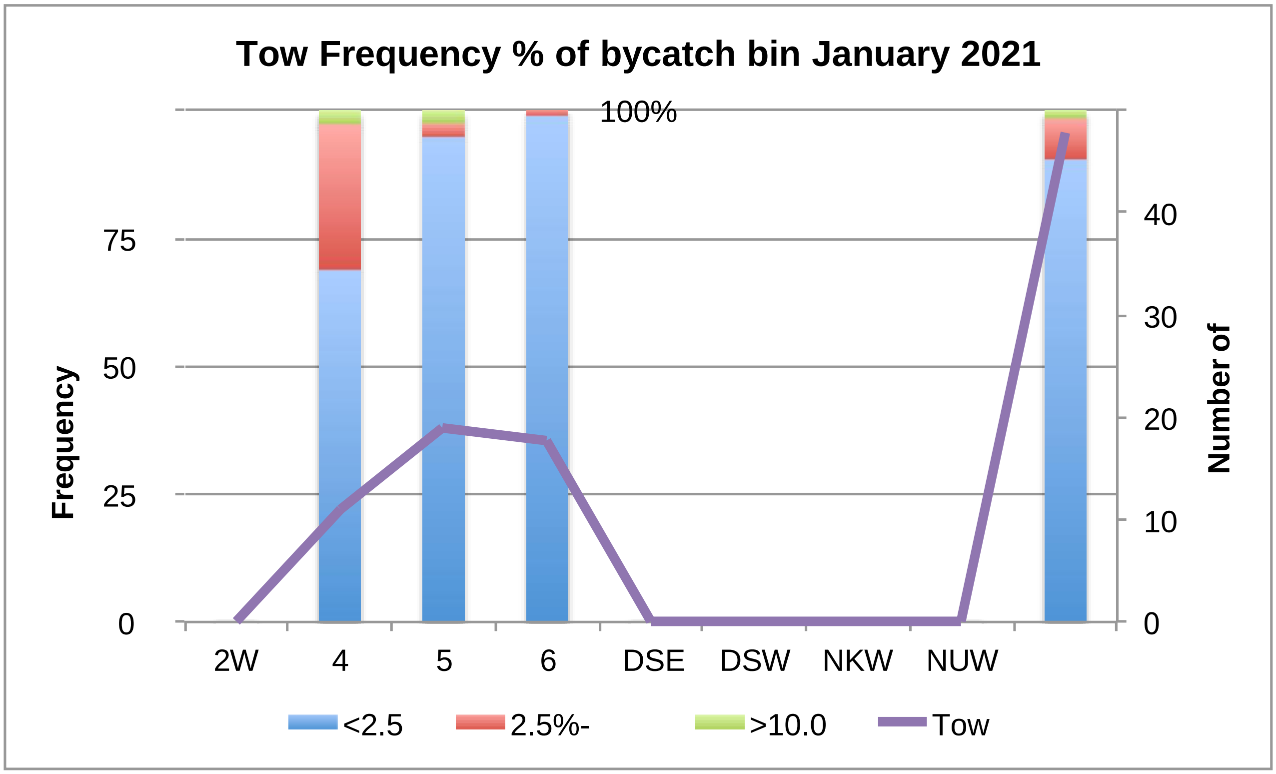
December 2020

Area	Shrimp (kg)	Redfish (kg)	Redfish %	Tow Frequency <2.5%	Tow Frequency 2.5%-10.0%	Tow Frequency >10.0%
2W	453	2,426	535.5%	0	0	10
4	642,694	41,562	6.5%	40	28	27
5	331,792	6,468	1.9%	49	12	1
6	19,766	180	0.9%	5	1	0
DSE	252	5,045	2002.0%	0	0	5
DSW	430,750	36,268	8.4%	87	22	28
NKW	394,100	409	0.1%	32	0	0
NUW						
Total	**1,819,807**	**92,358**	**5.1%**	**213**	**63**	**71**



