ANNUAL REVIEW OF BATHURST CARIBOU – 2022 ACTION PLAN

March 2022

BATHURST CARIBOU ADVISORY COMMITTEE

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Disclaimer:

The BCAC recognizes that the implementation of management actions moving forward is subject to appropriations, prioritizations, and budgetary restraints of the participating agencies and organizations

The BCAC includes representatives from public governments, Indigenous governments and organizations, and other management authorities:

Wek'èezhìı Renewable Resources Board

Tłı̨chǫ Government

Yellowknives Dene First Nation

Łutsël K'é Dene First Nation

Deninu K'ue First Nation

Northwest Territories Métis Nation

Athabasca Denesųłiné Néné Land Corporation

Parks Canada

North Slave Métis Alliance

Nunavut Tunngavik Incorporated

Kitikmeot Regional Wildlife Board

Kugluktuk Angoniatit Association (HTO)

Ekaluktutiak (Cambridge Bay) HTO

Government of Nunavut

Government of Northwest Territories

Other BCAC member organizations: Salt River First Nation, Umingmatok (Bay Chimo) HTO

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The BCAC & the BCMP

The Bathurst Caribou Advisory Committee (BCAC) was established in 2017 to guide the development of the Bathurst Caribou Management Plan (BCMP, 2021). The Committee now has an ongoing role in advising on the implementation of the BCMP, including participation in the Annual Review on Bathurst Caribou. The BCAC's objectives, broadly, are:

- To learn from and adaptively manage the physical, biological, and cultural relationship between people and caribou.
- To cooperatively provide advice for the management of the Bathurst caribou herd and its habitat, striving to ensure a healthy, viable herd capable of fulfilling harvesting needs.
- To promote and strengthen communication and sharing of information related to the Bathurst caribou herd and its habitat.

Annual Review on Bathurst Caribou

The Annual Review on Bathurst Caribou is a time for all communities, organizations, and governments across the Bathurst range to come together to review and discuss new information about the Bathurst herd and activities within the herd's range. A key outcome of the Annual Review is the determination of the herd's status and recommended management responses for the coming year. During the Annual Review, participants will:

- Review and discuss the Bathurst herd's population, trend, and status.
- Seek consensus on recommended management actions and monitoring actions to be carried out over the coming year.
- Recommend an implementation schedule for management actions and monitoring activities for the coming year.
- Reflect on the effectiveness of the BCMP to date and discuss lessons learned and potential revisions to the Plan.

Following the Annual Review, a Bathurst Caribou Action Plan and a publicly available summary report on the proceedings and outcomes of the Annual Review will be developed.

Presentations Made at the 2021 Annual Meeting

During the 2021 annual meeting, BCAC organizations gave presentations on their communities' experience and observations of Bathurst caribou. Many of the communities that harvested from the Bathurst herd in the past reported that the caribou had not travelled near their communities in recent years. As such, they had few direct observations to share as part of the status decision for the present year. These communities still play an important role in the BCAC, as their knowledge of historic population status and conditions provides important context for this year's status decision. Additionally, it is hoped that as the Bathurst caribou herd recovers, these communities will be able to once again observe and harvest from this herd. Participation in the BCAC until that time will maintain and strengthen relationships and improve the quality of the decisions made at the annual meetings.

Northwest Territories Métis Nation

Presentation by Earl Evans (NWTMN)

NWTMN explained that the current range of the Bathurst herd is not easily accessed by their members. Hunters have to travel 1500 kilometers to see Bathurst caribou on their winter range. It was noted that their members only see the herd for a very short period of time and, as such, are not able to record many observations of Bathurst caribou.

This lack of access has created hardship for the people who have previously harvested from the Bathurst herd. In the past, they would see groups of caribou that were three or four miles wide at places like Gordon Lake, with thousands of caribou on the lake crossing on the winter road. It was commented that although there were lots of trucks present on the winter road at that time, the caribou did not seem bothered by them.

In the late nineties, 12 caribou were harvested at Gordon Lake by a group of harvesters. It was observed that none of the caribou harvested had any fat on them which may be an indicator they were already on the decline then. In the following years (after 2010), NWTMN put forward a resolution to not hunt Bathurst caribou on winter roads until they could see improvements in the herd numbers.

Over the years (since 2010), NWTMN has seen a lot of bad hunting practises. The 2020/21 harvest season was marked by a high number of observations of disrespectful or wasteful hunting practices. In recent years, the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT) has increased enforcement on the winter road and increased public information and media releases, which got people talking. NWTMN feels these actions raised a lot of awareness about the situation.

Kugluktuk Angoniatit Association

Presentation by Randy Hinanik (KAA)

In the nineties, those living at Contwoyto Lake harvested annually from the Bathurst herd during the caribou's migration to their calving grounds, up near the coastline. In the mid-nineties, the population of the herd was fairly high, and they would see a lot of healthy animals. During that time, people at Contwoyto Lake would watch the Bathurst caribou go by for two weeks straight.

Unfortunately, the population numbers are so low that they have seen very few Bathurst caribou in recent years. More information should be shared on the number of caribou harvested by each community, including reports from harvesters and renewable resource officers, as well as reports on seizures from illegally harvested animals.

Athabasca Denesųłiné Né Né Land Corp

Presentation by Tina Giroux-Robillard (ADNLC)

The ADNLC reported that they were unable to make any observations of Bathurst caribou this year, as the herd did not migrate to their wintering range within Nuhenéné (the traditional territory of the Athabasca Denesųłiné).

