



**Tłıchǫ Government**

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**Northwest Territories Environment and Natural Resources**

Mr. Jonas Lafferty  
Interim Chair  
Wek'èezhli Renewable Resources Board  
4504 49<sup>TH</sup> AVENUE  
YELLOWKNIFE NT X1A 1A7

DEC 15 2015

Dear Mr. Lafferty

**Re: Joint Management Proposal for Bathurst Caribou**

The Tłıchǫ Government (TG) and Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT) would like to submit to the Wek'èezhli Renewable Resources Board (WRRB) a management proposal for the period of November 2016 to November 2019 for the Bathurst herd. The proposal is updated from the version sent to WRRB on November 22, 2015 and reflects suggestions made by WRRB in a letter on November 27, 2015.

We look forward to hearing from the WRRB on our proposal and about a hearing in 2016 on these caribou management and monitoring actions.

Sincerely,

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Department of Culture and Lands  
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Grand Chief Edward Erasmus, TG  
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Chief Johnny Arrowmaker, Wekweèti, TG  
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Ms. Laura Duncan, Tłıchq Executive Officer, TG  
Mr. Sjoerd van der Wielen, Lands Protection Manager, TG  
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Mr. Eugene Pascal, Chair, GRRB  
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Mr. Patrick Gruben, Chairperson, Inuvialuit Game Council (IGC)  
Mr. Steve Baryluk, IGC  
Chief Allan Adam, Athabasca Chipewyan First Nation  
Chief Herb Norwegian, Dehcho First Nations

**Chief Joachim Bonnetrouge, Deh Gah Got'ie Dene Council**

**Chief Louis Balsille, Deninu K'ue First Nation**

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**Chief Steve Courtoreille, Mikisew Cree First Nation**

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**Chief Tim Lennie, Pehdzeh Ki First Nation**

**Chief Dolphus Jumbo, Sambaa K'e Dene Band**

**Chief Courtney Cayen, West Point First Nation**

**Chief Roy Fabian, Katl'odeeche First Nation**

**Chief Frieda Martselos, Salt River First Nation**

**Chief Andrew Wandering Spirit, Smith's Landing First Nation**

**Mr. Clifford McLeod, President, Fort Providence Metis Council**

**Mr. Bill Enge, President, North Slave Metis Alliance**

**Mr. Ron Robillard, Director, Athabasca Denesuline Nene Land Corporation**

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**Mr. Benjamin Denecheze, Chief Negotiator  
Manitoba Denesuline, Northlands First Nation Land Claims Office**

**Mr. Peter Thorassie Jr, Chief Negotiator  
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**Mr. Fred Fraser, President, Fort Chipewyan Metis Local 125**

**Ms. Annie Boucher, Executive Director, Akaitcho Territory Government**

**Mr. Don Balsillie, Chief Negotiator, Akaitcho Treaty 8 Tribal Corporation**

**Mr. Gary Bailey, President, Northwest Territory Metis Nation**

**Mr. Clem Paul, President, Mountain Island Metis**

**Chief Edward Sangris, Dettah, Yellowknives Dene First Nation (YKDFN)**

**Chief Ernest Betsina, N'dilo, YKDFN**

**Chief Felix Lockhart, Lutsel K'e Dene First Nation**

**Mr. Gary Bohnet, Principal Secretary, Office of the Premier**

**Ms. Lynda Yonge, Director of Wildlife, ENR**

**Mr. Wilfred Hooka-nooza, Executive Director, Dene Tha First Nation**

**Mr. Ben Kovic, Chairperson, Nunavut Wildlife Management Board**

**Ms. Cathy Towtongle, President, Nunavut Tungavik Inc.**

**Mr. Gabriel Nirlungayuk, Deputy Minister  
Department of Environment Government of Nunavut (GN)**

**Mr. Dirkus Gissing, Director of Wildlife, Department of Environment, GN**

**Mr. Mathieu Dumond, Manager of Wildlife, Department of Environment, GN**

# Wek'èezhìi Renewable Resource Board Management Proposal

<b>1. Applicant Information</b>	
<b>Project Title:</b> Government of the Northwest Territories and Tłıchǫ Government Joint Proposal on Caribou Management Actions for the Bathurst herd: 2016-2019	
<b>Contact Persons:</b> <b>Organization Names:</b> <b>Addresses:</b> <b>Phone/Fax Numbers:</b> <b>Email addresses:</b>  <div style="margin-top: 10px;">           Sjoerd van der Wielen            Manager, Lands Section            Department of Culture and Lands Protection            Tłıchǫ Government            BEHCHOKQ, NT X0E 0Y0            Phone: 867-392-6381            Fax: 867-392-6406  <a href="mailto:SjoerdvanderWielen@tlicho.com">SjoerdvanderWielen@tlicho.com</a> </div> <div style="margin-top: 10px;">           Fred Mandeville Jr.            North Slave Regional Superintendent            Department of Environment &amp; Natural Resources            Government of the Northwest Territories            YELLOWKNIFE, NT X1A 2P9            Phone: 867-873-7019            Fax: 867-873-6263  <a href="mailto:fred_j_mandeville@gov.nt.ca">fred_j_mandeville@gov.nt.ca</a> </div>	
<b>2. Management Proposal Summary: provide a summary description of your management proposal (350 words or less).</b>	
<b>Start Date:</b> November 1, 2016	<b>Projected End Date:</b> November 1, 2019
<b>Length:</b> 3 years	<b>Project Year:</b> 1 of 3
<p>This management proposal carries forward recommendations that arose from the “Revised Joint Proposal on Caribou Management Actions in Wek’èezhìi”, which was submitted to the Wek’èezhìi Renewable Resources Board (WRRB) in May 2010 by the Tłıchǫ Government (TG) and the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT). Overall, the main objective in the 2010 proposal, which was to halt the Bathurst barren-ground caribou herd’s rapid decline from 2006-2009, appeared to be achieved when the herd’s numbers approximately stabilized between 2009 and 2012. However, the June 2015 calving ground photographic survey showed that the herd had declined substantially since 2012. This proposal is meant to apply from November 2016 to November 2019; the next population estimate is expected in 2018 and a new management proposal may be needed thereafter. Management actions will be evaluated annually and will be adapted as new information becomes available.</p> <p>The goal of the actions presented in this proposal is to reverse the Bathurst herd’s decline</p>	

and promote an increase in the number of breeding females in the herd, over the period of November 2016-November 2019. Management actions will focus on improving adult female survival through continued harvest management and by implementing a community-based wolf harvest program to reduce caribou mortality on the Bathurst winter range. Increased wolf harvest on the Bathurst range will also be promoted via collaborative programs with other Aboriginal governments. Biological monitoring of the herd will continue similarly to monitoring done between 2010 and 2015, and the number of caribou collars will be updated annually to maintain 30 collars on cows and 20 collars on bulls for a total of 50 collared animals. Additional monitoring may be considered depending on resources available.

This proposal has three main components carried forward from the previous joint proposal in May 2010:

- 1) Hunter harvest: TG and ENR recommend closing all harvest of Bathurst caribou until the next photographic survey scheduled for June 2018. This recommendation would be reviewed annually and revised based on any new information. The mobile Bathurst conservation zone, within which no caribou can be harvested, would be continued in 2015-2016. TG and ENR will explore further options for management and monitoring of Bathurst caribou harvest, including the creation of sub-zones developed in collaboration with Aboriginal groups, where harvest could be managed depending on distribution of collared caribou. Additional effort will be needed in promoting respect for caribou, which includes hunter education on sound hunting practices including limiting wounding losses and wastage, reliable harvest reporting and increased public education on the status and management of caribou herds.
- 2) Predator management: Management efforts to increase the annual harvest of wolves on the winter range of the Bathurst herd to 80-100 per year have had limited success. TG and ENR recommend that a wolf management approach be developed with Tłıchǫ hunters and communities. Mobile wolf-hunter camps will be established in early or late winter, with the objective of removing wolves from the Bathurst range. Resident and specialized wolf hunters will also be allowed to access incentives for prime wolf pelts, and ENR will work with other Aboriginal groups to promote increased wolf harvest in the Bathurst range. ENR will lead a review of wolf monitoring methods in the NWT and carry out a feasibility assessment of predator management options to increase caribou survival rates.
- 3) Monitoring: Biological monitoring of the Bathurst herd proposed for 2016-2019 would continue and enhance the program of surveys and satellite radio-collars established in the 2010 joint management proposal, and include the following components:
  - calving ground photographic surveys (June) every 3 years (next survey in 2018) to estimate abundance of breeding females and herd size,
  - annual calving ground reconnaissance surveys (June) to estimate relative abundance of cows,
  - fall composition surveys (October) every 2-3 years to estimate sex ratio and summer calf survival; and
  - annual late winter composition surveys (March-April) to estimate calf survival and recruitment.