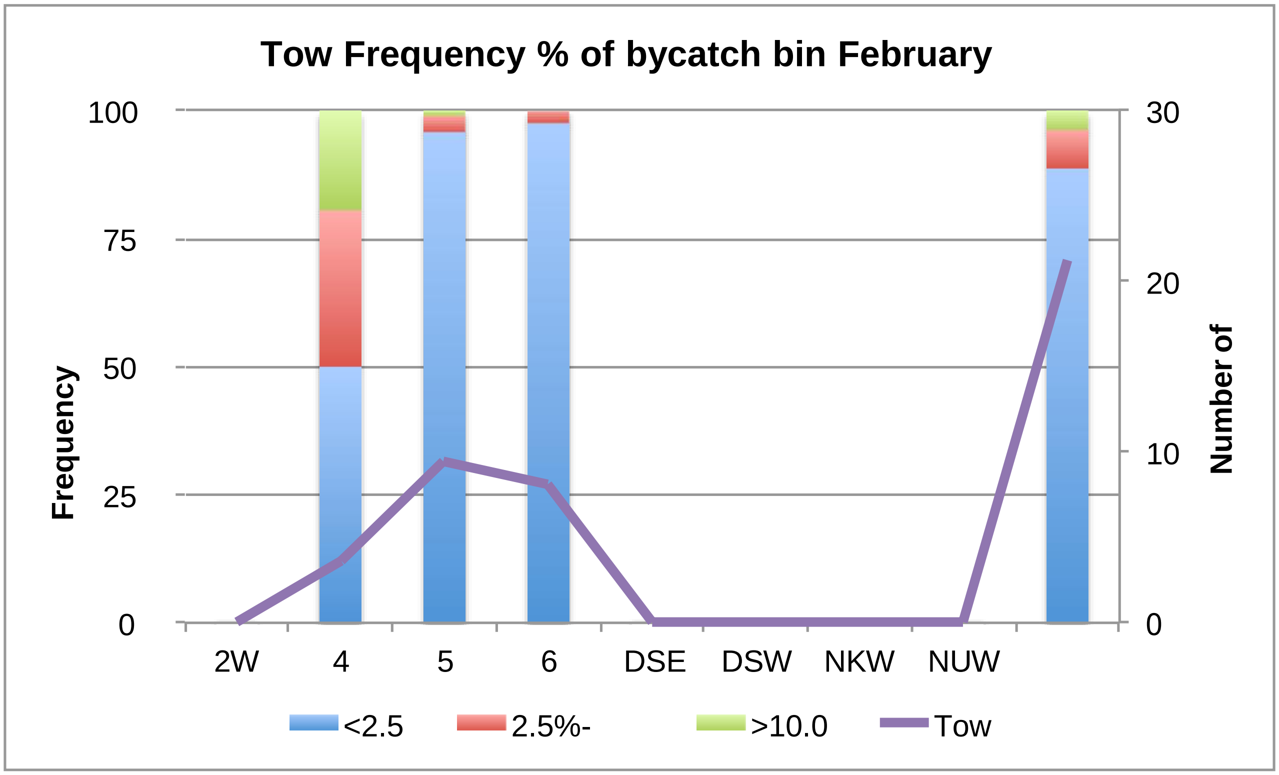
January

Area	Shrimp (kg)	Redfish (kg)	Redfish %	Tow Frequency <2.5%	2.5%-10.0%	>10.0%
2W						
4	823,340	20,416	2.5%	75	31	3
5	1,569,369	15,273	1.0%	181	5	5
6	1,153,458	4,018	0.3%	176	2	0
DSE						
DSW						
NKW						
NUW						
Total	**3,546,167**	**39,707**	**1.1%**	**432**	**38**	**8**



February

Area	Shrimp (kg)	Redfish (kg)	Redfish %	Tow Frequency <2.5%	2.5%-10.0%	>10.0%
2W						
4	250,049	15,403	6.2%	18	11	7
5	672,900	3,880	0.6%	91	3	1
6	579,158	2,017	0.3%	79	2	0
DSE						
DSW						
NKW						
NUW						
Total	**1,502,107**	**21,300**	**1.4%**	**188**	**16**	**8**