Tłı̨chǫ Government - Department of Culture and Lands Protection

Ekwǫ̀ Nàxoèhdee K'è (Boots on the Ground) Monitoring Program

Presentation by Roy Judas, Joe Zoe, Petter Jacobsen

Ekwǫ̀ Nàxoède K'è is a Kokètì ekwǫ̀ (Bathurst caribou) monitoring program based upon the Traditional Knowledge (TK) of Tłı̨chǫ and Inuit indigenous elders and harvesters. The objectives are to monitor the conditions of Kokètì ekwǫ̀ herd on the summer range, focusing on four key indicators: (1) habitat; (2) ekwǫ̀ conditions; (3) predators, and (4) industrial development.

The Tłı̨chǫ monitoring data were presented and discussed over two sessions. The first session was largely led by Joe Zoe and Roy Judas. Many of their comments are included directly in the Primary Indicators and Modifying Indicators tables (see pages 16–17), as they provided numerous recent observations of the Bathurst herd.

In a later session, Petter Jacobsen presented an overview of work by Ekwǫ̀ Nàxoèhdee K'è (Boots on the Ground) and the data they have collected. When the program first started in 2016 it was really the elders and harvesters guiding its development. They showed participants where and how to do careful and respectful monitoring of the caribou. The key to the program's success is the elders' knowledge and strategy for using traditional hunting locations as places to watch caribou. Some examples of these are water crossings, land crossings between lakes, and the eskers. Caribou location (collar) data are regularly provided by ENR, which helps the team plan their visits to the monitoring locations.

Table 1: Monitoring Efforts 2016-2021

	2016	2017	2018	2019	2020	2021
Caribou Monitors	8	10	10	25	40	28
Field Days	26	40	40	57	48	66
Distance Travelled	481 kms	1186 kms	1784 kms	3240 kms	2561 kms	3572 kms
Monitoring Hours	140	207	218	325	190	266

The first team arrives, by air charter, to the base camp at Fry Inlet along the southwestern shores of Kokètì (Contwoyto Lake) just after the ice melts to start the summer monitoring. Based on a three-week rotation, monitoring teams observe the land and animals through the summer to early fall when caribou are in the area (generally July to September). The monitors regularly travel long distances by boat along the shores of Kokètì and walk inland on foot to find and watch caribou throughout the monitoring period.

The work involves long days but is rewarding. The monitors sit on the hilltops, watching the land for hours, just like hunters. Sitting and observing in this way has allowed them to notice many important things relating to the environment and caribou. They find evidence of people using the land everywhere they go. Sometimes, the evidence of human activities can be unsettling. For example, at old mine sites and camps monitors have found lots of tangled wire from old bear fences that can potentially get caught in caribou's antlers, entrapping them.

Table 2: Monitoring Indicators

	2016	2017	2018	2019	2020	2021
Weather and Vegetation	Warm, Dry	Mix Dry/Wet	Wet, Windy	Wet, Windy	Wet, Windy	Cool, Windy
Caribou Health	Normal, Many Injured	Normal	Early Fat, Bulls Healthy	Early Fat, Bulls Healthy	Healthy, Fat Animals	Healthy, Fat Animals
Calf Abundance	Normal, High	Normal, High	Normal, Low	Low	Low	Low
Wolves Observed	1	18	16	31	0	13

The goal of the program is to watch everything, not just the caribou. This allows them to see the trends in

indicators (see Table 2).

Caribou habitat

When the Ekwǫ̀ Nàxoèhdee K'è program started in 2016, there was warm and dry weather in July and there were lots of biting insects. The caribou had to move constantly and were not able to settle down and feed. In 2018, it started to get colder, wetter, and windier in the early summer; this reduced the stress on the caribou, and they were mostly observed to be peaceful and uninterrupted in their feeding. It was noted there was quite a big difference from the first few years (2016–17) when they barely saw caribou eating calmly, instead moving around in circles to avoid the insects. This change in weather, i.e., more rain, has also been good for the quality of the forage.

Caribou health

During the first years of the monitoring program, the health of the caribou seen was considered normal, although monitors did observe a lot of injured animals the first year. From 2018 to 2021, they started to see that the forage and habitat were in excellent condition, resulting in very healthy-looking caribou. The bulls were starting to gain their fat reserves around mid-July, which is early. They also started to grow large and dark antlers earlier in the season.

With the reduced insect activity during July, monitors were observing that the caribou were uninterrupted in their feeding for long periods of time instead of having to move constantly. The result is very healthy and fat-looking bulls.

Calf abundance

In 2016 and 2017 monitors observed a lot of caribou calves. In some cases, the ratio of calves to cows was one to one. In recent years, that ratio for the Bathurst Caribou has declined:

- ➔ 2019: 31 calves:100 cows
- ➔ 2020: 29 calves:100 cows
- ➔ 2021: 39 calves:100 cows[1]

There appear to be good environmental conditions for the population to grow, yet still many groups are seen with few or no calves.

Other observations

The monitors saw moose for the first time during their program at Contwoyto Lake in 2019 (11 were observed in 2019 and 7 in 2021). They also found what they suspected to be a large bald eagle nest in summer 2021, located on the barren lands where bald eagles are not known to nest. The teams will further investigate the nest site during field work in summer 2023. Both of these observations may be indicators of how the changing climate is

Figure 1: Possible eagle nest

[1] In summer 2021, there were Beverly collared caribou [illegible] program, which would have influenced the observed ca

impacting the expanding range of species into the region.

