

**Kugluktuk Angoniatit Association
Hunters' and Trappers' Organization
P.O. Box 309
Kugluktuk, Nunavut X0B 0E0
Ph. (867) 982 – 4908
Fx. (867) 982 – 5912
kugluktukhto@giniq.com**

January 5, 2011

Webb Outfitting (Nunavut) Ltd.
Southern Booking Office
P.O. Box 313
Pritchard, BC V0E 2P0

Dear Fred, Martin and George;

On behalf of the Kugluktuk Hunters & Trappers Organization (KHTO), I have to inform you that it was decided that the KHTO no longer supports the sports hunting of caribou in the Kugluktuk area and the Kitikmeot Region. And therefore, does not support the issuance of sports hunting tags for all caribou.

A motion M/C # 057/10 was passed by the Kugluktuk Hunters & Trappers Organization Board of Directors on September 9, 2010 as follows:

**“Whereas the Kugluktuk Angoniatit Association would like to stop the practice of issuing sports hunting caribou tags for the following caribou; Bathurst, Bluenose East and West, Dolphin and Union herds, as a first step to assist the herds from further decline. This motion was approved and carried. This will take into effect September 9th, 2010.
M/C # 057/10 David Klengenber/Peter Taktogon Carried”**

We ask for understanding of the importance to assist in preserving all caribou herds and look for your support on this matter. At this time, this is only a notice of the KHTO motion and will follow-up with you on all updates to the motion made. I have attached copies of (3) other documents pertaining to the Kugluktuk Hunters & Trappers decision.

We would like to continue the relationship with Webb Outfitting Ltd., and to continue to work together! Please feel free to contact us at anytime by phone, fax, mail or email.

Sincerely,

Barbara Adjun
Manager

c.c. Allan Niptanatiak, Conservation Officer, DOE, Kugluktuk
Department of Environment (HQ), Kugluktuk



Kugluktuk Angoniatit Association • Hunters' and Trappers' Organization
P.O. Box 309, Kugluktuk, Nunavut X0B 0E0 • Phone: (867) 982-4908 • Fax: (867) 982-5912
E-mail: kugluktukhto@qiniq.com

September 14, 2015

Kitikmeot Regional Wildlife Board
Ekaluktutiak Hunters & Trappers Association
Bathurst Inlet Hunters & Trappers Association
Bay Chimo Hunters & Trappers Association
Kurairojuark Hunters & Trappers Association
Taloyoak Hunters & Trappers Association
Department of Environment, Regional Office
Nunavut Wildlife Management Board – Iqaluit
Nunavut Tunngavik Inc. – Wildlife & Environment

krwb@niws.ca
ehtocb@qiniq.com
ckapolak@kitikmeot.edu.nu.ca
ckapolak@kitikmeot.edu.nu.ca
kugaarukhto@netkaster.ca
hunter@qiniq.com
MDumond@GOV.NU.CA
pkydd@nwmb.com
pirngaut@tunngavik.com

RE: Sports Hunting of Caribou in the Kitikmeot Region & Tags

This has become an ongoing and urgent issue for the Kugluktuk Angoniatit Association, Hunters & Trappers Organization (HTO), since 2009, when the HTO Board of Directors decided to take action by announcing in a statement that they will no longer support sports hunts on caribou.

In the past, the Kugluktuk HTO created priorities on what actions to take when caribou are in decline. The first priority being to stop all issuance of sports hunting tags on caribou for Kugluktuk. This was requested and sent for support from the other Kitikmeot Region communities. This statement was sent on December 7th, 2009. To date, this issue has not been addressed by the Kitikmeot Regional Wildlife Board or the other communities in the region.

A letter was sent to the outfitter that worked out of Kugluktuk, and it was Fred Webb's sports hunting outfitter stating that we are asking that all sports hunts be stopped on caribou until further notice, who sent a letter back to the Kugluktuk Angoniatit Association (HTO), stating that he fully supported the Kugluktuk Hunters & Trappers decision and would no longer conduct sports hunts on caribou. He also stated that he would still like to continue to conduct sports hunts on other animals, and continue to work side by side with the Kugluktuk HTO. The Kugluktuk HTO support the outfitter and continues to work closely with the outfitter and continues to receive reports.

What the Kugluktuk HTO cannot understand is how sports hunting is still being conducted on caribou while the caribou are in decline? How the caribou sports hunting tags are being issued in Nunavut and being hunted in the NWT, when NWT has a decision to stop sports hunting on caribou. Where is the logic? How does this assist our Inuit when Inuit are fighting to have caribou on our tables, and the sports hunters are allowed to hunt them for the big dollar, and in the pocket of the few Inuit, while the larger Inuit population struggle.

The Kugluktuk Angoniatit Association is requesting support from the Kitikmeot Regional Wildlife Board on the decision to stop issuing sports hunting tags on ALL caribou herds. It has become such a dire issue, the caribou are in further decline and still there are communities in the region who continue to conduct sports hunts, all for the big dollar.

The outfitters are supporting the sports hunters and their game of hunting, while Inuit are struggling to harvest caribou for subsistence, to put food on their table. Each community has a right to stop sports hunts on caribou, or can seek to work together with outfitters.

There is a bigger incentive that needs to be addressed, and that is to save our caribou to help our Inuit and to see that our younger generation will have caribou. Right now, our community members are not getting any caribou because the caribou are scarce, and the caribou have been too far away.

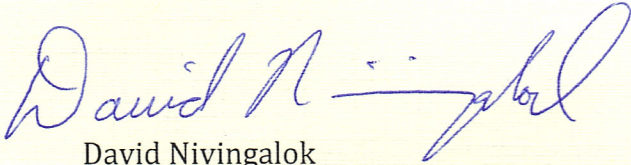
The caribou that our community harvests are the Bluenose East Caribou herd, the Dolphin and Union Caribou herd and sometimes the Bathurst Caribou herd. All the herds are presently showing major signs of decline. This has to be a major concern as a large picture. We need to address it as a Kitikmeot community, so larger issues do not come about. Which can be a moratorium like what happened in Iqaluit. And that is something we cannot allow.

We are asking each Kitikmeot community to support the Kugluktuk Angoniatit Association to stop the issuance of sports hunting tags on ALL caribou, and those are the Bluenose East Caribou, Dolphin and Union Caribou and the Bathurst Inlet Caribou. The Kitikmeot Region can fight together to save our livelihood, which is so important, to save the caribou for the younger generations to come. Do you want your grandchildren and great grandchildren to continue to have caribou while they grow up? Then there is action to be taken. We need to think of them now.

There are ways to educate our hunters to harvest other animals to help each community sustain them with country food. It can be done. Instead of conducting large community harvests on caribou, provide other country food instead, there is muskox, fish, rabbits, ptarmigan, seals, whale. We can teach and educate our communities that there are other country food and not caribou only.

The Kugluktuk Angoniatit Association, Hunters & Trappers Organization (HTO) is now requesting and seeking support to stop all sports hunts in the Kitikmeot Region. We need to do this until our caribou are in healthy populations again. We need to do this for our Inuit.

Regards,



David Nivingalok
Chairperson

ba/dn

c.c.	NWMB	jakeagok@nwmb.com
	NTI	bdean@tunnigavik.com
	DOE - Lisa Leclerc	lleclerc@gov.nu.ca
	MLA - Peter Taptuna	premier.taptuna@gov.nu.ca
	DOE - Minister	jmike@gov.nu.ca



Ekaluktutiak Hunters & Trappers Organization
P.O. Box 1270 Cambridge Bay, Nunavut X0B 0C0
Telephone #: (867) 983-2426 Facsimile #: (867) 983-2427
Email: ehtocb@qiniq.com

July 15, 2016

Nunavut Wildlife Management Board
Iqaluit, Nu
Attn: Jason Akearok, Executive Director

RE: Dolphin & Union (D/U) Caribou Herd Sports Hunt – Community Management Initiative

Mr. Akearok,

The Ekaluktutiak Hunters and Trappers Organization (EHTO) made a board decision to continue the FY-2016/17 sports hunt at twenty-five (25) tags for EHTO, five (5) tags for local outfitters and five (5) tags for High Arctic Lodge Sports hunts which is thirty-five (35) tags in total for the Dolphin/Union caribou herd.

Next fall FY-2017/18, the EHTO will voluntarily reduce the number of tags allocated to the Ekaluktutiak Sports Hunt Limited (ESHL) to ten (10) tags. For the time-being, the local outfitters and High Arctic Lodge Sports hunts allocation will remain the same with five (5) each.

The EHTO is not giving up its' total allowable harvest for sports hunts, but only voluntarily placing a reduction. Annually, the EHTO will review the number of tags with recommendations to be allocated to the sports hunt of the Dolphin/Union caribou herd.

The EHTO board is also suggesting the non-beneficiary resident's allocation to be reduced from five (5) tags down to two (2) tags. Although this may go against the entitlement in the New Nunavut Wildlife Act, the EHTO has rarely been encountered by non-beneficiary residents to acquire more than two (2) tags.

Regards,

Bobby Greenley, Secretary-Treasurer, EHTO

For: Bobby Greenley
EHTO, Chairman

Cc: Lisa-Marie Leclerc, Regional Biologist, Department of Environment, GN

Dolphin and Union Caribou Second Joint Meeting Report

Cambridge Bay, January 11 - 13, 2016



Department of Environment, Government of Nunavut
Iqaluit, Nunavut

Executive Summary

A workshop focusing on Dolphin and Union Caribou took place in Cambridge Bay between January 11 and 13, 2016. During this workshop, the Government of Nunavut, Department of Environment (DOE), Government of Northwest Territories (GNWT), Environment and Climate Change Canada (ECCC), NTI, and the Kitikmeot Wildlife Regional Board (KRWB) representatives conducted consultations with the Hunters and Trappers Organizations from Nunavut and Northwest Territories. The primary purpose of the workshop was to provide co-management partners with an update on progress on the draft Dolphin and Union Caribou Management Plan, and to seek further input and knowledge to help complete the draft plan.

The review of efforts on the management plan was followed by discussions on a pathway forward with the intent of developing a draft management plan suitable for community consultation. The meeting format was a series of presentations on herd status, reviews of the draft outline, framework, threats, and potential harvest management options, followed by questions and comments. The meeting was an open exchange of knowledge, both scientific and traditional and local.

Presentations on herd status and reports on research projects provided up to date knowledge for participants to start their discussions. The discussions on threats and actions to mitigate those threats will help further develop the management plan. A discussion on harvest management options will be used to define what recommended actions should be taken as caribou move through their natural population cycle. Finally a process and timeline were identified for the co-management partners to advance the management plan through each respective process.

This report attempts to summarize the comments made by participants during the workshop. A full record of the workshop is available in the minutes.

Preface

This report represents the Dolphin and Union Caribou working group's best efforts to accurately capture and translate all of the information that was shared during workshop.

The views expressed herein do not necessarily reflect those of one specific organization, but rather, the best advice and opinions from the participants.

Table of Contents

Executive Summary.....	i
Preface	ii
Table of Contents.....	iii
1.0 Summary Purpose	4
2.0 Purpose of the Workshop	4
2.1 Format of Meetings.....	4
2.2 Meeting Participants.....	4
3.0 Workshop Summary.....	5
3.1 Review of Outcomes from the March 2015 workshop.....	5
3.2.1 GN Knowledge Update and Background and Species Information	5
3.2.2 Traditional Knowledge Research	5
3.2.3 GNWT Traditional Knowledge Study.....	6
3.2.4 Health and Disease.....	6
3.2.5 Toxicology	7
3.3 Overview of Draft Table of Contents	7
3.4 Threats and the COSEWIC Threat Assessment	7
3.5 The Management Framework	8
3.6 Harvest Management Options.....	8
3.7 Summary of Issues and Actions	9
3.7.1 Summary of Key Concerns	9
3.7.2 Summary of Key Actions	9
4.0 Next Steps	10
Appendix 1 - Agenda	12
Appendix 2 - Presentations.....	15

1.0 Summary Purpose

This summary is intended to collate and summarize comments, questions, concerns, and suggestions rose during the joint meeting held with representatives from the co-management partners from the Northwest Territories, Nunavut, and Environment and Climate Change Canada. The summary and notes herein only reflect what was shared during the meeting.

2.0 Purpose of the Workshop

The primary purpose of the workshop was to engage co-management partners from Nunavut, the Northwest Territories, and Environment and Climate Change Canada in an ongoing dialogue on Dolphin and Union caribou. It also allowed management partners to continue, based on the 2015 Kugluktuk meeting, directing the development of a multi-jurisdictional management plan for the Dolphin and Union caribou herd. Review of efforts to date was followed by discussions on a pathway forward with the intent of developing a draft management plan suitable for community consultation.