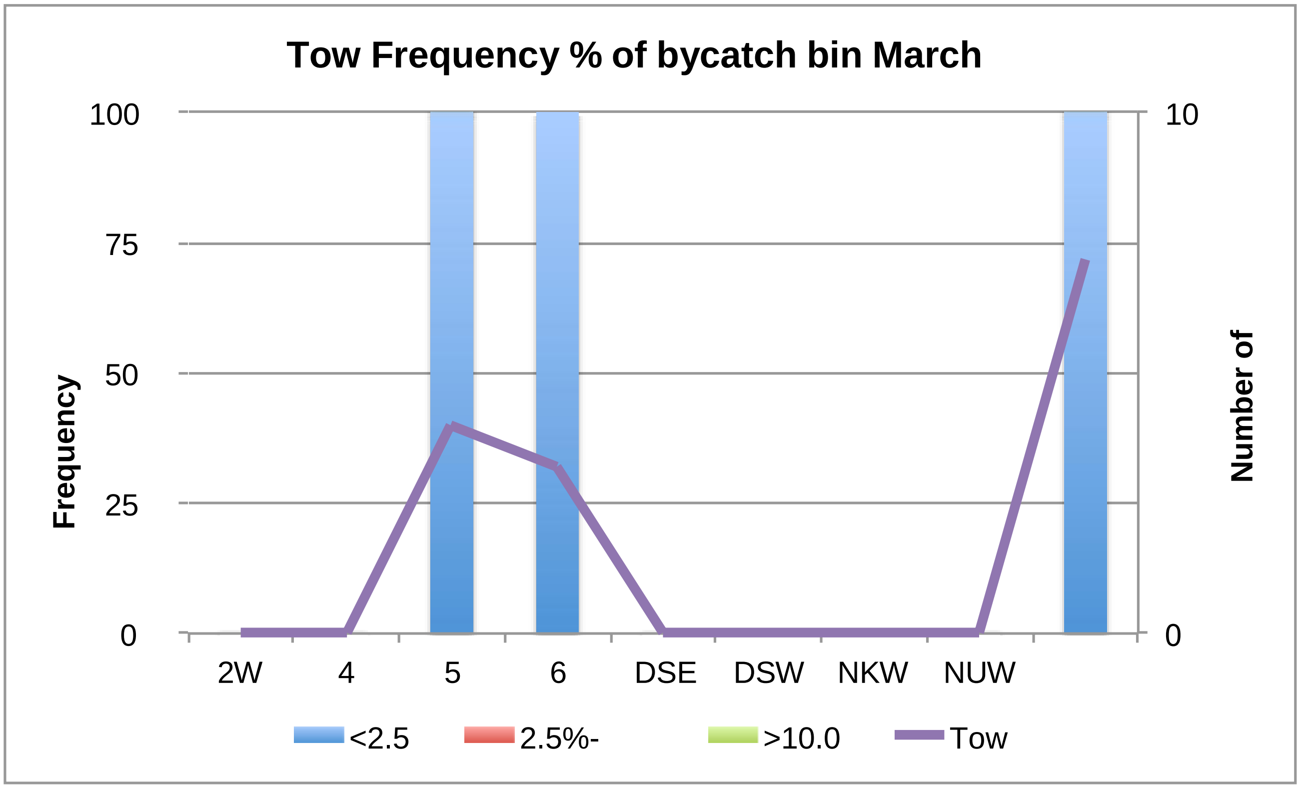


March

4						
5	523,250	1,194	0.2%	40	0	0
6	281,323	204	0.1%	32	0	0
DSE						
DSW						
NKW						
NUW						
	Total 804,573	**1,398**	**0.2%**	**72**	**0**	**0**

March

Redfish bycatch in shrimp fishery8				Pisces Consulting Limited		
				Tow Frequency		
				<2.5%	2.5%-10.0	>10.0
Are	Shrimp (kg)	Redfish (kg)	Redfish			
2W						