It was noted that monitors see grizzly bears, and that there are a few dens near the monitoring sites, but they have never seen the bears interacting with the caribou. The bears generally eat ground squirrels and grass.

KAA commented that they do harvest moose in their region. In particular, moose can be found along the Tree River. They have also seen eagles preying on very young calves on the calving grounds.

Government of the Northwest Territories – Department of Environment and Natural Resources

Presentation by Jan Adamczewski (GNWT-ENR)

The video called *How We Count the Caribou: Calving Ground Photo Survey* was shown.[2] After the video, it was explained that, unfortunately, this year's surveys did not involve community members from Nunavut due to COVID-19 restrictions.

Population estimates

As described in the video, aerial photos are an essential part of the calving ground survey. These photos are taken over the areas where most of the breeding female caribou occur and provide accurate counts of caribou. In 2021, the survey was done in the first two weeks of June.

In addition to the aerial photography, biologists complete a helicopter-based composition survey to estimate abundance of newborn calves on the calving ground, along with the proportion of caribou that are breeding females, non-breeding females, yearlings, and bulls. For larger groups of caribou (i.e., 100+ animals), the field team does their caribou class counts on the ground while the helicopter is landed and shut down to minimize any potential disturbance of caribou cows and newborn calves. The overall percentage of breeding females was about 75% (Figure 2). For comparison, the percentage of breeding females in the Bluenose-East herd in 2021 was 92%.

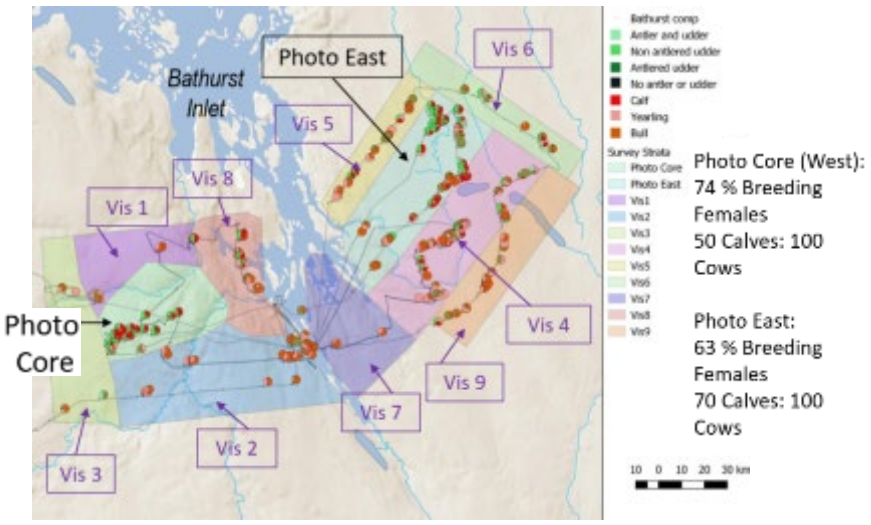


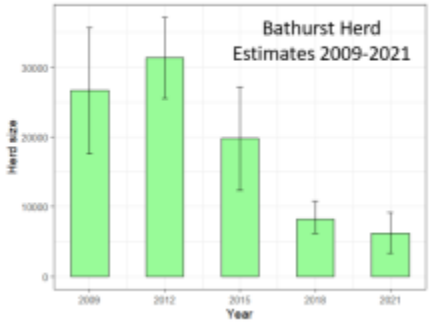
Figure 2: Bathurst Composition Survey June 11-14, 2021

It was explained that there was a lot of mixing with the Beverly herd east of Bathurst Inlet through the winter and in to June. Collared Beverly cows passed through the survey area on the east side of Bathurst Inlet and continued north and east toward the Queen Maud Gulf coastal calving area. It was not until later in June and early July when the collar data showed the herds starting to separate west and east of Bathurst Inlet. This pattern of movement influenced ENR's interpretation of survey results. Briefly, ENR assumed that the known collared Bathurst cows that moved

[2] https://www.youtube.com/watch?v=t0LYgsVR_Cs

east and calved with the Beverly herd may have emigrated to the Beverly herd, and will continue to be monitored. As such, the Bathurst herd estimate for 2021 was based on the distribution of female caribou west of Bathurst Inlet.

Figure 3 shows the Bathurst herd estimates for June 2021 and 2018. Each of the three estimates (i.e., breeding females, adult females, and herd size) shows an ongoing decline in the caribou numbers, but the rate of decline between 2018 and 2021 appears to have slowed down compared to the decline between 2015 and 2018.



Bathurst Estimates for June 2021

(Based on Caribou West of Bathurst Inlet)

	2018	2021
Breeding Females	3,636 (95% CIU 1,244)	2,878 (95% CIU 1,782)
Adult Females	5,162 (95% CIU 2,261)	3,808 (95% CIU 2,147)
Herd Size	8,207 (95% CIU 3,230)	6,243 (95% CIU 2,891)

Figure 3: Bathurst Population Estimates June 2018 & 2021

Herd fidelity

In previous years, between 1–4% of collared cows were noted to switch between calving grounds of neighbouring herds, and usually this movement occurs relatively equally between herds. Collared Bathurst and Beverly caribou have shown a high degree of mixing in recent winters, and it is possible that the Bathurst cows are attracted to the calving grounds of the Beverly herd by its much larger numbers. In three out of the last four years, a high percentage of the known[3] collared Bathurst cows have calved on the Beverly calving grounds (with minimal, switching of Beverly to Bathurst[4]):

- June 2018: 3 of 11 (27.2%) Bathurst cows to Beverly calving ground
- June 2019: 3 of 17 (17.6%) Bathurst cows to Beverly calving ground
- June 2020: No movement of Bathurst cows to Beverly calving ground
- June 2021: 6 of 34 (17.6%) Bathurst cows calved east of Bathurst Inlet, moved to Beverly calving ground in late June during the post-calving period.