Increased monitoring of the herd (e.g. annual fall composition surveys, annual composition surveys on the calving grounds, annual assessments of pregnancy rate from fecal collections on the late-winter range, assessments of wolf numbers on the winter range, and annual assessments of environmental indicators that may affect caribou condition and feeding conditions) will be considered if resources are available.

Up to 50 satellite radio-collars would be maintained on the herd (30 on cows and 20 on bulls), with annual additions to replace collars on caribou that die or collars reaching the end of their battery life. Additional collars may be considered if resources are available.

Monitoring of the Bathurst mobile conservation zone would be carried out by regular aerial fixed-wing flights and ground patrols by wildlife officers.

ENR and TG will support research that increases understanding of drivers of change in caribou abundance. TG and ENR support increased community-based monitoring by monitors from the Tłıchǫ communities.

Please list all permits required to conduct proposal.

NWT and Nunavut (NU) Wildlife Research Permits will be required annually to conduct monitoring recommended in this proposal.

The WRRB may hold a hearing to review management of Bathurst caribou, including a Total Allowable Harvest.

### 3. Background (Provide information on the affected wildlife species and management issue)

#### A. Bathurst caribou status in 2015

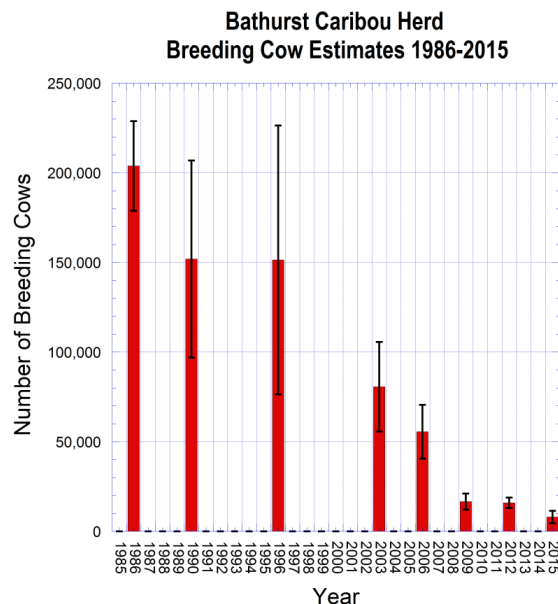


Fig. 1. Estimates of breeding females in the Bathurst herd 1986-2015 based on calving ground photographic surveys.

The June 2015 calving ground photographic survey resulted in an estimate of  $8,075 \pm 3,467$  (95% CI) breeding females and an overall herd estimate of  $19,769 \pm 7,420$  caribou in the Bathurst herd (Boulanger 2015). This result showed that the herd has continued to decline in recent years, and is consistent with a June 2014 reconnaissance survey that suggested that there was a continued decline in breeding females. Fig. 1 shows the estimated numbers of breeding cows in the Bathurst herd from 1986 to 2015, all derived using the same calving ground photographic survey method. From 1986 to 2015 the estimated abundance of breeding females declined on average by 11% per year. The observed rate of change between 2003 to 2009 showed that breeding cows had declined by ~26% per year. In response, the TG and ENR

developed and implemented the 2010 revised joint management proposal. Subsequent calving ground surveys showed that the trend of breeding females appeared to be close to stable from 2009 to 2012. However the 2015 calving ground survey indicated that breeding females had declined at a rate of about 23% per year since 2012.

Other demographic indicators for the Bathurst herd are consistent with a declining trend between 2012 and 2015 (ENR 2014a):

- late-winter calf:cow ratios have averaged below 30 calves:100 cows (ratios of 30-40 calves: 100 cows or more are associated with stable herds);
- estimated cow survival has been well below the 80% needed for a stable herd; and
- there is evidence of low pregnancy rate in at least some years, including winter 2014-2015.

It is also important to note that only 61% of the caribou observed on the Bathurst calving ground in June 2015 were breeding females; generally this proportion is expected to be around 80% or higher at the peak of calving, as in 2009 (84%) and 2012 (82%); (J. Boulanger pers. comm. 2015). Demographic monitoring of the Bathurst and Bluenose-East (BNE) herds was summarized by ENR in late 2014 (ENR 2014a), with more detailed survey and population modeling reports listed in that summary. A detailed survey report for the Bathurst herd in 2015 will be available early in 2016.

## **B. Management context and scope of current proposal for the Bathurst herd in 2015**

### Overall Management Process

The Tłıchq Agreement has a requirement for the WRRB, TG, GNWT, and Canada to develop an overall long-term management planning process for the herd. This process is to be developed with those parties that have jurisdiction over any part of the Bathurst range and with Aboriginal peoples who traditionally harvest the herd. Organizational meetings to define this long-term process began in 2012 and work continues to develop a comprehensive approach to managing the Bathurst herd. TG and ENR are committed to continued collaboration with the WRRB and other partners in developing a comprehensive management process, which may include a Bathurst caribou management board. Short term proposals such as the current one may include provisions for the monitoring and management of harvest and predators, as well as for management of development activities, caribou habitat, and other factors affecting caribou. This proposal is not intended to pre-empt any part of the comprehensive planning process for the Bathurst herd.

### Range planning and Environmental Assessment processes for the Bathurst herd

In recognition of the importance of habitat conservation and management, and in light of the scale of current and proposed development on the Bathurst herd's annual range, work to develop a range plan for the Bathurst herd was initiated by ENR in 2013. The range plan will provide guidance on how to monitor, assess and manage cumulative effects of human disturbance on the historic range of the Bathurst herd. Among the information layers gathered for this plan are collar and survey-based knowledge of the herd's seasonal and annual ranges, Traditional Knowledge from NWT and NU on use of caribou ranges and water crossings, and locations of all existing and proposed roads, mines and mineral leases. This plan is being developed through a multi-partner collaborative process that will eventually need to be included under the comprehensive management process required by the Tłıchq Agreement.

ENR and TG have engaged in all recent Environmental Assessment (EA) processes within the Bathurst range in the NWT (e.g. Gahcho Kue and the Jay extension associated with Ekati), to



ensure that possible effects on the Bathurst herd are duly considered and mitigated where possible. ENR and TG have also engaged in EA processes in Nunavut for projects that could affect the Bathurst herd's calving grounds and summer range (e.g. Sabina). ENR participated in a workshop June 2015 in Iqaluit on the draft Nunavut Land Use Plan and supported Government of Nunavut (GN)'s position opposing development on all caribou calving grounds in NU, and participated in a workshop in November 2015 in Iqaluit hosted by the Nunavut Wildlife Management Board (NWMB) focused on protection of caribou habitat in NU.

#### Joint Management Proposals and WRRB recommendations 2009-2015

An initial joint management proposal for Bathurst caribou was submitted to the WRRB by TG and ENR in November 2009. While TG and ENR agreed on most of the management and monitoring actions described in the proposal, they did not agree on the management of Aboriginal harvest.

In December 2009 the Minister of ENR used emergency measures to close all harvest of Bathurst caribou in the NWT (resident, commercial, and Aboriginal) in January 2010 in two large management zones (RBC02 and RBC03); these measures were to remain in place until review and recommendations from the WRRB in 2010.

A 5-day hearing was held by the WRRB in March 2010 on Bathurst caribou management. This hearing was adjourned after a request from TG and ENR for an adjournment to re-visit the issue of Aboriginal harvest from the Bathurst herd.

A revised joint proposal from TG and ENR on caribou management was submitted to the WRRB in May 2010. The main recommendation in the proposal was to establish an annual harvest target of  $300 \pm 10\%$  Bathurst caribou with a sex ratio of 80% bulls, with continued closure of resident and commercial harvest. The harvest target would be shared, with 150 caribou available to Tłıchq hunters and 150 for other Aboriginal users.

The WRRB held a second hearing in August 2010 and issued a report in October 2010 with 60 recommendations for management of Bathurst caribou and adjacent barren-ground caribou herds (Bluenose-East, Beverly/Ahiak; WRRB 2010). Those recommendations generally agreed with measures in the revised TG – ENR joint management proposal.