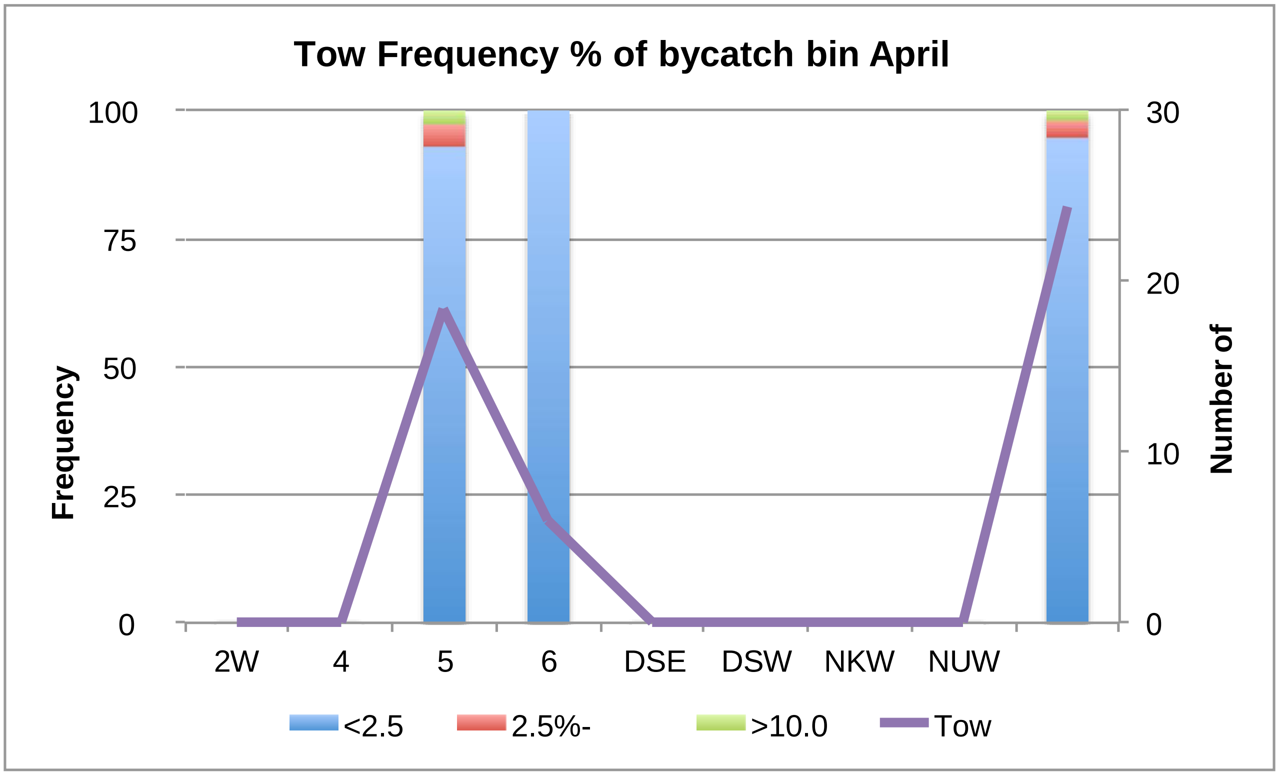


April

4						
5	1,658,582	13,011	0.8%	171	8	5
6	628,124	814	0.1%	60	0	0
DSE						
DSW						
NKW						
NUW						
	Total 2,286,706	**13,825**	**0.6%**	**231**	**8**	**5**