Cow survival estimates

The adult cow survival estimate is based on the number of collared cows that survive the year. In the last three years, survival rates for collared Bathurst cows have been higher than in preceding years. This is a very positive indicator as population trends are very sensitive to adult cow survival rates. The average of the last three years has been 91%, whereas a stable population would require about an 85% survival rate (along with a corresponding late winter calf:cow ratio of 35:100).

[3] In this context, "known" refers to collared female caribou whose location the previous June was known. For newly collared caribou (usually collared in March), their previous history is unknown.
[4] In June 2022, one Beverly collared cow was on the Bathurst calving ground.

Proportion of breeding females in June

From the June composition survey, ENR estimated that 75.6% of cows on the calving ground were breeding females, which is considered above average for barren-ground caribou[5].

Fall calf:cow ratios (late October)

ENR attempted a fall composition survey for the Bathurst herd this year (2021), but could not get a reliable Bathurst estimate due to the high degree of overlap and mixing with the Beverly herd. The last survey occurred in October 2020. At that time, the calf:cow ratio was 39 calves per 100 cows. This is considered a moderate-to-good ratio.

Fall sex ratios (late October)

There were no new data presented on this indicator, as the mixing of the herds in fall 2021 made an estimate impossible. The last bull:cow ratio estimated for the Bathurst herd was 64.1 bulls:100 cows in October 2020, which suggested an increasing trend from previous years.

Predators

During June composition surveys, the number of predators seen is recorded. Generally, more grizzly bears are seen than wolves on the Bathurst calving grounds, but the high variability in sightings makes it difficult to estimate a trend in predator numbers over time.

Bathurst Caribou Range Plan and Developing a Cumulative Land Disturbance Framework

Presentation by Karin Clark (GNWT-ENR)

After a brief overview of the Bathurst Caribou Range Plan's[6] background and objectives, ENR gave an update on the development of a cumulative land disturbance framework. Developing this framework was one of the main recommendations that came out of the range planning process.

This framework is an important tool to identify and manage habitat disturbance on the Bathurst range. It establishes three categories of cumulative disturbance or total disturbance within the Bathurst range. These categories are:

- Healthy: low levels of disturbance;
- Cautionary: moderate levels of disturbance; and
- High Risk.

The framework matches the management response to the level of cumulative land disturbance (see Table 3).

[5] Heard (1985) used 0.72 as an average estimate for proportion of breeding females on a calving ground based on Dauphine's (1976) field studies of the Qaminurjuaq herd.
Dauphiné, T. C., Jr. 1976. Biology of the Kaminuriak Population of barren-ground caribou Part 4: Growth, reproduction and energy reserves. Canadian Wildlife Service. Ottawa, ON.
Heard, D. C. 1985. Caribou census methods used in the Northwest Territories. Pages 229-238 in T. C. Meredith and A. M. Martell, editors. Caribou management - Census techniques - Status in Eastern Canada: Proceedings of the Second North American Caribou Workshop. McGill University, Val Morin, Québec.

[6] https://www.enr.gov.nt.ca/sites/enr/files/resources/bathurst_caribou_range_plan_2019_-_plan_pour_laire_de_repartition_des_caribous_de_bathurst_2019.pdf

Table 3: Range Disturbance and Responses

Range Status	Management Response
High Risk	**Intensive:** Restore active disturbance to below threshold level prior to new disturbance.
Cautionary	**Enhanced:** Increased requirements for type and amount of basic management level tools.
Healthy	**Basic**: • Community Guardianship • Habitat Conservation • Road Planning/Management • Offset/Compensatory Mechanisms • Wildfire & Fuels Management • Online Staking

Figure 4 shows what the Bathurst Range looks like with these cumulative disturbance categories applied. Areas 1, 3, and 5 fall within the Green/Healthy category as they exhibit low levels of disturbance. These areas make up 64% of the overall herd range. Areas 2 and 4, which contain most of the communities, roads, mining, and other developments, are in the Yellow/Cautionary status category, with moderate levels of accumulated disturbance; 36% of the herd range falls into this category. There are currently no areas in the High Risk category.

This framework was released in 2019, and the levels of disturbance in each range assessment area need to be updated. ENR has been working with the Cumulative Impact Monitoring Program (CIMP), which has developed an inventory of landscape change. This is a dataset that tracks and reports on levels of disturbance throughout the NWT. ENR is working with a contractor to ensure that the disturbance used in the framework is up to date and reflects disturbances that impact caribou. The updated disturbance dataset specific to the Bathurst range was completed in March 2022.

Habitat conservation

The Bathurst Caribou Range Plan includes recommendations related to habitat conservation. ENR has been working with BCAC members to look at how to best protect or conserve key water crossings or land corridors. ENR has held six workshops to date, with the goal of putting forward recommended areas for conservation.

ENR contracted a consultant to examine caribou collar data to understand where and when caribou are crossing rivers and narrow parts of lakes. The report has been distributed to BCAC members.