2.1 Format of Meetings

The meetings were held during three days (January 11, 12, and 13 2016) in Cambridge Bay at the Arctic Islands Lodge meeting room. Meetings were co-chaired by Joanna Wilson, Species at Risk Biologist with GNWT, and Mathieu Dumond, Regional Manager, DOE. The meeting format was a series of presentations on herd status, management process, reviews of the draft outline, framework and threats, and potential harvest management actions (presentations are in Appendix 2), followed by questions and comments. The meeting was an open exchange of knowledge, both scientific and traditional.

2.2 Meeting Participants

Name	Community	Organization
Simon Qingnaqtug	Taloyoak	Kitikmeot Region Wildlife Board
Ema Qaqqutaq	Kugaaruk	Kitikmeot Region Wildlife Board
Jimmy Haniliak	Cambridge Bay	Cambridge Bay Hunters & Trappers Organization
John Lucas Jr.	Tuktoyaktuk	Wildlife Advisory Management Council (NWT)
Joe Ilisiak	Paulatuk	Inuvialuit Game Council/ Paulatuk HTC
Joshua Oliktoak	Ulukhaktuk	Inuvialuit Game Council/ Ulukhaktuk HTC
Larry Adjun	Kugluktuk	Kugluktuk Hunters & Trappers Organization
Joanna Wilson Co-Chair	Yellowknife	Government of Northwest Territories (GNWT)
Lisa Worthington	Yellowknife	Government of Northwest Territories (GNWT)
Tracy Davison	Inuvik	Government of Northwest Territories (GNWT)
Sam Kapolak	Bay Chimo	Bay Chimo Hunters & Trappers Organization
Bert Dean	Rankin Inlet	Nunavut Tunngavik Inc. (NTI)
Lisa-Marie Leclerc	Kugluktuk	Government of Nunavut (GN)
Drikus Gissing	Iqaluit	Government of Nunavut (GN)
Mathieu Dumond Co-Chair	Kugluktuk	Government of Nunavut (GN)
Amy Ganton	Yellowknife	Canadian Wildlife Service (CWS)

3.0 Workshop Summary

The goals of the meeting were made clear to the participants prior to the meeting as well as at the start of it (See Appendix 1 Agenda). Participants actively engaged in many discussions that were preceded by a presentation. Participants raised many similar questions, concerns, and suggestions in addition to providing direct feedback to draft the management plan. The workshop maintained a positive tone throughout and many participants commented on the need to work together to find solutions to assure caribou conservation.

3.1 Review of Outcomes from the March 2015 workshop

A review of what was accomplished at the March 2015 workshop was provided as some participants were new to the process. The draft goals and objectives and the threats were revisited. A teleconference in October 2015 had already reviewed potential harvest management models to be discussed during this workshop.

3.2.1 GN Knowledge Update and Background and Species Information

An update of the DOE April 2015 collaring and the October 2015 survey was provided. The analysis is not completed, but the preliminary results revealed 14,730 (CI= 11,475-17,986) in the visual stratum. A presentation on the biology of the species, the history of research and monitoring, and the current and historical use of the herd were provided as a review of what will be comprised in the future sections 3 and 4 of the management plan.

Participants focused discussion on the historical and current use of the herd including accuracy of the original Nunavut Harvest Study, which only grouped caribou harvest and did not differentiate between herds. Most co-member partners felt that the record was accurate for their respective communities; however more effort is required to determine current harvest rates. This was discussed in terms of potential HTO/HTC based community monitoring, efforts at the second Nunavut Harvest Study, and the requirement under Section 5.7.43 of the NLCA to provide information. Additional discussion on harvest included the situation when one herd becomes scarce; it often results in another herd being targeted for harvest. This has been the case when Peary caribou is low, and the Dolphin and Union caribou is targeted in Ulukhaktuk, and when Bluenose East herd becomes low, the Dolphin and Union caribou is targeted in Kugluktuk. Both communities have increased their harvest of Dolphin and Union caribou in response to decreases in access or availability of other herds.

General support of harvest monitoring, as well as increased cooperation with industry to incorporate voluntary best practices, and reduced flying during calving summarized participant concerns.

3.2.2 Traditional Knowledge Research

The results of Traditional Knowledge collection were presented. The study took place in 2014 and 2015 in Cambridge Bay. Thirty individual interviews were conducted in the summer of 2014 and 7 group interviews in the winter of 2014. There were follow up interviews to validate the results of the 2014 interviews in the summer of 2015. The results provided excellent examples of quantification of oral knowledge depicting the caribou population recovering from a low in the 1960's to a peak in the late 1990's to the current decline being observed today using scientific methods.

In addition to describing population trend, key findings of scientific research conducted in October 2015, included: observation of poorer caribou body condition status since the decline, increased observations of caribou with abnormalities since the decline, and observation of diseases that might be new to the area.. The study participants' perceptions of factors that may have contributed to the decline of caribou in the area include; change in migratory routes (more to the east and west side), an increase in predators, deterioration of health status, human disturbance, and a change in climatic conditions that can have a direct or indirect effect on caribou populations.

Questions on the potential effects of climate change included an increase in new insects and new diseases. Although this was noted in the interviews, additional research is required. Additionally participants were interested to know if the interviews indicated an increasing muskoxen population and the potential impacts of increased competition between the two species. Although not an interview question, it was a recurring response.

Significant discussion was focused on the impacts of late season shipping that disrupts the fall migration and can lead to drowning. It also delays the caribou's staging time on the ice, leading to poor nutritional status. Potential mechanisms to try and implement a *no shipping* period during freeze up were discussed, but the situation is complex and managed by the federal government since international shipping takes place in these waters. More work needs to be directed to pursue the appropriate avenues with the federal government: in this case, Transport Canada. Voluntary agreements with industry to support no shipping during this period are already in place and could be pursued with additional companies.

Additional discussion focused on other community concerns from participants including; an increase in insect harassment associated with climate change and low flying aircraft and its impact (particularly on calving). Other concerns included increasing marine traffic (cruise ships and their passengers), an increase in grizzly bears, and the need for increased predator harvest to help caribou.

3.2.3 GNWT Traditional Knowledge Study

Traditional knowledge interviews were conducted in Ulukhaktuk from 2011 to 2013. The interviews highlighted threats to caribou and included human actions, such as low flying aircraft, development, predation, competition from muskox, and effects from climate change including more freezing rain, thin ice leading to drowning, and dryer weather negatively impacting vegetation.

3.2.4 Health and Disease

Samples taken from 25 Dolphin and Union caribou collared in April 2015 were blood, hair, and fecal samples for analysis. Feces were examined for parasites and results were mostly normal. One unusual finding is the existence of *Parelaphostrongylus andersoni*; this is the first report of this parasite found in Dolphin and Union caribou.

Lungworm was found in the feces. This worm was not historically found on Victoria Island, but as of 2010, it seems to have spread over the Island and appears to be increasing. The level at which this parasite is occurring in caribou does not appear to be a concern at this time.

The bacteria *Erysipelothrix rhusiopathiae* is present in Dolphin and Union caribou. It has caused die-offs in muskox. The prevalence of these bacteria should be monitored, as it may be a causal in the caribou decline. This is transferable to humans and therefore a human health concern.

Newly developed methods for determining stress levels from hair samples (cortisol levels) were performed. Preliminary results indicate that Dolphin and Union caribou had higher stress levels in spring 2015 compared to two other barren-ground herds and one woodland caribou herd. The study of stress is new and although it may be supportive of the decline it is too early to tell. However, it may become a useful tool to monitor stress level in caribou herds.

Concerns from participants on potential human health impacts from animals were discussed. Lungworm does not transmit to humans, but the bacteria *Erysipelothrix rhusiopathiae* does as well as Brucellosis. There are concerns over increasing snow goose populations and the potential for them to be a vector for new and increasing diseases. Birds and small animals can act as vectors, and can explain muskox die-off on Banks Island. Samples of 600 snow geese and rodent samples were taken, and it seems the bacteria were present in these animals

3.2.5 Toxicology

As part of the long term Northern Contaminants Monitoring Program caribou are tested for contaminants such as mercury, cadmium, radioactivity, brominated, and fluorinated compounds. The majority of these contaminants are transported through air currents from elsewhere and deposited on vegetation and ingested by caribou. Levels at this time do not pose a threat to human health from consuming caribou. Long-term monitoring is important to monitor the concentration of these contaminants in the animal.

Most questions were on human health impacts from consumption of caribou. However current standards indicate that the thresholds are below any level of consumption for meat.

3.3 Overview of Draft Table of Contents

The current version of the draft Table of Contents was reviewed for accuracy and completeness. Although many of the sections are yet to be drafted, participants felt that the current content of the management plan adequately covers all the information needs.

3.4 Threats and the COSEWIC Threat Assessment

After a review of the threats drafted for the management plan, participants concluded that the draft accurately reflects what was discussed at the first joint meeting in March 2015. Additional discussion on threats focused on the need for more research to address the impacts of climate change including: how climate change may impact forage quality and quantity, the time of green up in the spring, increase in new insects and diseases. Several participants identified a need to improve education on caribou both by the schools and within the family. There was one participant who felt a quota should be implemented to ensure the declines are not as severe as what is being experienced in Baffin Island. However another participant countered that this should be through HTOs/HTCs as opposed to through the formal decision-making process.

A presentation on the requirements under the *Species at Risk Act* for management plans and how the Threat Assessment Calculator is used to address those requirements was given. The threats calculator is a tool to enumerate and quantify each threat; to rank what threats are a big issues and what may only be a potential threat. The focus is on direct threats that either cause decline, (such as mortality or removal of habitat), or affect reproduction. Threats are scored and tracked, so they are not considered twice, which would skew the overall rating of the threats. The calculator is a complex, but useful tool. A teleconference is to be scheduled as a follow up to complete this agenda item.

3.5 The Management Framework

The management framework consists of the goal of the management plan (still in draft form) and the objectives to reach that goal. There are additional approaches identified to achieve each objective. This approach will ensure that objectives are met and through meeting the objectives, the goal(s) will be met.

Discussions on the current version of the management framework indicated that this section was mostly completed. These groups suggested to include current actions that involve working with industry to establish voluntary agreements on shipping and flying. They also suggested coordinating monitoring with industry, examining what mechanisms can move shipping concerns forward, the role that marine protected areas might play in protecting the sea ice component of the migration route, and specific actions to contact federal departments regarding the impacts of ice breaking activities.

3.6 Harvest Management Options

Three different options were presented as potential models for harvest management; these included the Bluenose Model, the Porcupine Model, and the Southampton Island Model. They are all similar in that they described actions related to distinct sections of a caribou population cycle. For example, if the herd is at its peak and stable, the herd would be assessed as green; a herd that is showing a decline would be assessed as yellow; and a herd at low would be assessed as red. Each of these would have prescribed management recommendations reflecting the respective conservation issues. A herd in the green would have few harvest restrictions, while a herd in yellow may see the removal of sport hunts, while a herd in red may see strict harvest limitations.

Considerable discussions resulted from these options. An exercise was performed to determine what thresholds should trigger each of these categories, and what the recommendations should be. The results (photos in appendix 2) will be used to inform the propose harvest management framework in the next draft management plan. Suggested thresholds for herd triggers between levels green, yellow and red are: 24,000 to 40,000 is high (green); 8,000 to 24,000 is medium (yellow); and below 8,000 is low (red). Within these ranges the population can be increasing, decreasing or stable. A point form summary of participant thoughts on appropriate recommendations during the various stages of the herd cycle follow below.

Herd is at Peak-Green Level

- Provide harvester and youth education when population is high, don't wait for the population to decline
- No Harvest restrictions on beneficiaries,
- Support reporting at the HTO/HTC level (community-based monitoring.),
- Ensure any changes are phased in,
- Allow community to determine if action should be taken,
- Commercial harvest may be a tool to bring down an overpopulation (i.e. Southampton Island caribou),
- Predator control, encourage harvest of predators by paying for samples.

Herd is in Yellow-Declining

- Increased monitoring and sharing of information,
- Harvest Management,

- Sample kits (help ID decline),
- Stop commercial/sport hunts,
- Restrict industry activities on land,
- NQL-bull only,
- Education; how to hunt alternate wildlife, use elders,
- Increase communications between stakeholders,
- Create a working group of stakeholders or commission,
- Periodic review of the state of knowledge

Herd is in Yellow-Increasing

- Easing of industry restrictions,
- Easing of harvest restrictions,
- Education,
- Return to baseline monitoring,
- Easing of Non-Quota Limitations (NQLs).