In October 2010, ENR signed an agreement with the Yellowknives Dene First Nation (YKDFN) that included tags or authorization cards for 150 Bathurst caribou, which included the same sex ratio of 80% bulls.

In spring 2013, WRRB recommended that short-term harvest of Bathurst caribou remain limited to 300 caribou and 80% bulls, and extended its 2010 recommendations for Bathurst caribou through the 2013-2014 hunting season.

In July 2014 an updated joint management proposal from TG and ENR was submitted to WRRB with recommendations to continue the Bathurst harvest target of 300 caribou and re-focus efforts to increase wolf harvest via Tłıchq winter camps. This proposal was put on hold when results of a June 2014 reconnaissance survey over the Bathurst calving grounds suggested a large further decline in caribou numbers.

In fall and early winter 2014, ENR hosted three meetings of Aboriginal leaders (August 27, November 7 and November 28) and two 2-day technical meetings (October 9-10 and October 22-23) to review evidence for decline in the Bathurst and BNE herds and to consider management actions to address these declines. Participants generally recognized the

seriousness of the situation but were unable to agree on a harvest recommendation for either herd.

In January 2015, ENR submitted to WRRB a proposal for interim management of Bathurst caribou through a Mobile Core Bathurst Caribou Conservation Area centered on locations of collared Bathurst caribou for winter 2014-2015. Within this mobile zone, no harvest would be allowed. In January 2015, WRRB accepted this proposal on an interim basis until June 2015.

#### Scope of the current joint TG-ENR management proposal

This joint proposal largely continues and builds on actions and monitoring developed in the 2010 joint TG-ENR proposal. The focus in 2010 was on key short-term monitoring and management needs, primarily resulting from the Bathurst herd's rapid decline to 2009. This 2015 proposal updates proposed actions in view of the herd's decline from 2012 to 2015. The timeframe for this proposal is 3 years (November 2016 to November 2019) with the understanding that management actions will be adapted as new information becomes available (e.g. changes observed in reconnaissance calving ground surveys scheduled for June of 2016 and 2017). A calving ground photographic survey planned for June 2018 may result in a new joint proposal in 2018, potentially leading to revised recommendations in 2019.

#### **4. Description of Proposed Management Action**

- **Describe the proposed management action, including implementation, location and Tłıchq Citizen involvement.**
- **What are the desired outcomes of the proposed management action?**
- **What, if any, outcomes may be incidental to the management action?**
- **What monitoring, if any, will be conducted to assess the effectiveness of the management action?**

#### **GOAL OF MANAGEMENT ACTIONS**

This proposal continues and enhances the management and monitoring recommendations for barren-ground caribou in Wek'ëezhii that were described in the May 2010 joint proposal. This proposal's overall goal for the next 3 years is to halt the Bathurst herd's decline and promote stabilization and recovery. Over the longer-term, the goal of management is to promote recovery of the herd so that sustainable harvesting that addresses community needs levels and the exercise of the Tłıchq right to harvest throughout Mqwhì Gogha Dè Nı̨łtłèè is again possible.

The sections that follow describe the three main elements of this proposal: (A) hunter harvest, (B) wolf harvest, and (C) monitoring.

#### **(A) HARVEST RECOMMENDATIONS FOR THE BATHURST CARIBOU HERD**

##### Recommended Harvest for the Bathurst Herd

In 2010, TG and ENR jointly recommended a harvest target of 300 Bathurst caribou (80% bulls), which represented a reduction in harvest of about 94% from a harvest estimated in 2008-2009 at about 5000/year, mostly cows (Adamczewski et al. 2009). At the time, a harvest of 300 was accepted as posing a limited risk of causing additional decline in the herd, although further decline (primarily due to other causes) was still possible. The harvest of 300 was to apply to two large management zones (R/BC/02 and R/BC/03) within which Bathurst caribou had generally wintered (Figure 2). These zones were generally effective at limiting Bathurst harvest, but in

some winters (e.g. 2013) Bathurst collared cows were found west and east of these 2 zones and may have experienced additional harvest pressure in those areas (ENR 2014a).

In this proposal, TG and ENR recommend that Aboriginal harvest of Bathurst caribou be reduced to 0, subject to annual review and as further information becomes available. Resident and commercial harvest would remain closed. The main reasons for recommending a 0 harvest are as follows:

- The herd has declined by 96% since 1986. Between 2012 and 2015, the herd declined rapidly from about 35,000 to about 20,000 animals, and the abundance of breeding females declined by ~23% per year, which corresponds to a halving time of ~3 years. Key population indicators such as late-winter calf: cow ratios, estimated cow survival rate, and recent pregnancy rates are consistent with a declining trend, and further decline appears likely.
- Although a "red zone" population size, below which all harvest would be closed, has not been established or agreed to for the Bathurst herd, there is precedent for closing all harvest from caribou herds that have reached very low numbers:
- All harvest of the Cape Bathurst herd in the Inuvik region has been closed since 2007 due to very low numbers in 2006 at ~2,000 animals, after declining from peak numbers of ~19,000 in 2000. (Wildlife Management Advisory Council NWT recommendation, implemented by GNWT).
- The Harvest Management Plan for the Porcupine caribou herd which was finalized in 2010 has a "red zone" threshold at 45,000 caribou, below which harvest would be closed. Surveys indicate this herd has generally not exceeded 200,000 at peak abundance. In this case the red zone is at about 23% of peak numbers.
- A management plan developed by the Advisory Committee for Cooperation on Wildlife Management for the Cape Bathurst, Bluenose-West and BNE herds in 2014 (ACCWM 2014) similarly established "red zones" for these 3 herds, although the plan does not specifically call for complete harvest closure if the herds are below these thresholds. For these three herds, peak estimated numbers and the red zone thresholds are, respectively: Cape Bathurst peak 19,000 and red zone 4,000 (21.0% of peak); Bluenose-West peak 112,000 and red zone 15,000 (13.4% of peak); BNE peak 120,000 and red zone 20,000 (16.7% of peak).
- By comparison with other herds, the Bathurst herd is at about 4% of its largest observed herd size in 1986 and may decline further. Thus TG and ENR recommend that the Bathurst herd should not be harvested for the next 3 years until the next calving ground survey in 2018, with annual re-assessment based on review of new information about population status.

#### Bathurst Harvest Management for 2015-2016

For the upcoming 2015-2016 winter harvest season, TG and ENR recommend continuation of the Mobile Core Bathurst Caribou Conservation Area (MCBCCA) as used in winter 2014-2015 (Fig. 2 - below). The zone will be revised weekly based on the most recent collar locations (i.e., a minimum convex polygon with a smoothed 20km buffer) and related information from aerial surveys. Within this zone, no harvest will be permitted. Updated maps showing the location of the Bathurst mobile zone will be provided weekly on ENR's web-site and to TG and Tłıchǫ communities, and to other communities and band offices that have harvested Bathurst caribou in

the North Slave region.

### Nunavut Harvest of Bathurst caribou

Harvest of Bathurst caribou in Nunavut has in recent years been estimated at about 70 bulls annually taken under tags issued to the small community of Bathurst Inlet and used for late-summer sports hunts. ENR and Aboriginal governments in the NWT have expressed concern over this harvest to the GN and other NU authorities. ENR has no authority for wildlife management or caribou harvest in NU but has been in frequent communication with GN about management of trans-boundary herds. Collaboration between the GNWT and the GN on trans-boundary caribou herds has been extensive at a technical level for a number of years, including GN participation in 2015 BNE and Bathurst calving ground photographic surveys. Updates on survey results have been provided to GN as they have become available, along with information about the herd-wide Bathurst harvest closure proposed by TG and ENR. The GNWT has also been in contact with the GN at the minister's level on caribou management issues. An update provided by the GN in late November 2015 indicates that a hearing by NWMB is likely to occur in February or March 2016; Total Allowable Harvest for the Bathurst herd will be assessed at that time. The GN has been working with regional wildlife boards, communities and the NWMB on these caribou harvest issues; the process in NU includes a needs assessment and community consultation. ENR will remain in frequent contact with the GN on these issues and participate where possible in the NWMB process.