Mobile caribou conservation measures (MCCM)

The application of mobile caribou conservation measures is also a

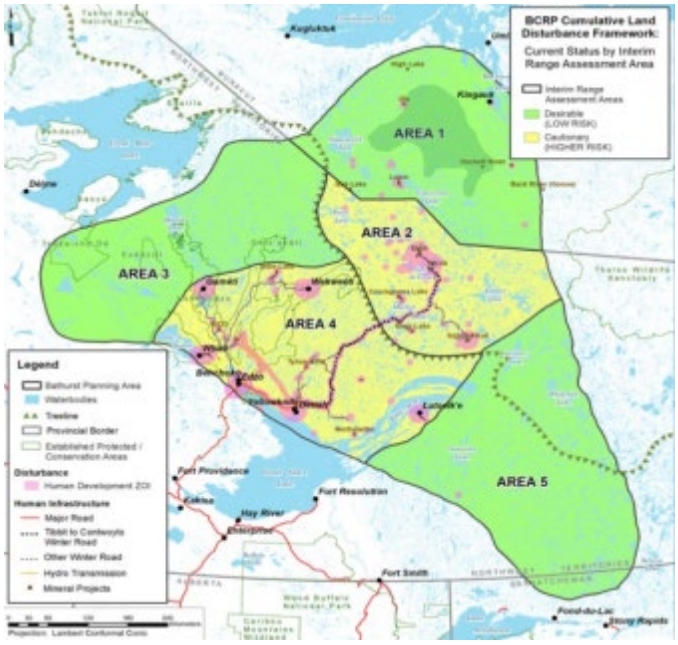


Figure 4: Disturbance Status of the Bathurst Range as of 2019.

recommendation in the Range Plan. The plan applies these measures in the centre of the core use area of the Bathurst herd. ENR has worked closely with an industry partner to develop a preliminary draft implementation framework document and operational guidance for mobile caribou conservation measures. These documents have been provided to BCAC members. ENR has identified a few industry partners that are willing to test the operational guidance document and will try to apply mobile measures to their exploration sites.

ENR will provide caribou movements from collar location data to the land use operator to support this work. Land use operators will supplement this with on-the-ground observations, and in some cases observations from aircraft. When caribou are observed within a certain distance from a camp or an industrial site, the operator is expected to reduce activity to reduce the disturbance to caribou and allow them to move through the area. The framework and operational guidance documents will be revised based on the test application.

Wildfire management

The Bathurst Caribou Range Plan includes recommendations related to wildfire management and identifying important winter habitat areas. The primary mechanism for GNWT to consider caribou habitat in responding to wildfire is through their "Values at Risk" (VAR) hierarchy, outlined in the NWT Forest Fire Management Policy[7]. Human life and infrastructure/property are the top priorities that guide GNWT's decisions about wildfire response, but natural resource values (such as caribou habitat) can factor in as an additional priority. For this management tool to be effective, key habitat areas identified as VAR should be limited in number and comprise specific areas of high priority. The ability of GNWT to protect these key habitat areas from wildfire will be limited by remaining resources in that wildfire season, and by distance to fire bases. In addition, these patches will not be protected indefinitely because doing so can lead to longer-term fuel loading, which in turn leads to increased burn probability and other ecological problems. Caribou habitat areas managed as VARs should be reviewed every 5 years, or more regularly as needed. ENR is working with Indigenous governments and Indigenous organizations to identify important caribou habit. Tłı̨chǫ Government has documented areas and shared them with ENR. Workshops have been held with NWTMN and ŁútsëlK'é Dene First Nation to identify these areas, but the information has not been shared publicly yet.

2021 Wolf Management Program

Presentation by Karin Clark (GNWT-ENR), Stephanie Behrens (Tłı̨chǫ Government-Department of Culture and Lands Protection)

The purpose of the wolf management program is to reduce the number of wolves on the winter range of the Bathurst and Bluenose-East caribou herds to reduce predation and support population recovery. The program is focussed primarily on support for wolf harvesters and the the traditional economy through incentives, training, and research and management. Aerial wolf removals were done in 2020 to meet wolf removal, but were not done in 2021 as wolf removal targets were met by ground-based hunting and trapping.

[7] Northwest Territories Forest Fire Management Policy 53.04.
www.enr.gov.nt.ca/sites/enr/files/documents/53_04_forest_fire_management_policy.pdf

The proposed wolf management program was publicly reviewed by the Wek'èezhìı Renewable Resources Board (WRRB) in 2020/2021 after a pilot year was conducted in winter of 2020. In early January 2021, WRRB approved the wolf management program for four additional years, with 20 recommendations for ENR and the Tłı̨chǫ government on how to implement the program. One of the recommendations was to focus on ground-based harvesting, rather than aerial shooting.

As part of the program, ENR offered enhanced harvest incentives in the North Slave Wolf Harvest Incentive Area. This area is defined in January of each year, based on Bathurst and Bluenose-East caribou collar distribution. Indigenous and non-Indigenous harvesters can receive between $1,200 and $1,950 for wolves harvested from the area. The wolf program also includes a monitoring and research component, comprising wolf abundance surveys, movement analyses, and monitoring health, condition, and diet composition of harvested wolves.

Last winter, a total of 135 wolves were taken by harvesters within the harvest incentive area; 32 by Tłı̨chǫ hunters, 87 by Inuit hunters, and 16 on the winter road which falls within the harvest incentive area. Of the wolf carcasses that were submitted, ENR examined 111 of them. Overall, the wolves were in good condition, with an average body condition score of 2.6 out of 4. The sex ratio of harvested wolves was approximately equal, and age composition of harvest was approximately two-thirds adults and one-third juveniles. When examining the females, 15% were pregnant and 28% had been pregnant previously. Litter size ranged from two to 12 pups, and the average was 6.4 pups. Stomach contents of the submitted wolves indicated diet was predominantly caribou.