Herd is in Red

- Increase monitoring, more frequent surveys,
- Setting TAH,
- Harvest from other caribou herds (if appropriate),
- Education; tell people to stop harvest and explain why there are restrictions,
- Harvest seasons.

3.7 Summary of Issues and Actions

The discussions were open and diverse, and some general themes were consistent throughout. Although a quantitative summary was not conducted, it is possible to summarize the key themes that were recurrent throughout the discussions, these are summarized below.

3.7.1 Summary of Key Concerns

- Predation from wolves and grizzly bears and their impacts on caribou number, particularly during calving,
- The number of flights, particularly low level flights during calving,
- The effects of climate change particularly on increasing insect harassment and potential impacts on forage quantity and quality,
- Increased shipping during the fall migration and potential for drowning,

3.7.2 Summary of Key Actions

- Work with industry to voluntarily implement best management practices,
- Pursue avenues for stopping shipping during the key migration; fall and spring,
- Increase education for harvesters in terms of caribou harvesting and how to harvest other species,
- Improve harvest monitoring,
- HTOs/HTCs to implement community-based quotas and monitoring were appropriate,
- Increased predator harvest through incentives and/or increased sport hunts.

4.0 Next Steps

The following text defines the proposed next steps and timeline to see the draft management plan through the respective territorial and federal processes.

2016-2018 Timelines for Dolphin and Union caribou management plan

As presented at joint management planning meeting, Cambridge Bay, January 13, 2016

- Finish drafting plan using input from this Cambridge Bay meeting (GN, GNWT & EC technical staff & managers)
- Teleconference organized by EC to work on COSEWIC threat assessment table (end of January)
- Draft plan and accompanying presentation to be provided to WMAC(NWT) for March 13-15, 2016 meeting - this would be the version to go out for community consultations
- April 2016
 - Consultation meetings held in individual communities, with HTC/HTOs
 - Review of draft by GNWT, GN, PC, WMAC (NWT), KRWB, NTI, KIA, IGC (“first jurisdictional review”) and by EC headquarters (“first compliance review”)
- GN, GNWT & EC technical staff & managers to edit the plan based on all those comments – edits to be done jointly
- September 2016
 - Revised draft plan reviewed by GNWT, GN, PC, WMAC (NWT), KRWB, NTI, KIA, IGC (“second jurisdictional review”, asking for support to post on SARA registry)
- GN, GNWT & EC technical staff to edit the plan based on all those comments – edits to be done jointly
- By mid-January 2017, EC to send proposed draft plan for translation into French – proposed draft ready for posting on SARA registry
- March 31, 2017 (hard deadline)
 - Draft plan posted as ‘proposed’ on the SARA public registry for 60 day public review
 - Draft plan posted by GNWT for public review
 - All partners including HTO/HTCs to be notified of opportunity to comment
 - If posted on March 31, comment period would end May 30
- GN, GNWT & EC technical staff & managers to edit the plan based on all those comments – edits to be done jointly
- Final management plan completed by August 2017
- Package submitted to NWMB by mid-August 2017 (may be joint submission by GN & EC)
- NWMB to consider the management plan at September 2017 meeting, followed by their hearings if needed
- Plan submitted to WMAC (NWT) for approval at their September 2017 meeting
- GN, GNWT & EC to seek Minister approval of the plan
- Response from NWMB by December 2017 – whether or not they approve the plan
- NWT Conference of Management Authorities consensus agreement by December 2017
- Management plan completed, approved and made public by March 31, 2018

Abbreviations:

ECCC = Environment and Climate Change Canada

GN = Government of Nunavut

GNWT = Government of the Northwest Territories

HTC = Hunters and Trappers Committee

HTO = Hunters and Trappers Organization

IGC = Inuvialuit Game Council

KIA = Kitikmeot Inuit Association

KRWB = Kitikmeot Regional Wildlife Board

NTI = Nunavut Tunngavik Inc

NWMB = Nunavut Wildlife Management Board

PC = Parks Canada

WMAC (NWT) = Wildlife Management Advisory Council (Northwest Territories)

Appendix 1 - Agenda

Dolphin and Union Caribou Joint Management Plan Workshop

Cambridge Bay, Nunavut

January 10 – 13th, 2016

Meeting Information

Goals of the Meeting:

- Integrate community perspectives (IQ/TEK) with scientific knowledge throughout the meeting
- Review and discuss the first draft of the Dolphin and Union Caribou Management Plan
- Review and collect feedback on key sections of management plan: species needs, threats, management objectives and approaches, including inclusion of IQ/TEK information.
- Discuss options for harvest management model and corresponding actions
- Review new knowledge and current research

Schedule:

- Arrival in Cambridge Bay: Sunday, January 10th in the afternoon. Grocery store may be closed by 5:00 so get groceries (if needed) before coming to the meeting room.
- Meeting:
 - o Sunday – lunch served in meeting room (catered), meeting 3:00 pm to 4:30 pm
 - o Monday & Tuesday - 9:00 am to 5:00 pm with health breaks and lunch (catered)
 - o Wednesday – 9:00 to 4:00 pm with health breaks and lunch (catered)
- Breakfast and dinners will be on your own. Green Row is open for dinner 5:00-7:00 p.m. and Arctic Islands Lodge is open for dinner from 5:00-6:45 p.m. Breakfast is available at the Green Row.
- Departure from Cambridge Bay: Wednesday, January 13th in the evening (6:00 pm flight)

Meeting Location: Arctic Islands Lodge, medium boardroom

Accommodation: Green Row Executive Suites (transportation will be provided to and from the airport)

Dolphin and Union Caribou Joint Management Plan Workshop

Cambridge Bay, Nunavut
January 10 – 13th, 2016

Agenda

Sunday January 10th, 3:00 p.m. – 4:30 p.m.

1. Welcome	Co-chairs – Joanna Wilson and Mathieu Dumond
2. Opening Prayer	
3. Opening Remarks	Co-chairs
4. Introductions	All participants
5. Outcomes/Expectations for meeting	All participants
6. Review of Outcomes from March 2015 meeting in Kugluktuk	Lisa Worthington

Monday January 11th, 8:45 a.m. – 12:00 p.m.

7. Knowledge and Research Update	
7.1. GN update	Lisa-Marie Leclerc
7.2. GNWT update	Tracy Davison Matilde Tomaselli
7.3. Traditional Knowledge Research	Tracy Davison
7.4. NWT Traditional Knowledge Study (tentative)	Susan Kutz
7.5. Health and Disease	Mary Gamberg

Monday January 11th, 1:00 p.m. – 5:00 p.m.

8. Review of Draft Management Plan - Background Information on Dolphin and Union caribou	All participants (lead presenter below)
8.1 Overview of draft table of contents	Lisa Worthington
8.2 Background & Species Information	Lisa-Marie Leclerc
- Historical & social perspectives	
- Use of the herd	
- Population and Distribution	

9. Review of Draft Management Plan – Threats to Dolphin and Union caribou	All participants (lead presenter below)
9.1. Threats in draft management plan	Lisa Worthington (with technical support from Lisa-Marie Leclerc and Tracy Davison)

Tuesday January 12th, 8:45 a.m. – 12:00 p.m.

9. Review of Draft Management Plan – Threats to Dolphin and Union caribou (<i>continued</i>)	All participants (lead presenter below)
9.2. Threat assessment by COSEWIC	Amy Ganton / Justina Ray
10. Review of Draft Management Plan – Management Framework	All participants (lead presenter below)
10.1. How the framework links to management plan	Lisa Worthington
10.2. Management goal/vision & objectives	Lisa Worthington

Tuesday January 12th, 1:00 p.m. – 5:00 p.m.

10. Review of Draft Management Plan – Management Framework (<i>continued</i>)	All participants (lead presenter below)
10.3. Recommended management approaches & actions to achieve objectives	Lisa Worthington

Wednesday January 13th, 8:45 a.m. – 4:00 p.m. (all day)

11. Options for Consideration of Harvest Management	All participants (led by Lisa-Marie Leclerc)
11.1. Decision on harvest management models	
11.2. Management recommendations	
12. Next Steps	Co-chairs
13. Closing Remarks	All participants
14. Closing Prayer	

Appendix 2 - Presentations




011DJAPcbCc<11Ycc
Building iv⁴ funavut Together
Afunavuluqatigiingniq

Nutigi

Dolphin and Union Abundance and Distribution


Lisa-Marie Leclerc



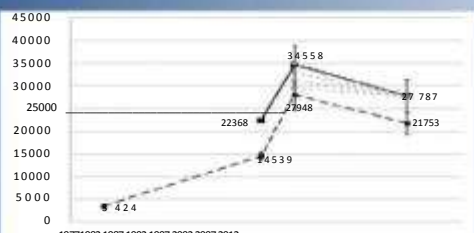
2015 Population and Distribution

- Dolphin and Union caribou are intermediate in size and color between Peary caribou and Barren-ground caribou.
- Dolphin and Union caribou is the most genetically differentiated of the barren-ground caribou (Zittlau, 2004) possibly due to genetic bottleneck.
- Special behaviors:**
 - They do not form well define calving ground, as its calving strategy is mainly individualist (Nagy et al., 2011).
 - Migratory herd crossing the sea-ice to reach their wintering and summering ground.

(Dumond and Lee, 2013)




4.4 Population and Distribution





Map of final systematic reconnaissance flights on October 25 (East of Cambridge Bay) and October 31 (West of Cambridge Bay) and second

(Dumond and Lee, 2013)




4.4 Population and Distribution





4.4 Population and Distribution

The resulting estimate of caribou of 14,730 (CI= 11,475-17,986).




2015 Survey



Ulukhaktok Traditional Knowledge Interviews 2011-2013



Humans Activities

- Five people mentioned human activities as a threat.



Predators



- Everyone Mentioned Predators as a threat to Caribou.
- They kill caribou, kill calves and also some are
- Both Wolves and Grizzly Bears
- People also concerned about their own safety because of increase in Wolves and Grizzly Bears

Threats

“When they do exploration they always fly around and when they see animal they turn around, fly low and take pictures. That’s when the caribou start running away.” – PIN02

“Any place where there are machines or planes start travelling every day or every second day and that they could easily move from that spot. Because from they come in start making noise they spook them off. Interrupt whatever they’re doing.” – PIN07

“When they work on the land, like, they’re drilling, the smell of smoke, the sound of the drills, the sounds of vehicles, maybe people, the smells of those drives the caribou away and that’s a threat to caribou. So they go somewhere else to where it can be at peace.” – PIN11

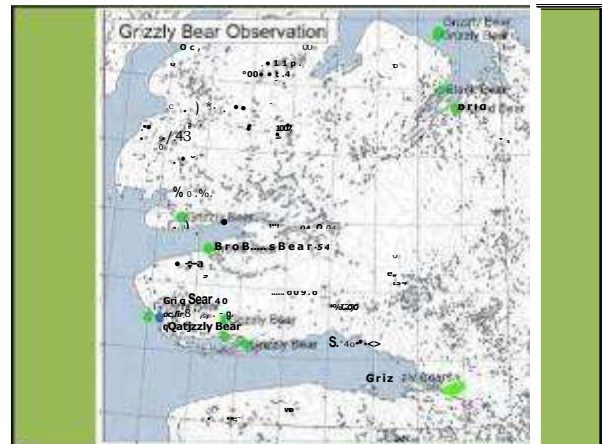
“Even now the wolves are still following the caribou. Everywhere they go they follow caribou. Not only the wolves, even so the Grizzly Bears are killing them. Right now there’s more Grizzly Bears that have been spotted.” –PIN07

“All because of the wolf, the wolf make eight pups and caribou make one pup. One caribou calf. That’s a big difference there. So like I said, that’s how come it’s really hard to see a female caribou with a calf. Females have lots of milk because it’s already been chased by the wolves and it’s really easy to be spooked now.” –PIN07

"Yeah, the population of the wolves have really increased because long ago there used to be hardly any wolves." – PIN02

"Used to never see Grizzlies when we were younger. Just few years now start seeing them more every year." – PIN02

"I never, never seen one when I was growing up anywhere. Grizzlies. I don't know why they're moving to our island." – PIN08



Competition - Muskox

- When talking about competition 9 people mentioned muskox. The reason they compete varied:
 - 7 people thought they might eat the same, 2 people thought they didn't.
 - 4 people thought caribou didn't like to be around the same place as muskox, with two of those people thinking the smell caribou didn't like.
 - It was observed that in the past when there was lots of caribou, there was no muskox

"They eat the same food. They just don't hang around together." – PIN03

"The caribou don't want to feed where the muskox feed because it's too strong for them, the smell, where they feed. But they eat the same food, that's why." – PIN07

"He said caribou has a different diet with the seasons. But the muskox diet never changes. When they open up their gut to check the contents are always the same. They never change. They eat these big leaves off the ground." – PIN04

Plant Growth

- Three people talked about plant growth as a concern for caribou



"The poor growth of the plants they eat." – PIN02 "the weather is changing and the land is also changing and so if there's hardly any rain and the weather doesn't go the way for the plants then there's nothing for them to eat." – Pin01

"Late spring early summer when people first started getting caribou their meat was tough, they had no fat, and it was due to the way the plants grew. Freezing, they'd start shooting out then freeze, shoot out and freeze, and that wasn't good for them. That is why the caribou was very skinny this year." – Pin10

Thin Ice

- Four people mentioned hearing about or seeing caribou going through thin ice, mostly in the fall time during freeze up.