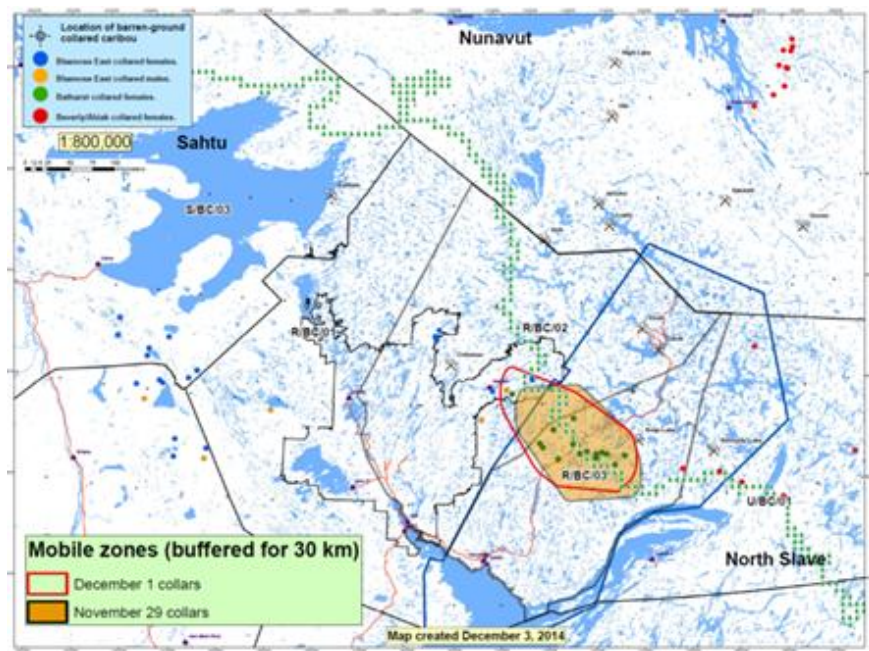


Fig. 2. An example of the mobile Bathurst conservation area (MCBCCA) centered on Bathurst caribou collar locations, winter 2014-2015. Zones RBC02 and RBC03 had previously been closed to harvest except for the harvest target of up to 300 caribou (80% bulls) 2010-2014.

### Bathurst Harvest Management for 2016-2017 to 2018-2019

TG proposed in a letter to WRRB (August 25, 2015) that an improved approach to managing harvest from the Bathurst and neighbouring herds could be a set of smaller sub-zones with fixed boundaries. An example of a set of sub-zones is provided in Fig. 3. (below). An advantage of sub-zones is that the boundaries would only need to be determined once and could be rivers, lake edges or other easily identified landscape features. A Bathurst no-harvest zone would be



TG and ENR agree that a sub-zone approach to management of caribou harvest has potential as an alternative to the mobile conservation zone, and will explore this approach over winter 2015-2016. Other alternatives or variations could also be considered. However, defining these zones, allowing for consultation and refinement, and turning the subzones into regulations cannot realistically be done in time for the winter 2015-2016 harvest season. The overall goal would be to define zones for the three herds that protect the Bathurst herd (based on collared caribou locations) and maintain harvest opportunities from the BNE and Beverly/Ahiak herds with the least limitation of hunting opportunities and a clear and easily understandable way of defining zone boundaries. As the sub-zones or modified harvesting zones would include areas used by other Aboriginal groups and areas to the east (towards Lutsel K'e) and north and west (Sahtú region), modified approaches to management of caribou harvesting zones would need to be reviewed with other communities, boards and Aboriginal organizations.

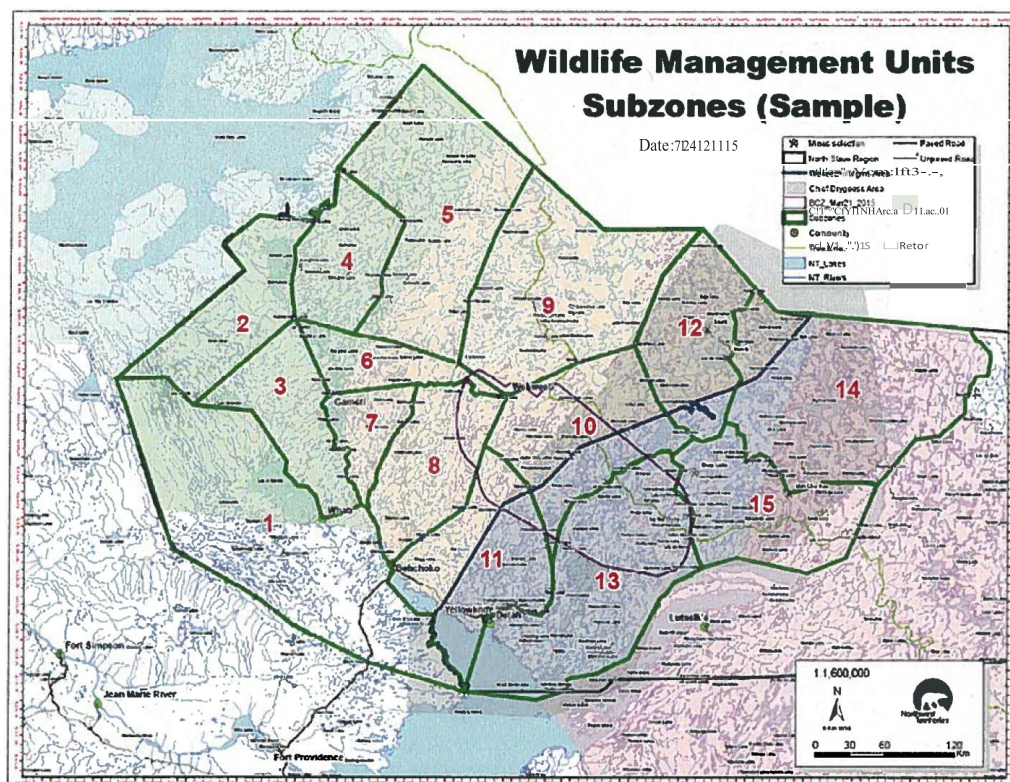


Fig. 3. An example of caribou management subzones that could be developed in the North Slave region (courtesy of TG letter to WRRB Aug. 25, 2015). An example of the Bathurst mobile zone from winter 2014-2015 is outlined in purple.

In winter 2015-2016, harvest management for the Bathurst and adjacent BNE and Beverly/Ahiak herds included a requirement for authorizations or tags for winter ranges occupied by the BNE and Beverly/Ahiak herds. A requirement for authorizations would continue in 2015-2016 to manage and monitor harvest, but the means used (authorizations, tags or a proxy) will be adapted as needed in collaboration with Aboriginal communities and boards.

## Monitoring of Bathurst Mobile Zone and Compliance

In winter 2014-2015 the Bathurst mobile zone was monitored regularly (sometimes weekly) until the end of the winter hunting season by aerial reconnaissance flights to increase knowledge of the herd's distribution and numbers, and to check for any activity (including hunting) on the winter roads to the mines. Wildlife officers also carried out ground-based patrols to ensure compliance with the no-harvest regime. Aerial and ground-based surveillance by ENR would continue throughout the winter harvest season in 2015-2016 and in future years.

#### Respecting the Caribou: Hunter Education

As part of harvest management for the Bathurst herd, ENR and TG suggest that an area where greater effort is needed is hunter education, with an emphasis on promoting traditional practices of using all parts of harvested caribou and minimizing wastage. Below are a few extracts from the consultation meetings that took place leading up to the Draft Bathurst Caribou Management Plan of 2004.

*"People do not do things without the caribou being aware of it. We depend on the caribou and so, when we will kill a caribou, we show respect to it. If we don't do that and we don't treat them really well, the caribou will know about it."* (Rosalie Drybones, Gameti. 1998).

- *"People should know how to think and talk respectfully about caribou."*
- *"People should respect caribou as gifts from the Creator."*
- *"All people should have knowledge of the caribou to respect caribou. This means knowing caribou behavior as well as how to think and talk about caribou."*
- *"Hunters should not be too particular when hunting caribou."*
- *"Caribou should not suffer in death."*
- *"Hunters must not boast about their harvest."*
- *"It is important to use all parts of the caribou and waste nothing."*
- *"People must care for the stored meat and discard bones and other unused parts in a manner that will not offend the caribou."*
- *"The relationship between the people and the caribou is based on mutual respect."*
- *"The rules about caribou respect are meant to be obeyed."*

Wastage is prohibited under the Northwest Territories Wildlife Act:

**57.** (1) Subject to the regulations, no person shall waste, destroy, abandon or allow to spoil

- (a) big game, other than bear, wolf, coyote or wolverine, or an upland game bird that is fit for human consumption; or
- (b) a raw pelt or raw hide of a fur-bearing animal or bear.