Tłı̨chǫ wolf harvesting camp

The Tłı̨chǫ wolf harvesting camp at Roundrock Lake near Wekweètì was set up from January 24 through March 29, 2021. During that time, five rotations of six hunters harvested 32 wolves. In comparison, only 3 wolves were harvested in the initial year of the project (2020). The camp location in 2020 at Reindeer Lake, which is below treeline, was more difficult to access. The hunters were able travel over 3,000 km during the 2021 season.

It was noted that there were other factors that may have led to the increase in the number of wolves harvested in 2021. Snow conditions were perfect for travel, which allowed the hunters to cover more ground. The caribou herd also migrated right into the area where they were camped and as such, the wolves followed them, which also made it easier for the hunters to access them. The hunters set up snares and traps for the wolves, but there were concerns about the potential for caribou to be caught in the snares. Therefore, rifles were used instead.

Wolf Collar Data Analysis

Presentation by Dean Cluff (GNWT-ENR)

This year, ENR biologists are using GPS data from collared wolves to detect when the wolves make a kill of a large animal like a caribou or moose. As they are not able to consume the animal at once, they may revisit the kill site repeatedly for two or three days. Sites were detected with clustered GPS points within a 200-metre area over two days which led biologists to estimate the location of some potential caribou kill sites that could be confirmed on the ground. This may be a useful approach to estimating kill or predation rates.

North Slave Métis Alliance Winter Road Monitoring

Presentation by Jessica Smart (NSMA)

The North Slave Métis Alliance (NSMA) sent monitors out as part of their pilot guardianship program in February and March 2021. [8]

While out on the winter road, monitors were asked to document everything they saw, including the presence of wildlife and humans as well as environmental concerns. They were given observation forms to fill out, GPS units to track their locations, and cameras to photograph what they saw. A total of 54 observations were made (see Figure 5). Of these reports, 30 focused on wildlife, 17 reports concerned human activity, and 7 environmental observations were documented.

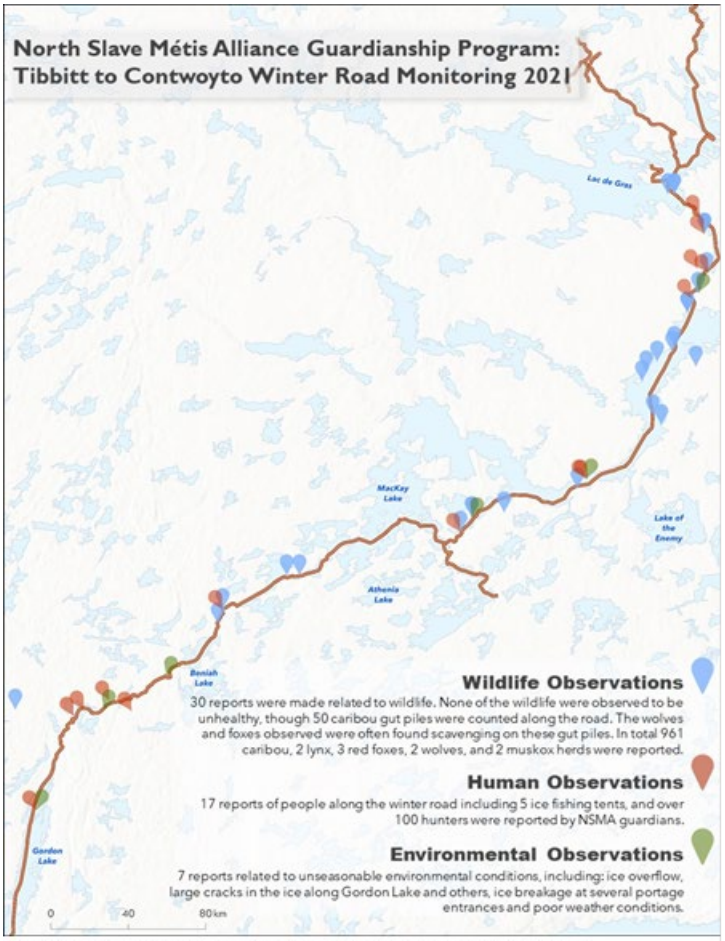


Figure 5: Map of NSMA winter road observations

Most observations were made of caribou. In total, roughly 961 caribou were counted along the winter road. One monitor estimated between 500 and 1000 caribou in one group. The program also documented roughly 20 gut piles in that same region, often with foxes and wolves scavenging on them (Figure 6). All wildlife was characterized as healthy by the monitors.

NSMA attended the Respectful Harvesters Workshop, which was hosted by ENR in December 2021 to discuss illegal and disrespectful harvesting on the winter road. The main outcome of this meeting was to bring multiple stakeholders together to agree on concrete actions to undertake for this upcoming season and to determine how to coordinate efforts moving forward.

[8] The majority all barren-ground caribou harvested in the North Slave region in recent winters has been from the Beverly herd. In 2018 the Beverly herd population estimate was 103,400; there are no harvest restrictions for Indigenous hunters. This Beverly harvest has taken place on mine winter roads east of the Bathurst mobile no-harvest zone. Monitoring programs on the winter roads have focused on this harvest. Harvest of Bluenose-East caribou is restricted under a Total Allowable Harvest and has been relatively limited in recent years.