“ You know when they go through the ice and drown. That’s another one.” –PIN01

“It doesn’t freeze fast anymore and the ice doesn’t get solid fast like it used to. When it used to freeze we used to just start walking on it the next day. On the ocean.” - Pin07

Freezing Rain

- Eight people mentioned Freezing Rain – or Rain on snow making a layer of ice on the ground.
- Some people recorded that it happened in the past. Other People noticed it happening more now than in the past, but one person notices it happening the same as in the past.

“Got snow now and then rain and then freeze again then it’s going to be hard for them for feeding.”– Pin07

“They can’t paw through the ice when it’s thick.” – PIN10

“Caribou, no matter what weather, they will graze but when the snow gets covered over with ice they find a lot of dead caribou. Because they can’t go pawing through that ice that’s on top of the snow.” – PIN04

“If you got a lot of storm. You know, some years winter time it could storm for many days. If there’s too much storm and it wells up a little bit then they get cold and iced up and all that, they get cold and they get stuck to the place where they’re sleeping, where they’re laying down. From the climate or whatever the weather changes fast sometimes. We’ve seen a couple of those do like that. Just laying there, dead from bad weather and all that. Sometimes it takes a long time to get nice out. Must be probably not the healthy ones, that’s why.” –PIN07

“Yeah, when it’s too much wind and cold weather and stuff like that, I guess, you know. Big storm. Got to be a big storm when they die like that. I could notice, I look at them, no blood, nothing, not even the blood every one of them they just freeze like that staying down.” PIN08

Caribou can die from weather events like freezing rain but they also have ways to deal with winter weather in the Arctic and extreme conditions.

- Caribou stay still during a storm , they will also move to different areas if the snow is bad or there is ice in an area.

- Three people mentioned they will fatten up for winter.

They know the weather, they know the seas, so they know when to come to these high areas where they can get out of the storm. – PIN04

“Winter time I think they just lay down, hunker down and wait for the weather.” - PIN03

He said in the fall time if we get snow and then rain the caribou leave that area and go somewhere else. They don't hang around in that area where they would have stayed. Due to weather, ice conditions on top of the snow, they will not stay. - Pin06

Health

Sickness isn't very common, some participants had never seen illness in caribou other participants saw the occasional sickness. Most common observation was issues with joints, or legs.

Caribou do get skinny during winter, but they get fat again in the spring and summer.

Like in the winter, like all animals they what you call try and eat as much as they can for the winter months so that they grow a layer of fat to keep them warm so that on days like this they know that they can't be roaming around hunting and that. - PIN01

She said in the winter there was one time when she noticed and first when she seen it there was an area, a grazing area. Her, really deep snow, the caribou just kept pawing at the ground until they could reach to the ground, to the growth under. - PIN10

“Just a couple since I started hunting. One that gets way left behind, that they have a cyst or something in their legs. Liquid. They run for a while and then they can't run anymore. “ - PIN03

When she was hunting she used to travel and she used to never hear of caribou getting sick. – PIN11

How know Caribou are doing well?

Three people commented on how to tell if caribou are doing well.

Things people look for is :

- If hunters are successful
- If the land/plants grown good
- See caribou coming in the spring.

Changes in the number Caribou

Almost everyone saw changes in number of caribou over their life.

There were times when there were less caribou in the past, in the 1970's and 1980's there were a lot of caribou then seem to decrease.

Reasons for the change was similar to the threats however it is also a natural cycle for animals.

Some people also talked about how caribou have moved away, and they will come back

It might deplete because there's so many things that come into consideration like the weather and the plants that grow and things that happen to the Earth and all those things that you mentioned come into what you call play on the survival of the caribou. – PIN01

Conservation

- **Most people mentioned changing harvesting – taking less or not taking Peary Caribou (smaller caribou). One participant mentioned getting muskox instead of caribou and another mentioned not hunting cows with calves.**

Habitat

Caribou like low areas, where it is damp and there is good plant growth. Most participants said this is where you would find them in summer but 2 participate also said you could find them here in winter.

Two participants also mentioned that caribou like shores in the summertime.

In winter most participates though caribou choice areas with less snow; high areas.

Two participants mentioned rocks; one thought they used rocks to get away from wolves.

What Caribou Eat

- Things caribou eat include:
 - Tuktut niqait
 - Lichen
 - Arctic Sorrel
 - Grass
 - Berries

To me their stomach is very green in the summer. –PIN06





2 **Study design**

☐ **SUMMER, 2014 30 INDIVIDUAL** Identified with help of KIA and HTO

- 23 Beneficiaries
- 5 Residents

Specific questions - muskox population

Open questions - emergence of other themes

3 **Study design**

☐ **WINTER, 2014 7 SMALL GROUP INTERVIEWS**

Total of 19 participants

11 from individual interviews

Group according to: age, hunting experience, hunting area of preference

Specific participatory activities

probe observations from the individual interviews

4 **Study design**

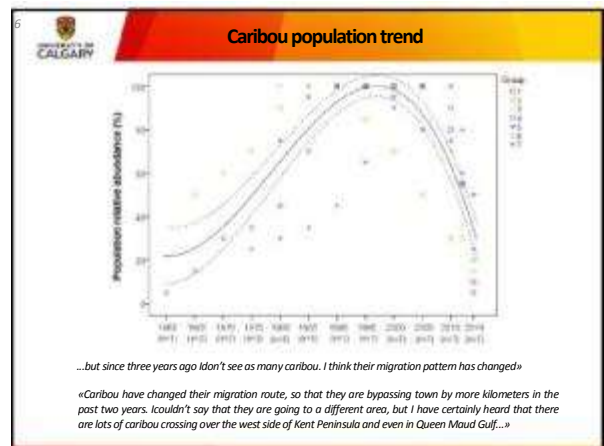
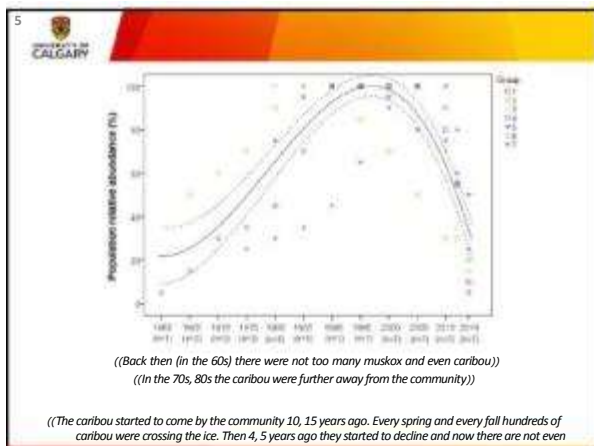
☐ **SUMMER, 2015 VALIDATION OF THE RESULTS**

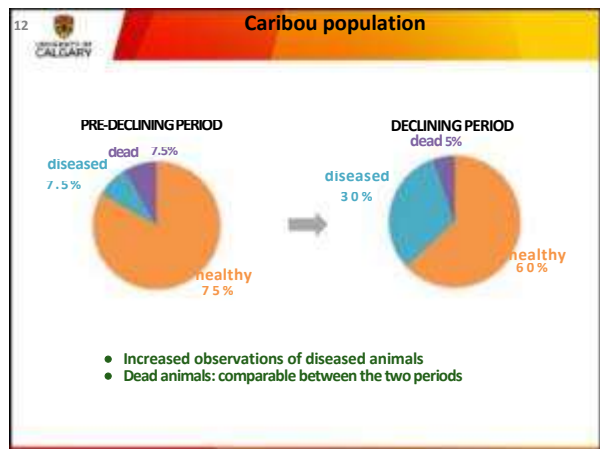
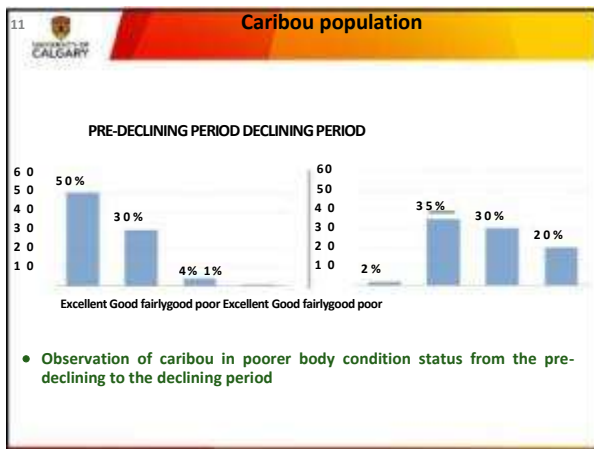
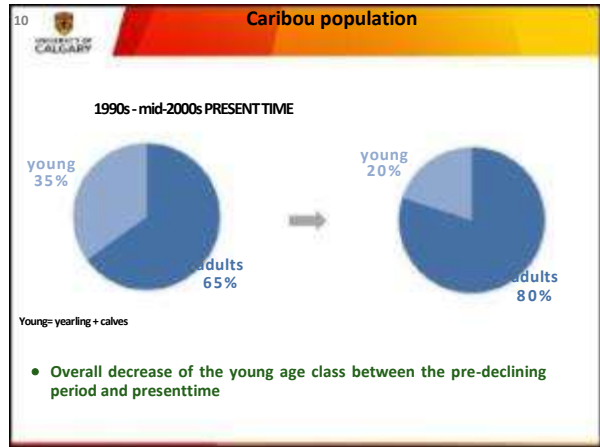
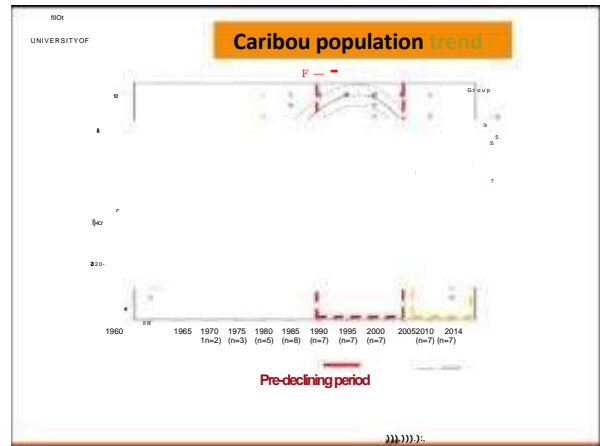
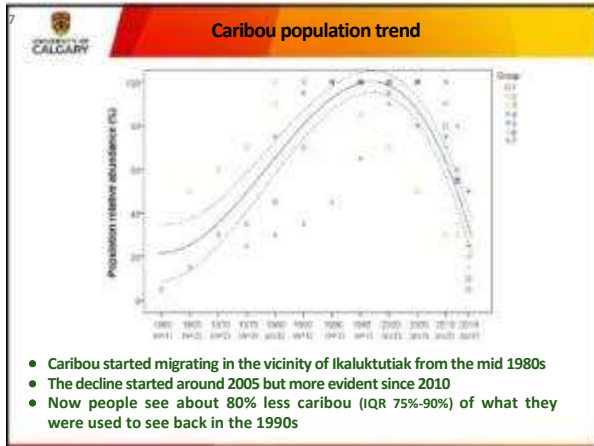
After data analyses