TG and ENR suggest the following education/public awareness initiatives to improve hunter practices and reduce wounding and wastage. Further detail is in Table 1:

- Continue to work with the communities, in particular, more closely with the school systems, on promoting Aboriginal laws and respecting wildlife, including how to prevent wastage;
- Invite elders to work with the youth to teach traditional hunting practices and proper meat preparation; and
- Posters, pamphlets, media and road signs will be used to better inform the public about respecting wildlife, traditional hunting practices, wastage, poaching and promoting bull harvest.

Table 1: Approaches and Objectives for Increased Education and Awareness

General Approach	Description & Objective	Lead (Support)
Public hearings	A public hearing on wildlife management actions for BNE herd in 2016	WRRB & SRRB (TG, ENR)
Community meetings	1 meeting per year in each Tłıchq community to discuss and update wildlife management issues and actions	TG (ENR)
Radio programs	When needed radio announcements, interviews and/or updates on wildlife management in Tłıchq language during winter hunting season over next 3 years	TG & ENR
Sight-in-rifle programs	Conduct community-based conservation education programs with an objective of 1 workshop / Tłıchq community / hunting season for next 3 years	ENR (TG)
Outreach through internet and social media	Regular updates (10 updates per season) on government websites and social media during fall and winter hunting seasons (Facebook & Tłıchq website)	TG, ENR (WRRB)
Poster campaign	Produce posters for distribution in each Tłıchq community: posters to be developed for each year over next 3 years	TG, ENR

ENR has promoted sound hunter harvest practices, reduction of wastage, harvesting bulls instead of cows, and related conservation education in NWT communities for a number of years. In response to community demands, ENR is currently developing a Hunter Education program. A working group developed materials which are currently out for review with individuals, boards, agencies and organizations involved in the Wildlife Act creation. There are 8 sections in the program (the responsible hunter, ecology and wildlife management, hunting laws, firearm safety, hunting skills, planning and preparation, the hunt and survival skills).

## B. ENHANCED WOLF HARVEST IN THE BATHURST RANGE

### Predator (wolf) management

In 2014-2015 harvest of Bathurst caribou was further reduced from 300 to a ceremonial harvest of 15; the harvest of Bathurst caribou is proposed to be zero from 2015-2016 to November 2019. Population indicators suggest that the herd is likely to decline further. In light of these circumstances, there is strong interest from Aboriginal governments and communities in increasing wolf harvest as a way of increasing caribou survival rates and promoting recovery of herds. Views on reduction of predator numbers to benefit ungulates like caribou or moose are diverse and sometimes polarized, thus any more intensive actions to reduce wolf numbers will need to carefully consider community views along with biological considerations.

Understanding of wolf ecology based on monitoring wolves at dens on the Bathurst late summer/fall range was summarized by D. Cluff in Adamczewski et al. (2009) and more recently by Klaczek (2015) and Klaczek et al. (2015). In general these studies showed that wolf

abundance and productivity, particularly pup survival, at Bathurst range dens has declined as the herd reached much lower numbers after 2000. However, it is possible that wolf predation has affected caribou survival rates more strongly during decline and at low herd size, even if there were far fewer wolves than at higher herd size (see Seip 1991).

Wolves are difficult to count, particularly on the large remote ranges used by barren-ground caribou herds in NWT and NU. ENR will conduct a technical review of wolf monitoring and management in the NWT in winter 2015-2016, and develop options for consideration. In view of the further decline in the Bathurst and other NWT herds, ENR will carry out a technical feasibility assessment of wolf management options in 2016, to consider the practicality, costs, and likely effectiveness of different management actions. This assessment will be developed collaboratively with TG and the input of other interested parties, with the initial focus on the Bathurst herd. ENR has had a number of discussions with biologists and managers with the Alaska Department of Fish and Game on approaches they have used in feasibility assessments for predator management. Three of Alaska's four tundra migratory herds have declined in recent years and management to address these declines is under discussion.

Among the key aspects that need to be considered is the number of wolves associated with the herd and the proportion or number of these that would need to be removed to improve caribou survival rates. The annual kill rate of wolves has been estimated at ~ 29 caribou / adult wolf, i.e., with apparent consumption rates ranging from 4.4 – 5.6 kg of caribou per wolf per day (Hayes et al. 2000), thus removal of substantial numbers of wolves could increase caribou calf and adult survival rates over winter. This could have an impact on the herd, considering the current small size of the Bathurst herd. However, a review of wolf control programs in 1997 concluded that wolves would need to be reduced by at least 55% for at least 4 years over a large area to increase ungulate survival rates (Orians et al. 1997). Removal of up to 30% of wolves is considered in Alaska as a sustainable harvest (i.e. no net reduction of wolves) due to the rapid replacement of wolves by pups or wolves from elsewhere, in addition to the higher per capita kill rates and larger losses of meat to scavengers associated with small wolf packs (B. Dale, ADFG, pers. comm. 2015).

At this point, grizzly bear management to benefit Bathurst caribou is not being considered, although observations on calving ground surveys, including Bathurst 2012 and 2015, suggest that there may be more bears than wolves on the calving grounds (GNWT unpublished data). Bears may be an important cause of moose and caribou calf mortality in the first few weeks after calving (Orians et al. 1997), but substantial caribou killing by bears is limited to this time period. Wolves are effective predators of caribou year-round (Orians et al. 1997). The Bathurst calving grounds are within NU, thus any consideration of predator management on the calving grounds would need to be discussed under NU processes for wildlife management. That said, Tłıchǵ traditional knowledge exists about the effects of bear predation on caribou outside calving grounds and the issue may be revisited by GNWT or TG.

#### Previous efforts to increase wolf harvest (2010-2014)

The May 2010 proposal recommended increased harvesting of wolves on the Bathurst range to reduce mortality of caribou due to predation by wolves. Financial incentives for prime pelts (\$400) and carcasses (\$200) were used to increase harvest of wolves on the Bathurst winter range, with an objective of harvesting 80 to 100 wolves annually. Wolf harvest was monitored annually through the GNWT fur harvest database. The program had poor success in achieving the 2010 joint proposal objective and it is unlikely that survival rates of adult and calf caribou were meaningfully altered. The total numbers of wolf carcasses reported in the North Slave Region was 19 (2009-2010), 41 (2010-2011), 80 (2011-2012), and 56 (2012-2013) respectively (averaging 49 wolves/year). Of the 196 wolves harvested in total, 47 were associated with dumps or sewage lagoons, 49 were taken from where collared Bathurst cows have not occurred



in recent years (i.e., east of Great Slave Lake in areas near Artillery Lake, Reliance and Lutsel K'e), and 20 were in the Yellowknife area. Recent review of the fur harvest database also showed that not all harvested wolves are accounted for within the fur harvest database. Thus as a follow-up, GNWT and TG will collaborate to improve monitoring the annual wolf harvest and other wolf mortalities by region, through coordination of data collection and analyses of existing fur harvest and wildlife export permit records.

In light of the limited success of the wolf harvesting incentive approach to date, TG and ENR recommend more specific management actions to increase and sustain an elevated annual harvest of wolves on the Bathurst winter range. If conducted effectively and for multiple years in combination with harvest management, management actions that sufficiently reduce wolf density are predicted to increase caribou survival and calf recruitment, which would contribute to increased herd growth and recovery (Gasaway et al. 1983, Hayes et al. 2003). In addition to addressing concerns about wolf predation on caribou, this recommendation will also address concerns from Tłıchq people who report that wolves are abundant and increasing in and around communities (workshop discussions in Gameti, February 2013, and Yellowknife, December 2013). An initial goal of harvesting 100 wolves from the Bathurst winter range will be used, and will be updated through the collaborative technical feasibility assessment of wolf management options for the Bathurst range.

#### Community-based wolf harvesting program for 2015-2018

Recognizing the general principle that "communities should play an important role in the management of wolves, including sharing local and traditional knowledge about wolves" (Yukon Government 2012), initial discussion among staff from TG and ENR and Tłıchq community representatives have resulted in the following elements being proposed for developing and implementing a community-based wolf harvesting program to address the real and perceived aspects of this human-wildlife conflict.

The basic premise is that Tłıchq communities will have meaningful input into deciding how to hunt and trap wolves in a culturally respectful manner, selecting candidates (including interested youth) who will be trained in effective field techniques for hunting/trapping wolves, skinning, and fur preparation, and identifying appropriate locations away from communities for skinning and processing wolf carcasses. Selected individuals will receive training from recognized expert wolf hunters/trappers and/or expert instructors. ENR would develop, coordinate, and provide the training workshops. An important factor in these workshops will be the cultural teachings from local Elders. Some believe that, from a cultural standpoint, Tłıchq people do not hunt wolves. By bringing in an Elder to explain to Tłıchq people that wolves are a problem and that Tłıchq should do something about it as long as one follows the traditional laws, more people will be motivated to go out on the land to harvest wolves.