Ekwǫ̀ Harvest Monitoring Program

Presentation by Stephanie Behrens (Tłı̨chǫ Government - DCLP)

Figure 6: Fox scavenging on discarded caribou (Photo: W. Mercredi, NSMA)

The Ekwǫ̀ Harvest Monitoring Program was developed to monitor the harvesting of both Bluenose-East and Beverly caribou in the Tłı̨chǫ region; all Bathurst harvest has been closed in the NWT since 2015. Bluenose-East harvest is managed using authorization cards, and Tłı̨chǫ community monitors track this harvest. The main monitoring program in 2021 was on the winter roads east of the Bathurst no-harvest zone and in winter 2022 monitoring was within the mobile zone. Utilizing the expertise of elders and harvesters, the program helps to ensure that new generations of hunters are following Tłı̨chǫ traditional practices. The monitors were also able to help hunters understand territorial regulations.

A core value of the program is teaching harvesters how to be safe on the land. Training programs for monitors were held in the communities. While on the land, monitors were able to share some of this knowledge with the hunters they interacted with.

At their check station on the highway, monitors asked hunters a number of questions including:

- How many caribou did you see?
- How many wolves did you see?
- How big were the wolf packs?
- Compared with 10 years ago, were there more or fewer caribou and wolves?

It was noted that there was room for improvement in their data collection practices, as the monitors needed to slow down and focus on filling out their books properly.

Monitors conducted about 120 interviews. According to these interviews, a total of 940 caribou were harvested between February and March. Most of the reported caribou harvested were bulls (699 bulls, 236 cows, 5 unknown); in light of uncertainty in the bull to cow ratio, future monitoring will work to improve accuracy of the sex ratio. Based on distribution of collared caribou, it was assumed that most harvested caribou were from the Beverly herd.

In the future, the Ekwǫ̀ Harvest Monitoring Program will focus on promoting respectful harvesting and educating young harvesters. The goal is to reduce the amount of wastage and incidence of wounded caribou. It was also noted that a lot of the returning hunters pass by the check station at night, after the monitors have left. In the future, the program will aim to have monitors at the station 24 hours per day.

Determining Herd Status and Management Actions

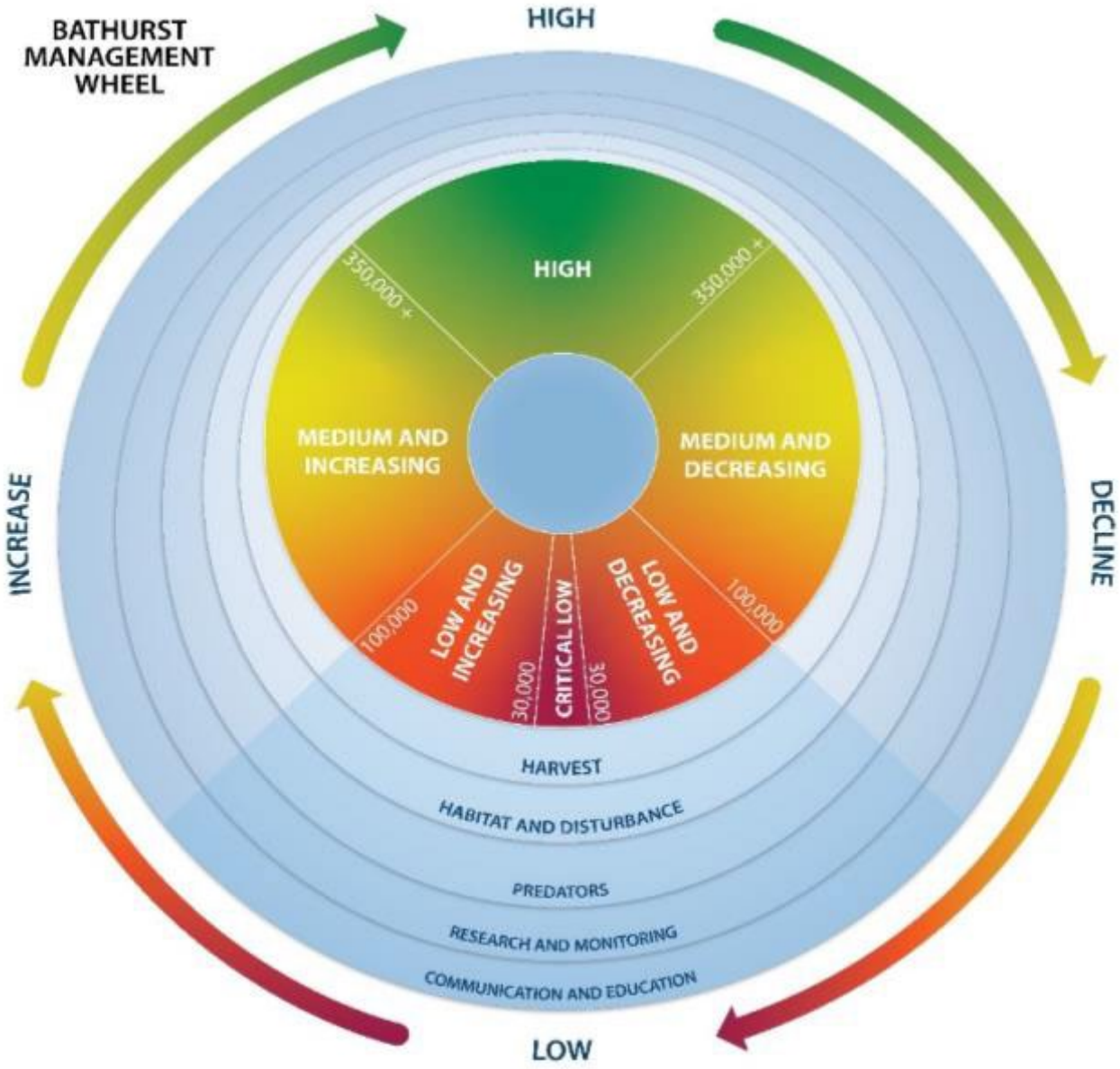


Figure 7: The Bathurst Management Wheel provides a framework for identifying management actions at various herd status thresholds. (Source: BCAC, 2020.)