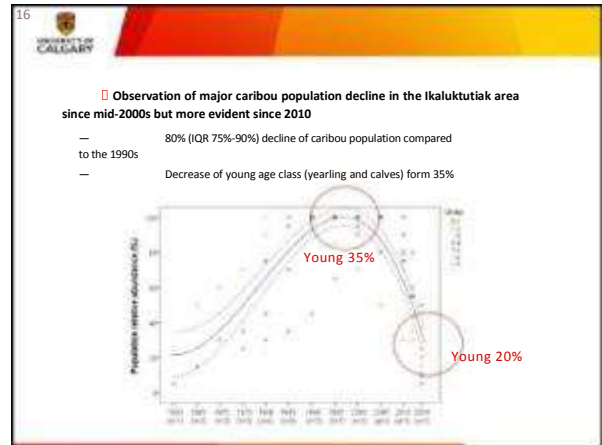
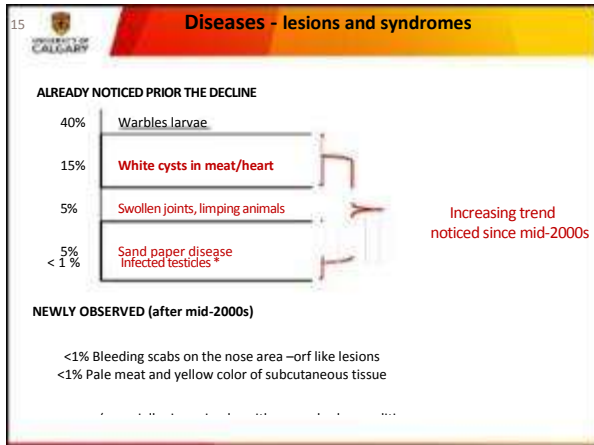
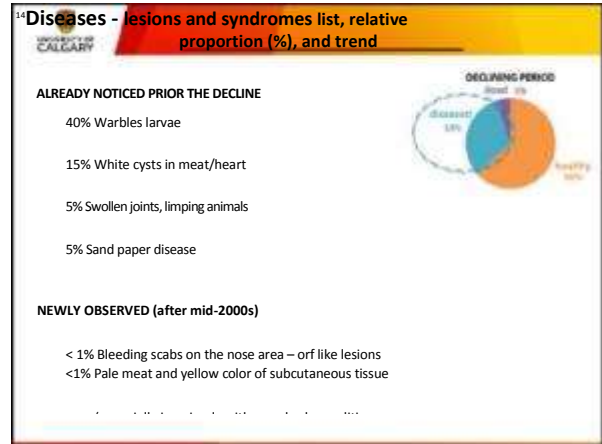
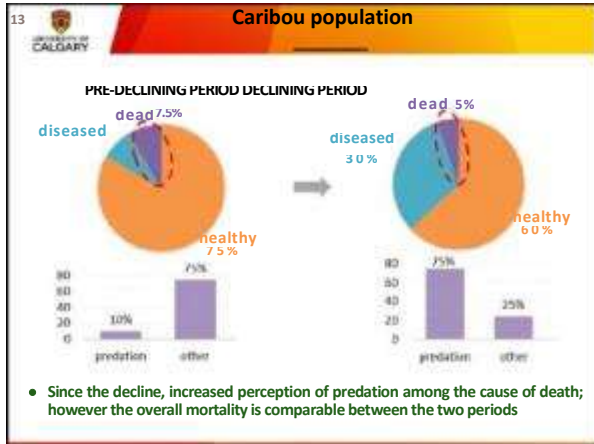
Presentation of results

Feedback from participants

n= 31/38







- 17
- Observation of poorer caribou body condition status since the decline
 - Increased observations of caribou with abnormalities since the decline
 - Increasing trend of some lesions/syndromes
 - Observation of diseases that might be new to the area (e.g. orf like)
 - Unchanged perception of overall caribou mortality between the pre-declining and declining period
 - Participants' perceptions of factors that may have contributed to the decline of caribou in the area
 - Change in migratory routes (more to the east and west side)
 - Increase in predators
 - Deterioration of health status
 - Human disturbance
 - Change in climatic conditions that can have a direct or indirect effect on caribou populations

18 **Acknowledgements**

UNIVERSITY OF CALGARY

Community of Ikaluktutiak

Kitikmeot Inuit Association

Charlie Evalik, Stanley Anablak, Paul Emingak, Julia Ogina, Fred Pedersen, Joey Evalik, Sarah Jancke and Michelle Buchan

Ekaluktutiak Hunters and Trappers Organization

CHARS Jimmy Haniliak, Alice Maghagak, Brenda Sitatak

January 10,

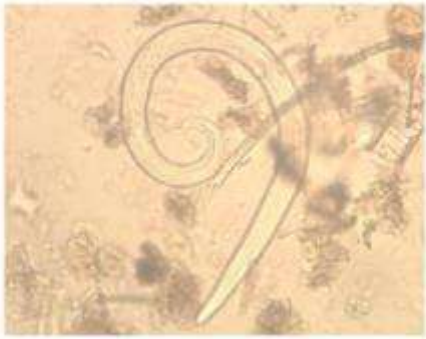


Summary report of the preliminary results of health analyses for caribou collared in the Kitikmeot, April 2015

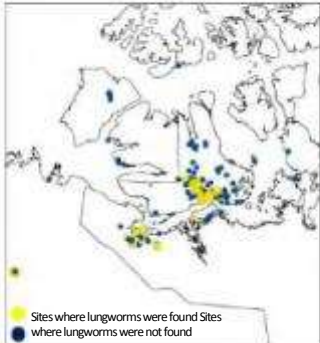
Susan Kutz with [Pratap, Kaffie](#), Angeline McIntyre and [A/S, Carlsson](#)

96NzgAYRic

Feces examined for Parasites






Distribution of lungworm, *Varestrongylus eleguneniensis*, based on muskox fecal samples




• Sites where lungworms were found
• Sites where lungworms were not found

Blood samples: Tested for *Erysipelothrix rhusiopathiae*

- Bacteria that is associated with muskox die-offs on Banks and Victoria Islands
- Can infect caribou and many other species, including people
- Only 'discovered' recently, but probably has been around for a longer time
- Very preliminary results: 5 of 22 (23%) of the tested caribou

Blood testing for *Brucella* and other diseases underway



Preliminary results: Stress levels determined from hair

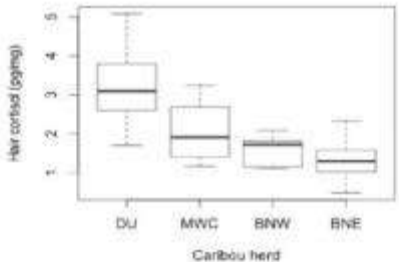
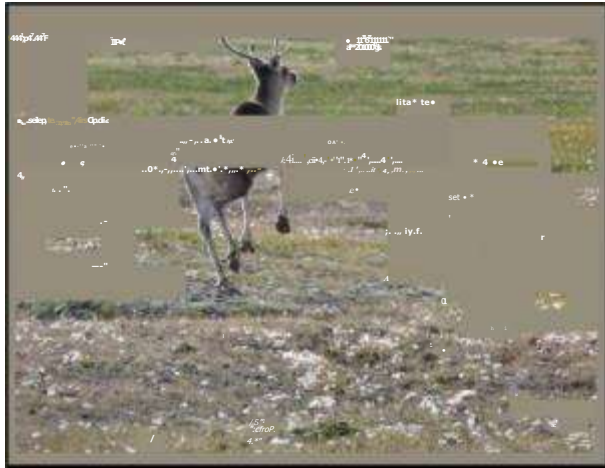


Figure 1. Dolphin Union caribou (DU, n=25) have significantly higher hair cortisol levels compared to Mountain Woodland caribou (MWC, n= 19), Bluenose West caribou (BNW, n=10) and Bluenose East caribou (BNE, 29).



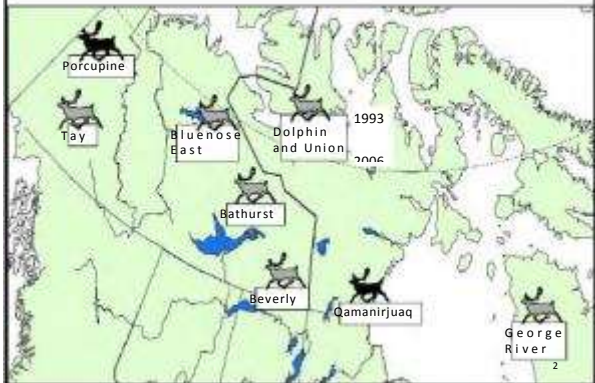
Contaminants in Arctic Caribou



Mary Gamberg
Whitehorse, Yukon

1

NCP Arctic Caribou Sampling Program



2

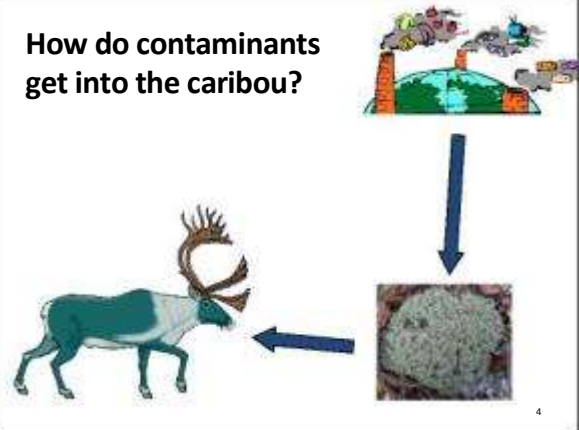
Potential Contaminant Issues in Arctic Caribou

- Cadmium
- Mercury
- Fluorinated compounds
- Brominated compounds
- Radioactivity



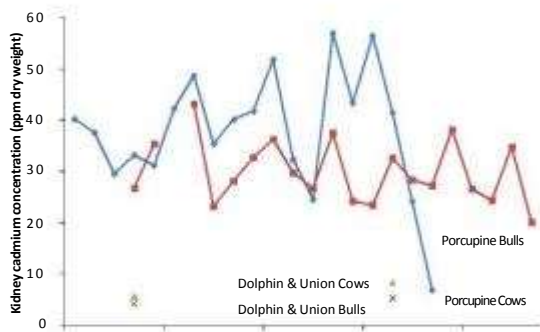
3

How do contaminants get into the caribou?



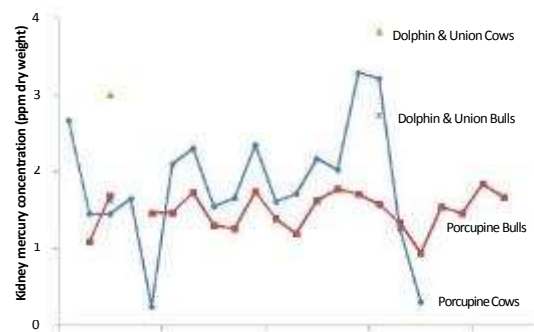
4

Kidney Cadmium in Arctic Caribou



5

Kidney Mercury in Arctic Caribou



6

'New' Contaminants

Brominated flame retardants (PBDEs)

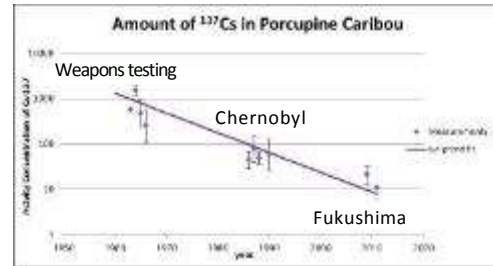


Fluorinated compounds (Teflon™)



7

Effect of Fukushima Nuclear Accident



Geometric means (±SD) of the activity concentrations in the Porcupine caribou (MacDonald et al., 2007 except for

the last two data points which are from this study).

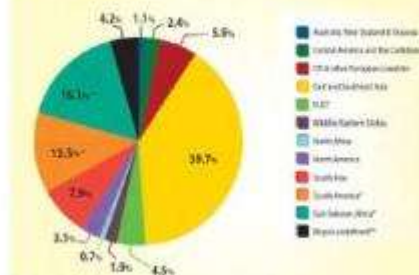
Health Assessment

CARIBOU	Kidneys	Livers	Meat
Porcupine	24	12	All You Want

9

Why do we continue to monitor caribou?

Regional mercury emissions in 2010



Asia and North America are the two largest contributors to mercury emissions in 2010. Asia and North America are the two largest contributors to mercury emissions in 2010.

10

What do we know about mercury in caribou?

- In the fall, mercury is higher in cows than in bulls
- In the spring, mercury may be lower in cows than in bulls
- Mercury is generally higher in spring caribou than fall
- Mushrooms may provide a pulse of mercury in the fall

11

Why do mercury levels fluctuate over years?

- Rain
- Snow
- Wind
- Temperature
- Migration patterns
- Time of green-up
- Industrial emissions
- Volcanoes
- Forest Fires

12

What Can We Do?