Individuals for community-based teams would be initially selected from Wekweètì and Gamètì. Teams will establish field camps in focal areas during winter months and harvest wolves in a manner consistent with Tłıchq practices. ENR, with support from TG, will provide funding, training, field support, and monitor overall program effort and effectiveness. Tłıchq hunters have the option to either deliver the wolf carcass (entire unskinned wolf) to ENR and receive straight pay-out (proposed as \$200) or prepare the hide themselves for submission to ENR either with traditional skinning (proposed as \$400 for the hide and \$50 for the skull) or pelts prepared to taxidermy standards through the Genuine Mackenzie Valley Fur (GMVF) Program (proposed as \$400 for the pelt, \$50 for the skull, and a prime fur bonus of \$350 if the pelt sells for more than \$200 at auction). Wolf carcasses will be necropsied by ENR biologists.

The training program will be initiated in winter 2015-2016 with the communities of Wekweètì and

Gamèti, where 6 to 12 selected individuals will participate in one or more training workshops. The training workshops will have three experts: a (Tłıchq) wolf hunter/trapper expert; a taxidermy skinning expert; and a Tłıchq elder.

Based on recommendations from Tłıchq elders<sup>i</sup>, TG and ENR will implement a pilot program in winter 2016 for organized hunting and trapping of wolves within areas of winter range that would have maximum potential benefit for improving overwinter survival of caribou. The focal areas for wolf harvesting would be based on the mobile conservation zone for Bathurst caribou in which a community-based team (comprising 2-3 hunters, TG staff, &/or biologist) would be mobilized multiple times over the winter to hunt and trap wolves multiple times. Wolf management actions may complement caribou harvest restrictions by helping improve survival of Bathurst caribou in winter.

Other aspects of the pilot project will be tied to ENR's regular aerial surveillance of the Bathurst mobile conservation zone, which may also provide ENR biologists with an opportunity to develop methodology for estimating relative abundance and occurrence of wolves within the defined area based on observations of wolves (packs and individuals) and wolf tracks. This information will be shared with TG and may steer the location of wolf harvest camps. Wolf carcasses will be subject to standard post-mortem analyses and sample collections to document age, sex, diet, health and condition. A monitoring program will be implemented that accurately records hunter effort, activities and wolves harvested and will be summarized and reported by TG and ENR at the end of each winter wolf hunting season.

Depending on available resources, an additional workshop will be held in one other Tłıchq community in fall 2015 or winter 2016, with remaining Tłıchq communities completing the training by winter 2016. This would result in a core group of trained and experienced wolf hunters in each Tłıchq community who would be active and effective in the field and capable of training other interested hunters and trappers in the community.

In addition to training Tłıchq hunters as part of a community-based wolf harvesting program, recommendations from non-Tłıchq communities and governments were made to extend wolf hunting opportunities and incentives to Northwest Territories residents and non-residents (i.e., guide-outfitters). The opportunity for resident hunters and guided outfitters to hunt wolves on the Bathurst range is already in place. ENR will also work with other Aboriginal governments interested in increased wolf harvest from the Bathurst range.

### **C. MONITORING OF BATHURST CARIBOU HERD**

#### Monitoring under 2010-2013 Tłıchq -ENR caribou joint proposal

Main monitoring actions from the 2010 Tłıchq/ENR caribou joint management proposal are summarized in Table 1 (above), and updated to reflect conditions in 2015. Monitoring actions consisted of three main components: (1) biological monitoring of the Bathurst caribou herd, (2) monitoring of caribou harvest, and (3) wolf monitoring. In 2010, the WRRB provided recommendations that were in general support of the monitoring actions proposed.

In this proposal, the three monitoring components are summarized in following sections, each with an assessment of monitoring 2010-2013 and modified monitoring proposed for 2016-2019.

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<sup>i</sup> <http://www.tlicho.ca/news/tlicho-elders-wolf-workshop>

### Biological monitoring for the Bathurst herd 2016-2019

Biological monitoring of the Bathurst herd proposed for 2016-2019 includes the following elements:

1. Annual reconnaissance surveys on the calving grounds in June as an index of the numbers of breeding females;
2. Estimates of the number of breeding females & herd size every 3 years based on calving ground photographic surveys;
3. Estimates of pregnancy rate (proportion of breeding females) based on June composition surveys every 3 years;
4. Estimates of bull:cow ratios and calf:cow ratios as a relative index of summer mortality of calves based on fall composition surveys during the rut (October) every 2-3 years;
5. Annual composition surveys in late winter (March/April) to estimate recruitment of calves;
6. Estimation of cow survival rate from collars and OLS (ordinary least squares) model every 3 years;
7. Maintenance of 50 GPS collars (30 on cows, 20 on bulls) with annual replacements of collars;
8. Annual monitoring of indices of environmental trend that may help explain population indicators.

The surveys listed above have, to date, been carried out as planned for the Bathurst herd since 2010, and they should build a continuing picture of the herd's population size and trend. Indices of environmental trends on the herd's range will be monitored over time and archived within a long-term database with the assistance of Don Russell and the CARMA (Circum Arctic Rangifer Monitoring and Assessment) group.

### Collars:

The increase in collar numbers to 50 follows a recommendation from TG in 2014 and this greatly improves confidence in monitoring herd trend and many other herd attributes. Previously (before March 2015), Bathurst collar numbers had been limited to 20 or fewer and all were on cows, largely due to Tłıchǫ concerns over the use of collars and animal capture and handling. ENR (2014b) provided a brief review of uses of collars and recommended numbers of collars for various applications in a rationale for increasing the numbers of collars on the Bathurst herd to 65 (50 on cows and 15 on bulls). Some applications, such as monitoring cow survival rates with good precision, would require 100 collared caribou, while other applications can be addressed reliably with 50 or fewer collars.

TG and ENR agree to consider further increasing the number of collars on cows and bulls in this time of herd decline, depending on resources made available by GNWT. The use of collars has in the past been a contentious issue. However, at this particular and critical time with low and declining Bathurst numbers, it is important to have the best available information. Balancing social and cultural concerns and the scientific rationale for increasing sampling size to improve quality of biological information is not easy. Support for increased collar numbers from TG would come with the understanding that GNWT will commit the resources needed to improve the program, and share the data regularly with the TG. The collars may also assist in determining where and when predators should be removed as well as tracking whether actions like predator management might be having an effect on the herd. The collared caribou should also help in developing better monitoring studies that determine if changing environmental and climatic conditions, as well as the influence of resource development, are affecting the caribou.

A programming option that has recently become available is "geo-fencing" where the number of

GPS locations collected increases substantially and allows more detailed analysis of the movements of collared caribou near mines, roads or other designated sites. ENR plans to deploy Telonics Iridium collars with geo-fencing polygons around existing and likely future roads and mines in the Bathurst range when collars are added in late winter, beginning in March 2016.

Additional monitoring that may be considered to improve monitoring and understanding of the Bathurst herd's status, distribution and ecology is summarized below. These methods will be considered if resources (funds and staff time) are made available by GNWT.

1. Annual composition surveys on the calving grounds to determine the proportion of breeding females as an index of pregnancy rate;
2. Annual fall composition surveys to provide increased information about summer calf survival; and
3. Annual winter assessments of pregnancy rate from fecal samples collected during late-winter composition surveys;

As harvest is proposed to be zero for the Bathurst herd, monitoring will need to focus on ensuring compliance via ground-based and aerial patrols at frequent intervals. As noted earlier, the Bathurst mobile zone would be monitored regularly (sometimes weekly) until the end of the winter hunting season by aerial reconnaissance flights to increase knowledge of the herd's distribution and numbers, observe and record presence or absence of wolves and/or wolf-kill sites and to check for any activity (including hunting) on the winter roads to the mines. Wildlife officers will also carry out ground-based patrols to ensure compliance with the no-harvest regime. Aerial and ground-based surveillance by ENR would continue throughout the winter harvest season in 2016-2017 and in future years.