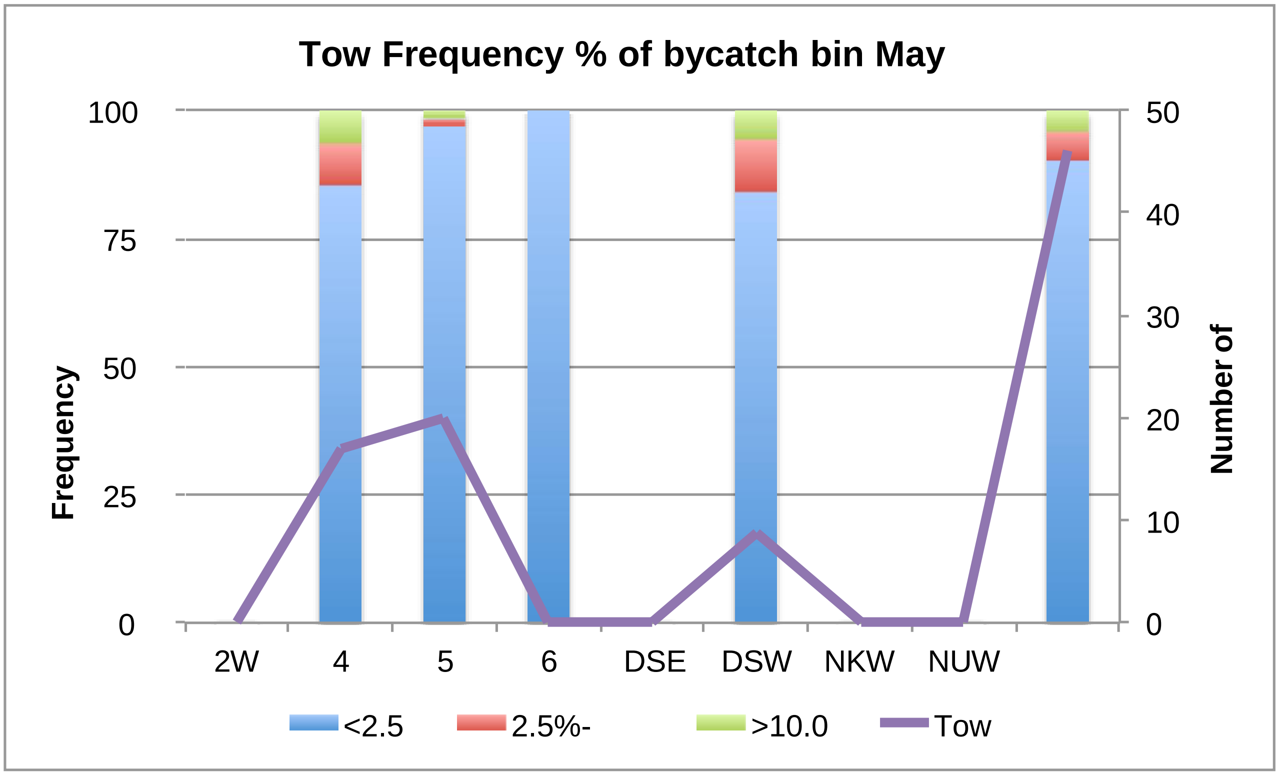
April

Redfish bycatch in shrimp fishery9				Pisces Consulting Limited		
				Tow Frequency		
				<2.5%	**2.5%-10.0**	**>10.0**
Are	**Shrimp (kg)**	**Redfish (kg)**	**Redfish**			
2W						



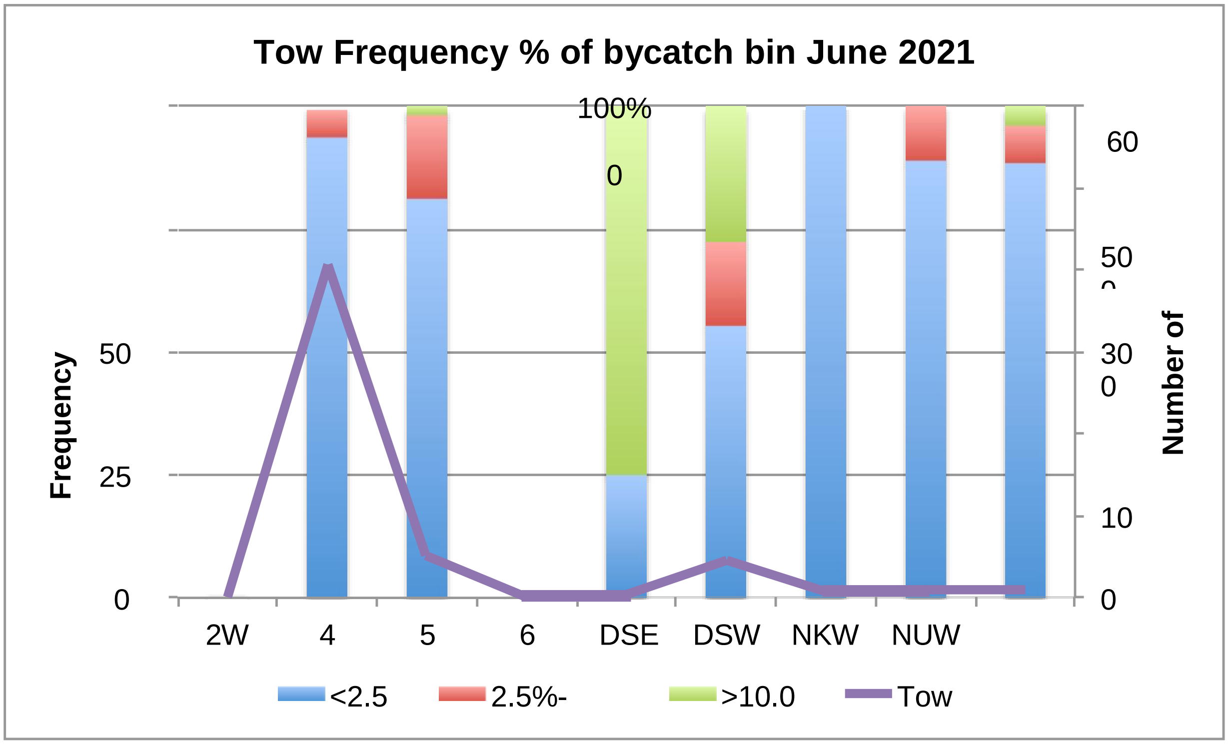
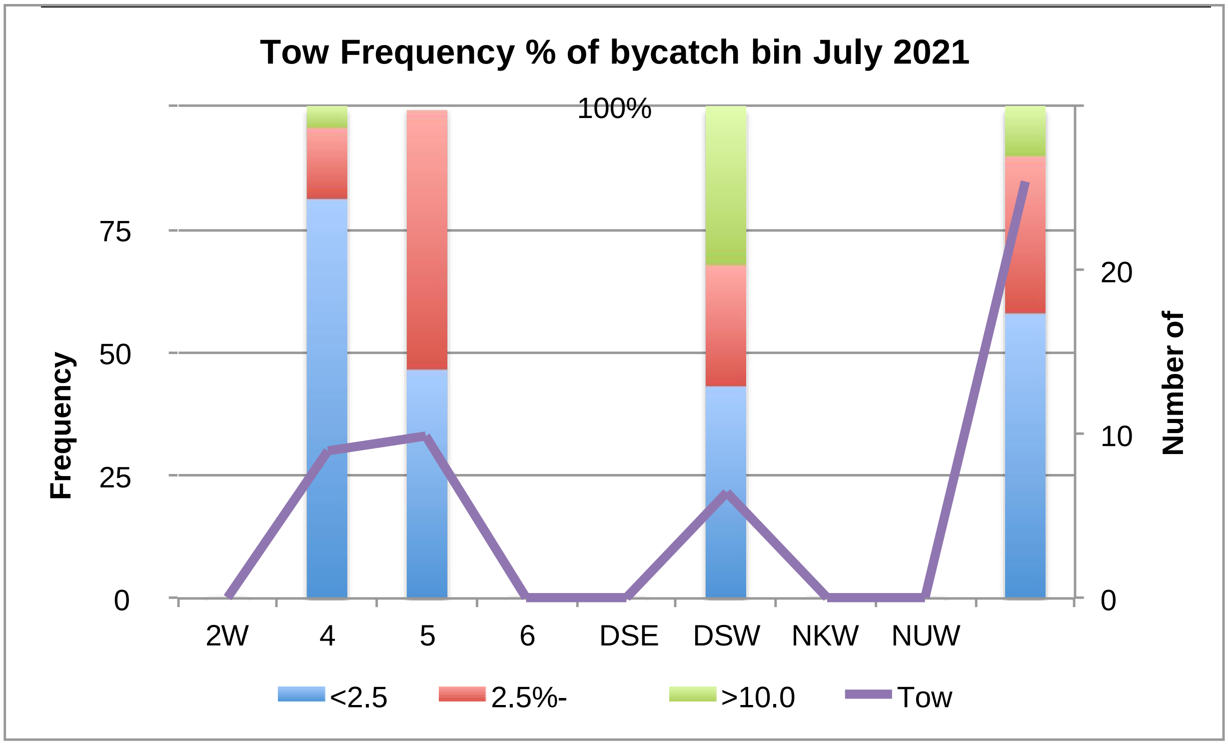
May