Monitoring Programs

Provide information on contaminants to individuals and communities

Provide evidence for Territorial, National and International legislation

13

International Legislation

Stockholm Convention

- 2004
- Limits production of persistent organic pollutants (DDT, PCBs)
- 179 countries signed
- 152 countries ratified

Minimata Convention

- 2013
- Limits emissions of mercury
- 128 countries signed
- 20 countries ratified
- Not ratified by

14

Thank You!

to
All the Hunters who
Contributed to this
Program!

15

Draft Table of Contents:
Dolphin & Union Caribou Joint Management Plan

PREFACE

ACCEPTANCE STATEMENT

ACKNOWLEDGMENTS

EXECUTIVE SUMMARY

1. INTRODUCTION
2. STRATEGY DEVELOPMENT
 - 2.1 Purpose and Guiding Principles of the Joint Management Plan
 - 2.2 Planning Partners
 - 2.3 Co-management Planning Process [Nunavut and ISR]
 - 2.4 Inuit Qaujimagatuqangit\Traditional Ecological Knowledge
3. BACKGROUND
 - 3.1 Historical Perspective
 - 3.2 Social Perspectives
 - 3.3 Use of the Herd
 - 3.3.1 Communities that harvest species
 - 3.3.2 History of Subsistence and Commercial Harvesting
 - 3.3.3 History of harvest management
4. SPECIES INFORMATION
 - 4.1 Species Status
 - 4.2 Species Description & Biology
 - 4.2.1 Life cycle and reproduction
 - 4.2.2 Natural mortality and survival
 - 4.2.3 Diet
 - 4.3 Population and Distribution
 - 4.4 Needs of the caribou
5. THREATS and LIMITING FACTORS
 - 5.1 Limiting Factors
 - 5.2 Description of threats
 - 5.2.1 List different threats:
 - 5.2.2 Threat #1....

- 5.2.3 Threat #2...etc
- 5.3 Factors that may have a positive influence
- 5.4 Knowledge Gaps
- 6. MANAGEMENT
 - 6.1 Management Goal
 - 6.2 Management Objectives (List)
 - 6.3 Current Management Actions
 - 6.4 Managing based on Herd Status (Level)
 - 6.5 Approaches to Achieve Objectives (Descriptions)
 - 6.6 Management Actions and Implementation Schedule (Table)
 - 6.7 Socioeconomic and Environmental Effects of Management
- 7. MEASURING PROGRESS
- 8. NEXT STEPS
- 9. REFERENCES




bDrLDJ „>`APcbC<ll'ac
Building | *Nunavut* Together
/Nunatiul iuqatigiingniq BAtir
le *Nunattu* ensemble

Nutigi

Background & Species Information

Lisa-Marie Lederc



Sections

- 3. Background
 - 3.1 Historical perspective
 - 3.2 Social perspective
 - History of subsistence and commercial harvesting
 - History of harvest management
- 4. Species information
 - 4.1 Species status
 - 4.2 Species description and biology
 - Life cycle and reproduction
 - Natural mortality and survival
 - Diet


3.1-2 Historical and social perspectives



- Since mankind has colonised the barren-land, his subsistence was based on caribou availability.
- Caribou:
 - At the based of the Northern Aboriginal Cultures
 - Has social and economical impacts.




3.3 Use of the herd



- 3.3.1 Communities that harvest the species
 - Dolphin and Union cross two jurisdictions
 - Winter: Paulatuk, Kugluktuk, Bay Chimo, Bathurst Inlet


3.3 Use of the herd



3.3.2 History of subsistence and commercial harvesting


- Availability in function of the herd distribution and movement.
- Up to 1994 , 289 tags was allocated for caribou commercial harvest in
- Inuvialuit Harvest study (88-97): 681 to 441
- Nunavut Harvest study: Kuelukuk 1..575 Cambridge Bay. R11. Bathurst
- Small Harvest Study 1January 1994- May 1995 and October 1995- June 1996.
- Kugluktuk : 90% of barren-ground caribou and 10% DIU

3.3 Use of the herd



3.3.3 History of harvest management

- No TAH set on the Dolphin and Union Caribou : harvest caribou to the full level of his or her economic, social, and cultural needs.



4. Species information

4.1 Species Status


NMWT - Special Concern (2013, 2015)

4.2 Species description and biology

Dolphin and Union caribou are intermediate in size and color between Peary caribou and Barren-ground caribou.

Dolphin and Union caribou is the most genetically differentiated of the barren-ground caribou (Zittlau, 2004) possibly due to genetic bottleneck.

They do not form well define calving ground, as its calving strategy is mainly individualist (Nagy et al., 2011).



NMWT - Special Concern (2013, 2015)

4. Species information

4.2.1 Life cycles and reproduction

- Calves at 3 years of age

4.2.2 Natural mortality and survival

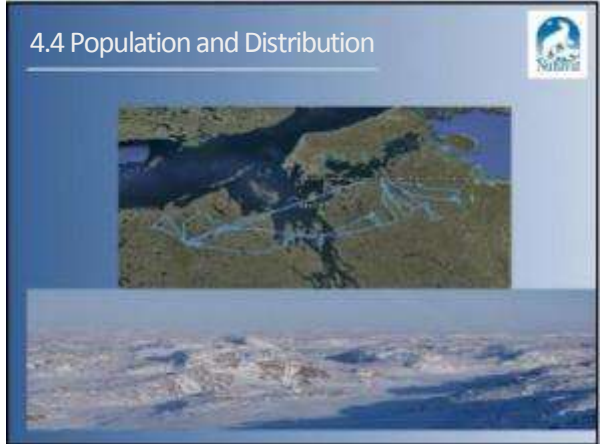
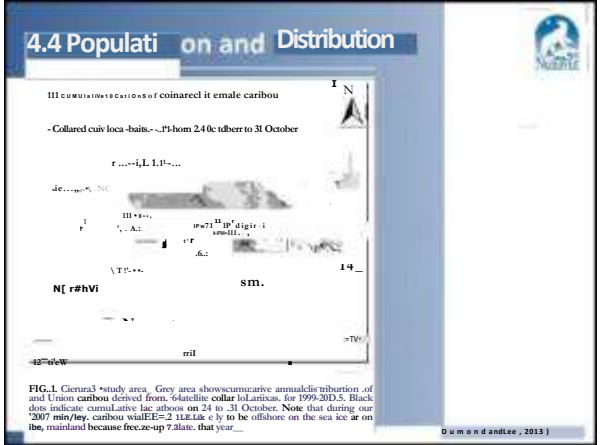
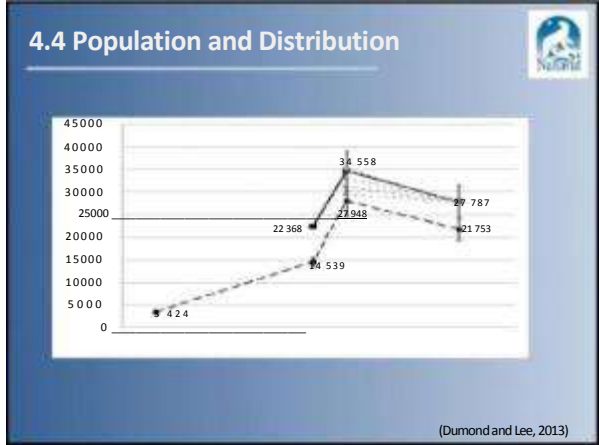
- Knowledge gaps

4.2.3 Diet

- Mid-tully grasses and green willows

4.3 Habitat Needs

- Victoria Island, Mainland, sea-ice



4.4 Population and Distribution

This slide features a map of Cambridge Bay, Nunavut, at the top. Below the map are two side-by-side photographs of caribou. The caribou on the left is lying down in a snowy field, while the one on the right is standing and facing right.

4.4 Population and Distribution

- Body condition was assessed according to CAR MA's Rangifer Health & Body Condition Monitoring Protocol Level II, section 3.
- The body index condition is scored to healthy caribou as health female caribou were targeted for this program. Healthy animal will have a better chance to resist disease, harsh winter conditions and predation and stay alive for the duration of the study.

The slide includes a bar chart on the left with the y-axis labeled 'Frequency of Body Condition Index' and the x-axis labeled 'Body Condition Index'. The chart shows three bars of increasing height. To the right of the chart is a photograph of a caribou standing in a snowy landscape.

2015 Survey

This slide shows an aerial photograph of a herd of caribou in a vast, flat, snowy landscape. The animals are scattered across the terrain, appearing as dark spots against the white snow.

2015 Survey

This slide displays a map titled 'Reconnaissance flights on October 27 (West of Cambridge Bay)'. The map shows the coastline of Cambridge Bay and surrounding areas. A legend in the bottom left corner lists various data series, including 'Disturbance Index (0-250)' and 'Wind Speed (0-10.0)'. The map includes a scale bar and a north arrow.

2015 Survey

This slide shows a map titled 'Map of final systematic reconnaissance flights on October 29 (East of Cambridge Bay) and October 31 (West of Cambridge Bay) and second'. The map displays the flight paths as lines across the terrain, with a legend on the right side. A scale bar and north arrow are also present.

2015 Survey

This slide shows a map titled 'Map of final systematic reconnaissance flights on October 29 (East of Cambridge Bay) and October 31 (West of Cambridge Bay) and second'. The map displays the flight paths as lines across the terrain, with a legend on the left side. A scale bar and north arrow are also present.

Dolphin and Union Caribou Management Plan Threats



Photo by Mathieu Dumond

Lisa Worthington

Environment & Natural Resources



Dolphin and Union Caribou

- Killiniq, Island,
- Arctic-Island,
- Mainland caribou,
- Tuktu, tuktu, tuttu
- caribou du troupeau
- Dolphin-et-Union
- *Rangifer tarandus groenlandicus x pearyi*



Photo by Kim Poole



Dolphin & Union Caribou Limiting Factors

Limiting Factors

- * Non-human factors that limit the abundance and
- * Make a species more vulnerable
- * Ea. age at first reproduction, prev abundance

Threats

- * Caused by human beings
- * Contribute to the population

Dolphin & Union Caribou Limiting Factors

- * Parasites and disease
- * Predation
 - Wolves, grizzly bears



Photo by Kim Poole

Dolphin & Union Caribou Threats

Climate Change

Warmer temperatures cause:

- * Later fall freeze-up and earlier spring thaw = longer staging time before migration.
- * Insect harassment
- * Warm weather = New parasites and diseases

***Impact on vegetation = increase in high quality forage



Photo by Kim Poole

Dolphin & Union Caribou Threats

Industrial Activities and other Human Disturbance

- * Tourism activities
- * Aircraft
- * Mining projects



Photo by Kim Poole

Dolphin & Union Caribou Threats

Presence of other species

- Muskox
- Geese
- Other herbivores (e.g. hare, lemmings)



Photo by Kim Poole

Dolphin & Union Caribou Threats

Harvesting beyond a self-sustaining level

- NWT: there is no mechanism to collect harvest data.
+
- Nunavut: harvest reporting is not mandatory.
=
- When a population declines, a consistent rate of harvest could become a threat.



Photo by Kim Poole

Dolphin & Union Caribou Threats

Other threats:

- Contaminants (includes impact of salt on habitat)



Photo by Kim Poole

DOLPHIN AND UNION CARIBOU MANAGEMENT FRAMEWORK

Outline of draft goal, objectives, approaches and actions Based on Group Discussion in Kugluktuk: March 25 – 27, 2015

MANAGEMENT GOAL/VISION:

The long term persistence of healthy Dolphin and Union caribou recognizing their cultural importance.

To support a healthy and viable population of Dolphin and Union Caribou that moves freely between mainland and Victoria Island, and offers harvesting opportunities for present and future generations.

OR:

To support a healthy and viable population of Dolphin and Union Caribou that moves freely between mainland and Victoria Island, that allows for human use of caribou and their habitat while respecting conservation concerns..

To keep Dolphin and Union caribou from becoming threatened or endangered.

OBJECTIVES:

These are five objectives for the management of Dolphin and Union caribou. These objectives apply broadly across the herd's range in NWT and Nunavut.

1. Adaptively co-manage Dolphin and Union caribou by using a grassroots, community-based approach and the best traditional, community, scientific and technical information available.
2. Communicate and exchange information on an ongoing basis between co-management partners, communities, industry and the public with regard to monitoring and managing Dolphin and Union caribou.
3. Collect information on Dolphin and Union caribou using TK and IQ, community monitoring and scientific methods to inform sound management decisions.
4. Promote minimal human disturbance to habitat (particularly sea-ice crossings) to maintain a healthy, migratory population of Dolphin and Union caribou.
5. Ensure management actions including harvest are based on herd status.