#### Wolf monitoring for the Bathurst herd (2016-2019):

Wolf monitoring for the Bathurst range (2010-2013) included ongoing monitoring of wolf abundance and productivity at den sites on the southern edge of the Bathurst summer range. This was initiated in 1996 when the herd was at much higher numbers. These surveys suggest that wolf numbers on the Bathurst range and the average number of pups at traditional den sites have declined substantially since 2005, likely as a result of the caribou herd's decline, and remained low between 2010 and 2013. ENR North Slave Region, in collaboration with University of Northern British Columbia, deployed 15 satellite collars on female wolves in 2013 to better understand movements and ecology of collared wolves. A recent graduate thesis by Klaczek (2015 and see Klaczek et al. 2015) summarized recent collar movements and demographics of wolves in the Bathurst range.

ENR will conduct a review of appropriate methods to monitor wolf abundance and distribution over time. One of the main objectives will be to explore the feasibility of a more robust and improved wolf monitoring program for the NWT. The review will include an assessment of the den survey methods in use since 1996 and will be completed by spring 2016.

Based on the ENR-led collaborative feasibility assessment, the community-based wolf harvesting pilot project on the Bathurst winter range will be reviewed and updated. The goal will be to implement a more thorough adaptive management approach which would prescribe increasing off-take of wolves by hunters. Numbers, locations, age, sex and condition of wolves taken will be reported, and an assessment of effectiveness will include evaluating the impact of the increased wolf harvest on observed wolf densities and proximate indicators of caribou population health such as overwinter survival of calves and adults.

### **Other monitoring and management actions related to Bathurst caribou**

Similar to the 2010 joint TG and ENR caribou management proposal, this new proposal will be focused on relatively short-term monitoring and management actions for the Bathurst herd. TG and ENR recognize that a more comprehensive approach to research and monitoring of the herd is needed. This approach will include supporting research and monitoring of key environmental and habitat variables that affect caribou abundance, to broaden our collective understanding and provide recommendations for management of cumulative effects of disturbance. While the initiatives described below are outside the scope of this proposal, they are referenced to signal the importance TG and GNWT place on them.

#### *Monitoring and research on key environmental and habitat variables*

Climate change, weather in all seasons, and other environmental variables affect caribou abundance and distribution. A better understanding of these factors and their effects on caribou is needed. Approaches to this could include the following:

- Annual monitoring of environmental and habitat conditions from remote sensing and climatology datasets. Identifying and tracking key variables for habitat, environmental and climatic conditions on the Bathurst range. Environmental conditions should be monitored as they may affect caribou population dynamics through reduced calf recruitment or adult survival especially in years with severe winter conditions or poor summer growing conditions (Hegel et al. 2010a and 2010b; Hebblewhite 2005; Chen et al. 2014). Indices of insect harassment (Witter et al. 2012) can be developed from summer weather indices. Climatic indicators collected at Bathurst range scale could build upon the analyses by Chen et al. (2014), with specific consideration given to the 25 candidate indicators that Russell et al. 2013 described as a 'caribou-relevant' dataset. The selected covariates could be included in OLS model analysis to further explore the effects of the environment and other factors on demography.
- A recent study by Chen et al. (2014) suggested that spring calf:cow ratios in the Bathurst herd were correlated with indices of summer range productivity one and a half years earlier; the mechanism proposed was that cows with poor summer feeding conditions were likely to be in poor condition during the fall breeding season, leading to low pregnancy rates. ENR has also asked biologist D. Russell to review environmental trend data collected since 1979 by CARMA for NWT caribou herds (drought index, snow depth indices, warble/bot fly index) that may assist in explaining how key environmental trends have contributed to declines in caribou herds.
- The two governments generally support increased research into underlying drivers of change in herd abundance by partnership with academic researchers and remote sensing specialists. There is a need to better understand predation rates and their significance to caribou, environmental factors affecting caribou condition and population trend, and the effects of climate change on these relationships.
- Supporting current (Chen et al. 2012, 2014) and further research on environmental factors affecting caribou.
- Developing an overall strategy for caribou monitoring built around environmental and cumulative effects assessment. The impact hypothesis diagrams by Greig et al. 2013 (p. 50 and p. 70), provide a starting point and framework that links impact pathways of natural environmental and human-caused stressors to population demography in

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migratory barren-ground caribou. ENR initiated a process in 2013 to develop a cumulative effects monitoring program for wildlife and wildlife in the Slave Geological Province (GNWT 2013). Included in the process is identifying key monitoring and research needs, including those for Bathurst caribou and their range.

- TG currently is working on implementing a “Boots-on-the-Ground Monitor Program” for the summer months. This program will have 2-3 monitors and 1-2 technical staff “24-7” on the land for the months of July and August (depending on caribou movement). The monitors will collect TK about the general behaviour of the Bathurst Caribou. However, this program is still in the development stages and the objectives and research questions still have to be fine-tuned. Because TK is holistic and looks at everything, the monitors will observe insect harassment, feeding behaviour, predator behaviour etc. The program will also have a scientific research component. The monitors will collect caribou scat for diet analysis. The monitors will also record caribou behaviour using a standardized behavioral sampling method so that results can be interpreted and applied in the context of describing behavioral responses of caribou to disturbance.

**Table 1, Part 1. Biological monitoring of Bathurst herd**

Indicator(s)	Rationale	Desired Response	Adaptive Management Options	How Often	Notes
1. Numbers (density) of 1+ year old caribou on calving ground from reconnaissance surveys	Provides index of number of breeding cows on calving grounds; number of 1+ year old caribou correlated with number of breeding females.	Increasing trend in numbers of 1+ year old caribou on annual calving ground.	If trend in 1+ year old caribou is increasing, continue as before; if trend stable-negative, re-consider management.	Annual (between photo-surveys)	Precision improved 2013 using 5-km spacing between flight lines.
2. Estimate of breeding cows from calving ground photo survey	Most reliable estimate for abundance of breeding cows & can be extrapolated to herd size based on pregnancy rate and sex ratio.	Increasing trend in numbers of breeding cows by 2018.	If trend in breeding cows increasing, continue as before; if trend stable-negative, re-consider management.	Every 3 years	Last surveys 2009, 2012, 2015, next in 2018. Trend in breeding females is most important for herd trend.
3. Cow productivity; composition survey on calving ground in spring (June)	Relatively low calf:cow ratio in June 2009 – many sub-adult cows not yet breeding; establishes basis for potential calf recruitment through fall & winter.	High calf:cow ratio (80-90 calves:100 cows).	Low ratio indicates poor fecundity and poor nutrition in previous summer; survey data integrates fecundity & neonatal survival.	Every 3 years	Essential component of calving ground photographic survey.
4. Fall sex ratio; composition survey (October)	Tracks bull:cow ratio; Bathurst ratio increased from 31-38 bulls/100 cows 2004-2009 to 57-58/100 in 2011-2012; prime bulls key for genetics, migration.	Maintain bull:cow ratio above 30:100.	If bull:cow ratio below target, consider reducing bull harvest. Fall calf:cow ratios indicate spring & summer calf mortality relative to June ratios.	Every 2-3 years	Needed for June calving ground photographic survey – extrapolation to herd size. Provides fall estimate for calf:cow ratio.
5. Calf:cow ratio in late winter (March-April); composition survey	Herd can only grow if enough calves are born and survive to one year, i.e., calf recruitment is greater than mortality.	>40 calves:100 cows on average.	If average calf:cow ratio $\geq 40:100$ , continue as before; if average ratio $\leq 20:100$ , herd likely declining; re-evaluate management.	Annual	Calf productivity & survival vary widely year-to-year, affected by several variables, including weather.
6. Cow survival rate (estimated from OLS model, including collar data)	Cow survival estimated 67% in 2009, 78% in 2012 (from model). Need survival of 83-86% for stable herd.	Increase to 83-86% by 2018	If cow survival increases to 83-86%, continue as before; if survival stays below 80%, re-assess harvest & wolf management.	Regular (every 3 years)	Population trend highly sensitive to cow survival rate; recovery will depend on increased cow survival.
7. Maintain 50 collars on Bathurst herd (30 cows & 20 bulls, with annual increments)	Reduce uncertainty in defining winter herd distribution; improve confidence in assigning herd identity to hunter-kills and improve overall harvest management; provide a direct & more precise estimate of adult female survival	More reliable harvest management & improve datasets for OLS model analysis of demography.	Develop options for implementing new management zones with Tłı̨chǫ communities; has potential for improved zoning strategies that permit more flexible and effective harvest management.	Annual deployment of collars to maintain 50 on the herd	Tracking movements and locations of collared bulls (n=20) would assist in directing hunters to areas with bulls.
8. Monitor annual indices of environmental conditions	Indices of range condition, drought index, warble fly index may help explain trends in calf:cow ratios, pregnancy rates	Indices positive for herd, but focus is explanatory.	Adaptive management does not apply but indicators may help explain and predict possible herd responses	Annual	Trends in environmental indices may help explain underlying drivers of change in herd trend.