Area	Shrimp (kg)	Redfish (kg)	Redfish %	Tow Frequency <2.5%	2.5%-10.0%	>10.0%
2W						
4	1,352,628	24,749	1.8%	146	14	11
5	1,438,228	13,337	0.9%	194	3	3
6	5,020	1	0.0%	1	0	0
DSE						
DSW	520,452	7,553	1.5%	74	9	5
NKW						
NUW						
Total	**3,316,328**	**45,640**	**1.4%**	**415**	**26**	**19**



June

Area	Shrimp (kg)	Redfish (kg)	Redfish %	Tow Frequency <2.5%	2.5%-10.0%	>10.0%
2W						
4	3,248,266	29,872	0.9%	380	22	4
5	366,341	4,754	1.3%	43	9	1
6						
DSE	580	560	96.6%	1	0	3
DSW	257,279	12,800	5.0%	26	8	13
NKW	31,615	350	1.1%	6	0	0
NUW	59,028	160	0.3%	8	1	0
Total	**3,963,109**	**48,496**	**1.2%**	**464**	**40**	**21**



Are	Shrimp (kg)	Redfish (kg)	Redfish	Tow Frequency <2.5%	2.5%-10.0	>10.0
2W						
4	673,933	11,887	1.8%	73	13	4
5	925,809	21,469	2.3%	46	52	1
6						
DSE						
DSW	293,618	22,871	7.8%	28	16	21
NKW						
NUW						
Total	1,893,360	56,227	3.0%	147	81	26