APPROACHES TO ACHIEVE THESE OBJECTIVES:

Recommended approaches (numbered as X.X.) are grouped on the following pages under each objective. More specific actions (numbered as X.X.X) are grouped below under each approach but will not be included in management plan (for implementation plan).

Objective #1:

Adaptively co-manage Dolphin and Union caribou by using a grassroots, community-based approach and the best traditional, community, scientific and technical information available.

- 1.1 Work with co-management partners, Aboriginal governments and organizations, local harvesting committees, and industry to share information and collaborate on management actions.
- 1.2 Co-ordinate research among different co-management partners and research institutions.
- 1.3 Assess and manage cumulative impacts on Dolphin and Union caribou population and habitat.

Objective #2:

Communicate and exchange information on an ongoing basis between co-management partners, communities, industry and the public with regard to monitoring and managing Dolphin and Union Caribou.

- 2.1 Encourage flow and exchange of information between parties, using various approaches, depending on group/demographic.

Objective #3:

Collect information on Dolphin and Union caribou using TK and IQ, community monitoring and scientific methods to inform sound management decisions.

- 3.1 Improve our understanding of Dolphin and Union caribou health, distribution, key habitat and population indicators, impacts of human activities, cumulative effects and relationships.
- 3.2 Monitor Dolphin and Union caribou population.

Objective #4:

Promote minimal human disturbance to habitat (particularly sea-ice crossings) to maintain a healthy, migratory population of Dolphin and Union caribou.

- 4.1 Monitor human and industrial disturbance.
- 4.2 Minimize human and industrial disturbance.
- 4.3 Monitor changes to habitat on an ongoing basis.
- 4.4 Work with all levels of governments to manage populations of other species that affect Dolphin and Union caribou habitat (e.g., overabundant geese).

Objective #5:

Ensure management actions including harvest are based on herd status.

Ensure long term harvest of Dolphin and Union caribou can be supported by the population.

- 5.1 Obtain accurate harvest data.
- 5.2 Access herd status based on information collected.
- 5.3 If necessary, manage harvesting activities within acceptable limits to ensure that harvesting opportunities are available in the future by respectfully harvesting today.

MORE DETAILS – List Actions

APPROACHES AND ACTIONS TO ACHIEVE THESE OBJECTIVES:

Objective #1:

Adaptively co-manage Dolphin and Union caribou by using a grassroots, community-based approach and the best traditional, community, scientific and technical information available.

- 1.1 Work with co-management partners, Aboriginal governments and organizations, local harvesting committees, and industry to share information and collaborate on management actions.
 - 1.1.1 Incorporate community and traditional knowledge and ensure that plans and actions for Dolphin and Union caribou management are informed by this knowledge.
 - 1.1.2 Continue to work with wildlife management advisory boards, game councils and local HTO/HTAs on Dolphin and Union caribou monitoring, stewardship and management.
 - 1.1.3 Work with industry on best practices and mitigation, monitoring and research.
 - 1.1.4 Continue engaging hunters, industry and public about Dolphin and Union caribou management.
 - 1.1.5 Annually review new information on demographics and habitat, and adapt management practices accordingly.
 - 1.1.6 If necessary, recommend alternative management actions (e.g., stricter habitat and/or harvest management) allowing for natural variation in numbers.
 - 1.1.7 Annually report on management actions and progress made toward meeting objectives in management plan.
- 1.2 Co-ordinate research among different co-management partners and research institutions.
 - 1.2.1 Identify knowledge gaps and establish high priority research questions.
 - 1.2.2 Co-ordinate research activities with different research institutions and promote high priority research.
 - 1.2.3 Ensure local involvement in research activities (planning, field research).

Objective #2:

Communicate and exchange information on an ongoing basis between co-management partners, communities, industry and the public with regard to monitoring and managing Dolphin and Union Caribou.

- 2.1 Encourage flow and exchange of information between parties, using various approaches, depending on group/demographic.
 - 2.1.1 Conduct “out on the land” trips, where experienced hunters (elders if they’re able) take youth out on the land.
 - 2.1.2 Use social media and the internet to reach out to youth.
 - 2.1.3 Conduct school visits to educate youth about managing Dolphin and Union caribou.
 - 2.1.4 Conduct community meetings to exchange information with communities about management of Dolphin and Union caribou.
 - 2.1.5 Investigate the potential of having industry contribute information to research and monitoring.
 - 2.1.6 Ensure ongoing communication between co-management partners and through supporting community monitoring programs.

Objective #3:

Collect information on Dolphin and Union caribou using TK and IQ, community monitoring and scientific methods to inform sound management decisions.

- 3.1 Improve our understanding of Dolphin and Union caribou health, distribution, key habitat, relationships and cumulative effects.
 - 3.1.1 Identify geographic areas of importance to Dolphin and Union Caribou through research and community/traditional knowledge.
 - 3.1.2 Monitor changes in predator abundance through community-based monitoring.
 - 3.1.3 Promote research on relationships between Dolphin and Union caribou and predators (including relatively new predators such as the grizzly bear on Victoria Island).
 - 3.1.4 Promote research on relationships between Dolphin and Union caribou and other species (e.g. other ungulates, geese).
 - 3.1.5 Promote research on Dolphin and Union caribou population, habitat, vital rates, and health and condition, including possible contaminants.
- 3.2 Monitor Dolphin and Union caribou population and periodically assess herd status.
 - 3.2.1 Expand community monitoring programs that provide information on Dolphin and Union caribou condition, population trends, and predators.
 - 3.2.2 Periodically estimate population size and trend.
 - 3.2.3 Assess herd status annually, based on framework.
- 3.3 Assess cumulative impacts on Dolphin and Union caribou population and habitat.
 - 1.3.1 Develop an approach to modelling cumulative effects.

Objective #4:

Promote minimal disturbance to habitat (particularly sea-ice crossings) to maintain a healthy, migratory population of Dolphin and Union caribou.

- 4.1 Monitor and minimize human and industrial disturbance.
 - 4.1.2 Develop guidelines, standard advice, and best practices for shipping, tourism and industry that can be regulated and evaluated;
 - 4.1.3 Identify organizations (e.g., HTOs and communities) who could/would play a lead role in promoting standard advice and guidelines for shipping, tourism and industry.
 - 4.1.4 Work with Transport Canada, tourism operators and other industry to regulate shipping and industry activities (e.g., establishing seasonal limitations for industry shipping and cruise ships during migration season and adjusting these in response to caribou status, if necessary).
 - 4.1.5 Develop guidelines for oil spill response related to caribou.

- 4.2 Monitor changes to habitat on an ongoing basis.
 - 4.2.1 Track human-caused landscape changes.
 - 4.2.2 Monitor industrial activity including shipping traffic.
 - 4.2.3 Track changes to sea ice and potential impacts to Dolphin and Union caribou.
 - 4.2.4 Monitor and evaluate compliance with (or implementation of) guidelines, standard advice, and best practices mentioned in 4.1.2.
 - 4.2.5 Work with communities to reduce release of contaminants through various venues (see 2.1.4).

- 4.3 Work with all levels of governments to manage populations of other species that affect Dolphin and Union caribou habitat (e.g., overabundant geese).
 - 4.3.1 Promote traditional harvesting of overabundant species through subsistence and sport hunts.
 - 4.3.2 Approach other governments to open hunting season earlier for geese.
 - 4.3.3 Promote collection of eggs within communities.

Objective #5:

Ensure management actions including harvest are based on herd status.

- 5.1 Obtain accurate harvest data.
 - 5.1.1. Educate people on the importance of reporting harvest.
 - 5.1.2. Work with local Hunters & Trappers Committees/Organizations and regional Wildlife Advisory Boards to collect accurate information on harvest levels.
 - 5.1.3. Report estimated total harvest levels, including the number harvested and the sex ratio, to caribou management authorities and co-management partners.

- 5.2 Assess herd status based on information collected.

- 5.3 If necessary, manage harvesting activities within acceptable limits to ensure that harvesting opportunities are available in the future by respectfully

harvesting today.

- 5.2.1. Investigate and consider defining *acceptable harvest* levels appropriate for different population size and trend in the herd.
- 5.2.2. Elders teach youth about wise harvesting practices that minimize negative impacts on caribou; includes no wasting of meat, harvesting only what is needed, proper marksmanship, ability to distinguish types of caribou; avoiding harvest of cows with calves.
- 5.2.3. Investigate the possibility of promoting alternative food sources through harvest of other species.
- 5.2.4. Annually review harvest levels and make management recommendations if necessary (e.g. temporary harvest limitations).

FOUR OPTIONS FOR DOLPHIN & UNION CARIBOU MANAGEMENT GOAL



1. The long term persistence of healthy Dolphin and Union caribou recognizing their cultural importance.
2. To support a healthy and viable population of Dolphin and Union Caribou that moves freely between mainland and Victoria Island, and offers harvesting opportunities for present and future generations.
3. To support a healthy and viable population of Dolphin and Union Caribou that moves freely between the mainland and Victoria Island, and allows for human use of caribou and their habitat while respecting conservation concerns.
4. To keep Dolphin and Union caribou from becoming threatened or endangered.

From the Bluenose Management Plan

9.2 When Do We Take Action

Our actions to help the caribou herds will be determined in part by the herd size, and whether it is increasing or decreasing. Management decisions will also be influenced by other information from harvesters and scientists such as recruitment, bull-to-cow ratio, body condition and health.

In this Management Plan there are four levels of herd status and management actions. These are colour-coded yellow, green, orange, and red.¹⁴ Management actions are based on defined phases of the population cycle. The herd status provides a trigger for specific management actions.

-  **Yellow:** The population level is intermediate and increasing
-  **Green:** The population level is high

- Orange:** The population level is intermediate and decreasing
- Red:** The population level is low

A representation of these thresholds is provided with corresponding colours in **Figure 8**.

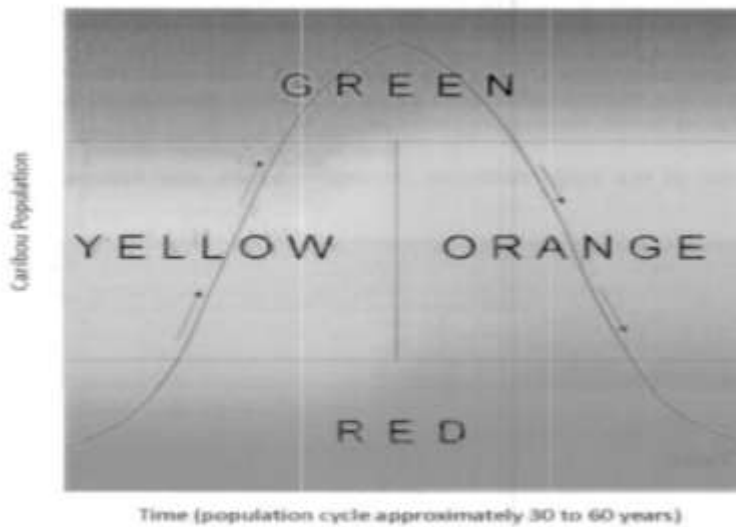


Figure 8: Caribou population status as colour zones.

Thresholds to help guide management actions were determined with input received from community and technical experts in a consensus-based process (**Table 2**). ACCWM members combined available science (historical high and low populations) with traditional knowledge and experience. Slight differences in thresholds between herds reflect the results from community engagements. The historic high, as measured by surveys, for each of the three herds, and the change over time, are shown in **Figures 4-6** of this report and described in more detail in the **Scientific Report**. Sufficient information was not available from results of modelling simulations to help set thresholds. However, this could be a helpful tool to provide further evaluation or adjustments in future planning. In addition, ENR has recently developed a “Rule of Thumb Approach” that describes a framework for barren-ground caribou harvest recommendations based on herd risk status. This approach relies on indicators – such as population size and trend – to help estimate the potential risk to a herd under different management scenarios; it is included with the **Scientific Report**.

The thresholds in **Table 2** are approximate and will be used to help guide management decisions and actions based on herd status. As explained earlier, estimated herd size is not the only indicator used to set a herd status into one of the four colour zones. Herd status decisions will use estimates of the overall number of caribou, whether a herd is growing in size or is declining (trend), and other monitoring indicators to assist in interpretation. In practise this means that although an estimate for a herd may cross or be very near a threshold, the determination of herd status will take into account all available information – it is not only the threshold value that is used to determine the colour zone. For example, a recommendation could be made to set a herd in a colour zone before a population estimate reaches a threshold value, or a decision could be made to keep a herd in a colour zone despite an estimate placing it just outside the threshold, if this is the best action based on all indicators considered together and according to the principles stated in this Management Plan.