**Table 1, Part 2: Harvest monitoring of Bathurst herd & monitoring of wolves and wolf harvest**

Indicator(s)	Rationale	Desired Response	Adaptive Management Options	How Often	Notes
9. (Harvest) Numbers of cows and bulls taken by all hunters	Cannot assess effectiveness of management if harvest is poorly tracked; harvest well over target could lead to further decline.	Compliance with 0 harvest of Bathurst herd	If unplanned harvest occurs, review/revise harvest reporting & management immediately	Annual	As recommended harvest will be 0, frequent monitoring by ground patrols and aerial patrols will be needed to ensure compliance.
9. Numbers of wolves killed/year	Wolves are main non-human predator on caribou; natural cow and calf survival rates should increase at low wolf numbers.	Increasing # of breeding caribou cows, increased cow survival. Annual wolf harvest increased to 80-100.	If cow numbers, survival increasing, continue as before; if trend stable-negative, re-assess management.	Annual	Experience in Alaska & elsewhere indicates need to remove significant numbers of wolves for several years to affect caribou survival rates.
10. Wolf abundance	Index of relative wolf abundance	Declining trend in wolf abundance		Regular, pending wolf monitoring review	ENR to review methods of monitoring wolf abundance. Input & collaboration from Dean Cluff, other biologists.



### C. Consultation

#### **Describe any consultation undertaken in preparation of the management proposal and the results of such consultation.**

ENR sent an initial letter with preliminary results of the June 2015 Bathurst calving ground photographic survey to all parties with an interest in this herd on September 2, 2015 and requested input on potential management actions, including a continuation of the 2014-2015 Bathurst mobile conservation zone into 2015-2016. A further letter was sent December 2, 2015 to all parties with an interest in the Bathurst herd with an update on herd status and proposed management actions.

TG sent a letter to WRRB on August 25, 2015 proposing management actions for the BNE and Bathurst herds. This included a harvest limit of 200 Bathurst caribou. ENR sent a letter to WRRB on September 22, 2015 on management actions for the Bathurst and BNE herds, which recommended 0 harvest from the Bathurst herd. WRRB recommended to TG and ENR on September 25, 2015 that the governments come to agreement on the Bathurst harvest (and other actions); TG and ENR then met in October 2015 and TG announced in late October that the Tłıchq would not harvest Bathurst caribou in 2015-2016.

WRRB requested in October 2015 that draft versions of joint proposals on Bathurst and BNE caribou be made available to WRRB in November for initial review. Draft proposals were sent by TG and ENR to WRRB on November 22, 2015. WRRB provided comments on the draft proposals on November 27, 2015, which were used to modify the two draft proposals.

TG and ENR staff met several times in fall 2015 to discuss caribou management and related issues, including interim management for winter 2015-2016 and management proposals for the two herds for 2016-2019. In addition, the Caribou Technical Working Group, which includes TG, ENR and WRRB at a staff level, met six times in 2015.

TG and ENR technical staff held 1 community meeting in early December 2015 in all the 4 Tłıchq communities to review caribou management issues for the short and long term. In these meetings the interim measures and the joint management proposals for both herds effecting the Tłıchq were discussed.

TG held a workshop on wolves with Tłıchq elders and hunters on October 29, 2015; elders agreed that the wolf was a problem for the caribou and that something needs to get done. The elders also said that they want Tłıchq hunters to harvest wolves as long as traditional laws are followed.

The North Slave Métis Alliance (NSMA) on September 16, 2015 wrote to ENR generally expressing support for management actions proposed for caribou herds in the North Slave region (including the Bathurst mobile conservation zone), provided that NSMA received an equitable share of caribou harvests in the N. Slave region for the 2015-2016 harvest season.

ENR met on September 16, 2015 with representatives of the YKDFN to discuss caribou management. YKDFN had generally supported the Bathurst mobile conservation zone in 2014-2015. YKDFN requested support for community monitoring and for community hunts. ENR met again with representatives of YKDFN on caribou issues on November 30, 2015. YKDFN did not support 0 harvest of Bathurst herd in 2015-2016 and suggested an ENR-YKDFN agreement as was signed in October 2010.

ENR met on November 6, 2015 with representatives of Lutsel K'e Dene First Nation (LKDFN) to discuss status and management of Bathurst and other caribou herds. LKDFN agreed that the Bathurst herd's decline was serious and required management action, but did not express support for 0 harvest of Bathurst caribou. There was support for increased incentives for community hunters harvesting wolves. LKDFN also expressed concern over the mines and roads and effects of disturbance on the caribou and asked for support for a community monitoring program.

ENR met on November 20, 2015 with representatives of the NWT Métis Nation (NWTMN) to discuss caribou management. NWTMN representatives were generally supportive of conservation measures for the Bathurst herd, and expressed strong interest in increasing harvest of wolves from the Bathurst range with ENR support.

#### D. Communications Plan

**Describe the management proposal's communications activities and how the Tłıchq communities will be informed of the proposal and its results.**

TG and GNWT leadership will, together, hold an information session in each of the 4 Tłıchq communities.

Technical workshops will be held in each of the 4 Tłıchq communities to inform on the implementation of any harvesting season restrictions.

Further meetings will occur through winter 2015-2016 as needed to provide updates on caribou status and continue dialogue with Tłıchq communities.

Table 1 (listed earlier in this proposal) describes approaches and objectives for increased public engagement and hunter education for caribou in Wek'èezhii.

#### E. Relevant Background Supporting Documentation

List or attached separately to the submission all background supporting documentation, including key references, inspection/incident reports and annual project summary reports.

Advisory Committee for the Cooperation on Wildlife Management (ACCWM). 2014. Taking Care of Caribou – The Cape Bathurst, Bluenose-West, and Bluenose-East Barren Ground Caribou Herds Management Plan (Final). C/O Wek'èezhii Renewable Resources Board, 102A, 4504 – 49 Avenue, Yellowknife, NT, X1A 1A7.

Adamczewski, J., J. Boulanger, B. Croft, H. D. Cluff, B. Elkin, J. Nishi, A. Kelly, A. D'Hont, and C. Nicolson. 2009. Decline in the Bathurst caribou herd 2006–9: a technical evaluation of field data and modeling. Environment and Renewable Resources, Government of Northwest Territories, Yellowknife, NWT, Canada.

Boulanger, J. 2015. Interim report: Estimates of breeding females and herd size from the 2015 Bathurst calving ground survey, Draft September 3, 2015. Environment and Natural Resources, GNWT, Yellowknife, unpublished report.

Boulanger, J., B. Croft, and J. Adamczewski. 2014a. An estimate of breeding females and analyses of demographic indicators from the Bathurst herd 2012 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories. File Report 142.

Chen, W., L. White, J. Z. Adamczewski, B. Croft, K. Garner, J. S. Pellissey, K. Clark, I. Olthof, R. Latifovic, G. L. Finstad. 2014 Assessing the Impacts of Summer Range on Bathurst Caribou's Productivity and Abundance since 1985. *Natural Resources*, 5, 130-145. <http://dx.doi.org/10.4236/nr.2014.54014>



Unpublished Report, Yellowknife, NT. 20 pp.

Witter, L. A., C. J. Johnson, B. Croft, A. Gunn, and L. M. Poirier. 2012. Gauging climate change effects at local scales: weather-based indices to monitor insect harassment in caribou. *Ecological Applications* 22:1838-1851.

Government of Yukon. 2012. Yukon Wolf Conservation and Management Plan. Environment Yukon, Whitehorse, Yukon, 24 pp

#### F. Time Period Requested

**Identify the time period requested for the Board to review and make a determination or provide recommendations on your management proposal.**

November 2016-November 2019; the next Bathurst calving ground photographic survey is scheduled for June 2018, which may lead to a new management proposal that year. Management actions should be reviewed annually or when key new information is available.

#### G. Other Relevant Information

**If required, this space is provided for inclusion of any other relevant project information that was not captured in other sections.**

#### H. Contact Information

**Contact the WRRB office today to discuss your management proposal, to answer your questions, to receive general guidance or to submit your completed management proposal.**

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