Table 2: Thresholds for the status of the Cape Bathurst, Bluenose-West, and Bluenose-East Caribou Herds.

HERD	Historic High As measured by surveys	Threshold Between green & yellow/orange	Threshold Between red & yellow/orange
Cape Bathurst Herd	12,000	12,000	4,000
Bluenose West Herd	56,000	56,000	15,000
Bluenose East Herd	60,000	60,000	20,000

Table 3: Summary of management actions.¹⁶

Management Actions Based on Herd Status/Colour Zone				
Management Action	The population level is intermediate and increasing	The population level is high	The population level is intermediate and decreasing	The population level is low
Education	<p>Recommend education programs for all status levels. Ideas for educational themes include:</p> <ul style="list-style-type: none"> • Promoting total use of harvested caribou, and proper butchering and storage methods; • Limiting wounding loss; • Letting the leaders pass; • Promoting community hunts with experienced hunters; • Use of alternate species; and • Increased sharing of traditional foods. 			
Habitat	<ul style="list-style-type: none"> • Identify and recommend protection for key habitat areas; • Review results of monitoring, including cumulative effects, to ensure enough habitat is available and caribou are able to move between areas of good habitat; • Recommend important habitat as a 'value at risk' for forest fire management. 			
Land use activities	<ul style="list-style-type: none"> • Review results of cumulative effects monitoring programs; • Provide advice on mitigation of industrial impacts to proponents and regulators. 	<ul style="list-style-type: none"> • Review results of cumulative effects monitoring programs; • Provide advice on mitigation of the impacts of exploration and development activities to proponents and regulators. 	<ul style="list-style-type: none"> • Review results of cumulative effects monitoring programs; • Provide advice on mitigation of industrial impacts to proponents and regulators; • Provide active and accessible communication and recommend education programs for all including proponents and airlines; • Recommend increased enforcement of land use regulations, including community monitors. 	<ul style="list-style-type: none"> • Work directly with proponents and regulators of exploration and development activities to advise on mitigation measures; • Review results of cumulative effects monitoring programs; • Provide active and accessible communication and recommend education programs for all including proponents and airlines; • Recommend increased enforcement of land use regulations, including community monitors.

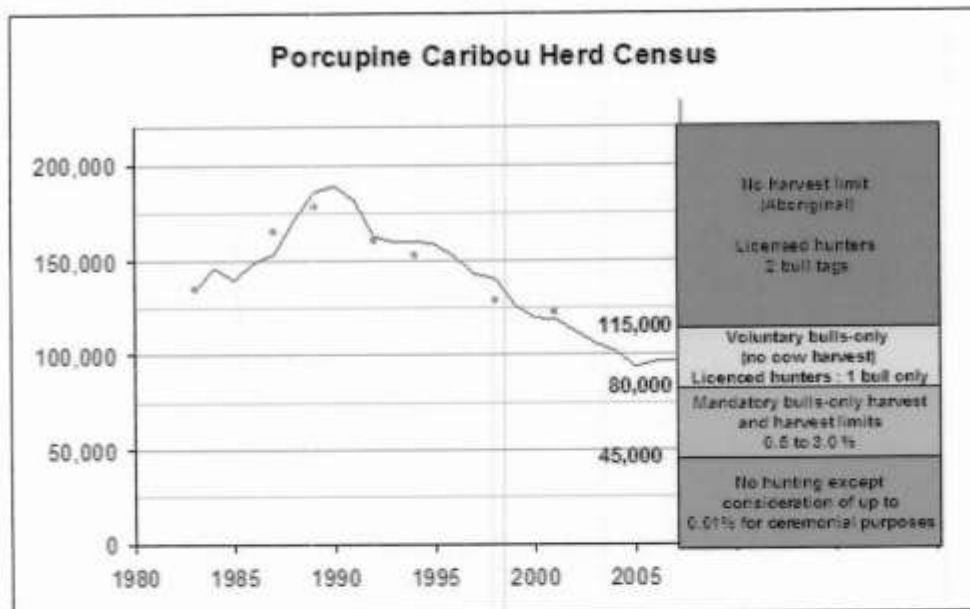
¹⁶ These management actions are in addition to the research and monitoring actions described in section 8.0 and summarized in Table 1.

Management Actions Based on Herd Status/Colour Zone				
Management Action	The population level is intermediate and increasing	The population level is high	The population level is intermediate and decreasing	The population level is low
Predators	<ul style="list-style-type: none"> Continue research programs to monitor predator condition (e.g., carcass collection and community monitoring programs). 	<ul style="list-style-type: none"> Continue research programs to monitor predator condition (e.g., carcass collection and community monitoring programs). 	<ul style="list-style-type: none"> Review results of research programs that monitor predator abundance and predation rates; Consider recommending options for predator management. 	<ul style="list-style-type: none"> Review results of research programs that monitor predator abundance and predation rates; Consider recommending options for predator management.
Harvest	<ul style="list-style-type: none"> Recommend easing limits on subsistence and then resident harvests ; Consider recommending outfitter and commercial harvests at discretion of the ACCWM. 	<ul style="list-style-type: none"> Support harvest by beneficiaries of a Land Claim and members of an Aboriginal people, with rights to harvest wildlife in the Region; Recommend that if subsistence needs are met resident harvest should be permitted (with limits); Potentially recommend resident (non-beneficiary), non-resident, sport hunts, and/or commercial harvests. 	<ul style="list-style-type: none"> Recommend a mandatory limit on subsistence harvest based on a TAH accepted by the ACCWM; Prioritize the collection of harvest information; Recommend no resident, outfitter or commercial harvest; Recommend a majority-bulls harvest, emphasizing younger and smaller bulls and not the large breeders and leaders; Recommend harvest of alternate species and encourage increased sharing, trade and barter of traditional foods, such as the use of community freezers; Recommend increased enforcement including community monitors. 	<ul style="list-style-type: none"> Recommend harvest of alternate species and meat replacement programs, and encourage increased sharing, trade and barter of traditional foods; Prioritize the collection of harvest information; Review of mandatory limit for subsistence harvest for further reduction; Recommend increased enforcement including community monitors; Resident, commercial, or outfitter harvest remain closed.

B. Colour Chart

At the Inuvik workshop it was agreed to use a colour chart for showing what the harvest should be in relation to how big the herd is. Such colour charts are already used for fire management and salmon management, and so many people understand what they mean and how to use them.

Harvest Management Colour Chart



Red dots are estimates of the number of caribou from counts during the photocensus.

Blue line is the trend in population size predicted by the Caribou Calculator using available data each year.

All hunters in all colour zones must report their harvest at all times. Rigorous and verifiable harvest monitoring will be an important information source for ongoing herd management.

Green 'Take what you need' — This means no aboriginal harvest restrictions; in other words, nothing special would be done, and people could hunt for what they need. Of course, respect for the caribou would always be emphasized. Licensed hunters would receive a maximum of two bull tags.

Yellow 'Voluntary Bulls only' — Bulls-only harvest, with the understanding that the goal is to have no cows harvested — governments will use tools like education initiatives, legislation, regulations, and/or bylaws to work cooperatively to achieve this 100% bulls-only target. Licensed hunter harvest would be reduced to one bull tag. The Parties are committed to achieving 100% bulls-only harvest. If this target is not effectively met, the Parties will commit to review the measures, including the potential application of a mandatory bulls-only harvest.

Orange 'Mandatory bulls only and harvest limits' — This means that the Parties would take steps to ensure hunters took only bulls and the total harvest and the related sub-allocations are collectively within the annual allowable harvest.

Red 'No hunting' — This means all hunting would cease except for the opportunity of a very small (0.0%-0.1%) bull-only subsistence-ceremonial aboriginal harvest.

Herd Management

The Management Plan recommends three approaches to overall monitoring and management of the population that accounts for natural long term population fluctuations (Table 3).

Level – 1: Core Management (Stable or increasing trend/high population)

Level 1 core management actions apply at all times during the population cycle and represents the minimum level of population management activities that need to be conducted. Core management actions are used to detect a decline in productivity and abundance.

Level – 2: Enhanced Management (Declining trend)

Level 2 is implemented when there is an indication that the population is declining. The management actions are designed to detect changes at a finer scale. At this level a total allowable harvest may have to be applied and/or modified.

Level – 3: Critical Threshold Management (Population level below Basic Needs Level)

Level 3 is implemented when there are not enough caribou to meet the basic needs level. Management actions for level 3 will remain the same for those at level 2, but would involve more intensive harvest management. At this level it is expected that non-quota limitations will be introduced and a Total Allowable Harvest will have to be set below the Basic Needs Level.

A → High/Stable

- > ^{**1} Education - youth
(including other wildlife)
- > Encourage harvest of Predators
(\$\$ + Education)
- > No Harvest Restrictions
on Beneficiaries

- > Harvest Monitoring
(Community Based monitoring)
- > Community Based
Mgm
 - Commercial - Meat Plant
 - Sport hunting
 - Resident hunting
 - Community (commercial) harvest
- > Consider other
harvest
based on community
land claim

Declining

- > increase ^{Prioritize} monitoring
(+ sharing of information)
↳ ex: Sample Kits
- Positive > Harvest Management
↳ limiting / ^{None-quota limitations} Male only +
- > Consider ending "other" harvest
(commercial)
- > Restricting Industry
(activities)
- ↑ > Education - elders → youth
(*include high education)
> alternative wildlife ^(cross youth handling)
> Trapper training to encourage ^{handling} harvest
predators.
- > Bring Communities / Agencies together
(collaboration)

Low
(even begining of increase)

> monitoring → Prioritize

> surveys

> harvest?

> TAH (season?)

> harvest of alternative herds/
wildlife

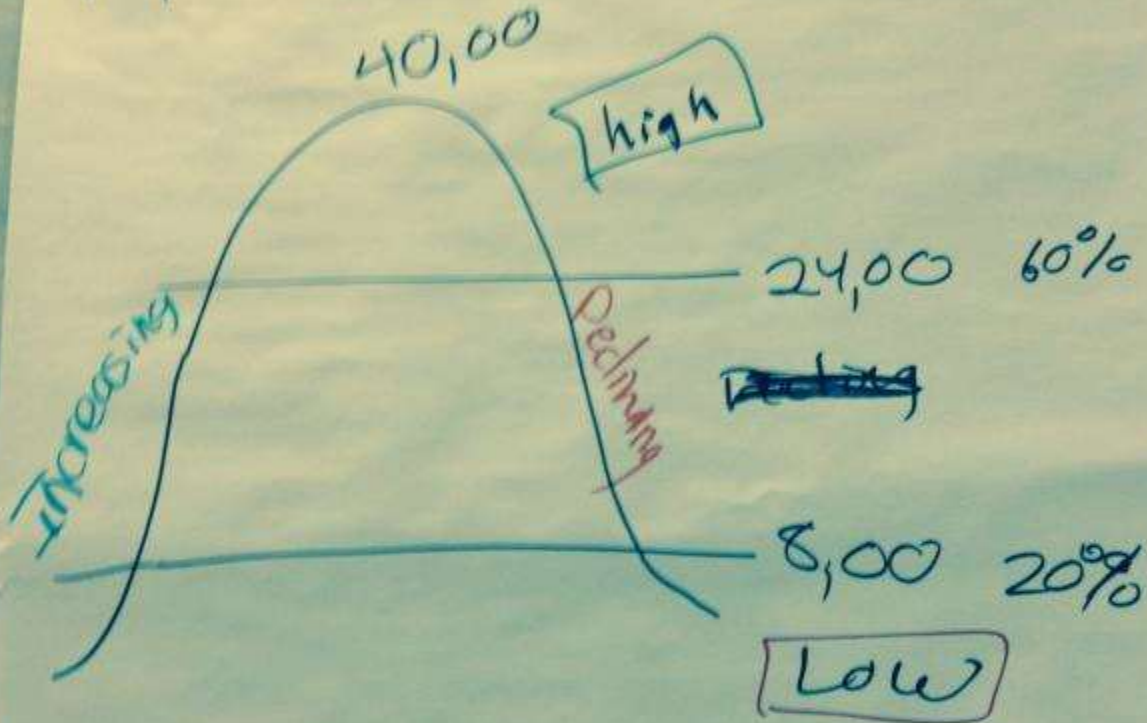
> Education

> why ~~TAH~~ TAH

Increasing

- > Consider lifting restrictions off Industry
- > Consider lifting Restrictions on Harvest
- > Education
- > "Baseline" monitoring (lower priority but some needed)

Population



Other indicators:

- > climate change - insects - ~~range~~
- > health/disease carrier

> recruitment

- > Distribution/migration Δ s
- > other species?