Each year at the Annual Review on Bathurst Caribou, members of the BCAC review Indigenous, community, and scientific knowledge about the Bathurst herd and seek consensus on a determination of herd status and recommended management actions. This discussion is guided by the Bathurst Management Wheel, a framework for adaptive management in which the herd status guides implementation of various monitoring and management actions for each of the five BCMP subject areas: harvest, habitat and disturbance, predators, research and monitoring, and communication and education.

Each of the six herd status levels is associated with two primary indicators of herd status – population size and population trend. These are: Critical Low, Low and Increasing, Medium and Increasing, High, Medium and Decreasing, and Low and Decreasing. Thresholds of herd size are associated with the boundaries between the status levels. However, herd size and trend are not the only considerations in determining herd status; a suite of indicators informed by all forms of knowledge are also considered. The full suite of indicators is:

- Population size, trend, and rate of change
- Caribou vital rates: cow survival, pregnancy (productivity), and calf survival
- Adult composition (sex ratio)
- Body condition and health
- Predator populations
- Range and movement patterns
- Habitat and environment

The colours of the Bathurst Management Wheel are blurred to reflect that there is flexibility in assigning herd status where information from indicators may be incomplete, and to indicate that there is discretion in the herd status assessment where all indicators from all knowledge sources are considered and discussed.

Bathurst Caribou Herd Status: 2022

The Bathurst herd's status is determined by the primary indicators of population size and trend, as well as all information about the modifying indicators.

Primary indicators

This table provides the most up-to-date information about the Bathurst herd's population size and trend.

	Critical Low	Low & Increasing	Medium & Increasing	High	Medium & Decreasing	Low & Decreasing
Population Size	Less than 30,000	Between 30,000 and 100,000	Between 100,000 and 350,000	More than 350,000	Between 100,000 and 350,000	Between 30,000 and 100,000
Population Trend	↓ or ↑	↑	↑	↑ or ↓	↓	↓
Annual Status Information	R.J. (TG)[9]: We haven't seen a lot because the herd went southeast towards Ekati and got mixed up with the other herds. This year the population is low. It has been down for many years. J.Z. (TG)[10]: We are seeing less and less caribou every time we go out. J.A (ENR)[11]: Estimated number of adult caribou at least 1.5 years old in 2021: 6,243 (95% CI 3,950–9,134). Estimated number of breeding cows: 2,878 (95% CI 1,778–4,660). Estimated number of adult females: 3,808 (95% CI 2,435–5,955) Estimates were based on June 2021 calving ground photo survey and October 2020 composition surveys to estimate sex ratio. Estimated 8.7% annual rate of decrease between 2018 and 2021. Estimated annual rate of decline 25.4% between 2015 and 2018. The estimated rate of decline has slowed.					

[9] Roy Judas (Tłı̨chǫ Government)
[10] Joe Lazare Zoe (Tłı̨chǫ Government)
[11] Jan Adamczewski (GNWT-ENR)

Modifying indicators

This table provides the most up-to-date information about the suite of modifying indicators, based on Indigenous, community, and scientific knowledge.

Monitoring Indicator	Indigenous & Community Knowledge	Scientific Information	Comments
Cow Survival	J.Z. (TG)[12]: The wolves go after the cows and calves. They tend to leave the big bulls alone.	The average of the last three years has been 91%, whereas a stable population would require about an 85% survival rate (along with a corresponding late winter calf:cow ratio of 35:100).	91% is a high survival rate. A stable population would require about an adult cow survival rate of 85% along with a corresponding late winter calf:cow ratio of 35:100.
Productivity & Pregnancy Rate		Percent breeding females on calving grounds: June 2018: 70.4% June 2019: 86.0% June 2021: 75.6% Pregnancy rate of captured cows: 2019: 9/11 (82%) 2020: 30/31 (97%) 2021: 9/10 (90%)	Percent breeding females on calving grounds is above average (relative to 72% for Qamanirjuaq herd as reported by Dauphine 1976) Moderate-to-good pregnancy rates of captured cows, 2018–2021.
Recruitment & Calf Survival	R.J. (TG)[13]: In other years they have seen low calf numbers. 2016–2017 high numbers of calves; 2018–2021 low numbers of calves. P.J. (TG)[14]: Calf:cow ratios: 2019: 31:100 2020: 29:100 2021: 39:100	Calf:cow ratios: Oct. 2019: 32.0:100 (95%CI 28.9–34.9) Oct. 2020: 39.1 (95%CI 36.2–41.9) March 2020: 30.4 (95%CI 26.2–35.0)	Moderate calf:cow ratios 2019–2020. Few recent March surveys results to report due to herd mixing. P.J.: A reason why they are seeing more calves at Contwoyto Lake in summer 2021 may be due to the mixing of the Bathurst and Beverly

[12] Joe Lazare Zoe (Tłı̨chǫ Government)
[13] Roy Judas (Tłı̨chǫ Government)
[14] Petter Jacobsen (Tłı̨chǫ Government)

	The conditions are good for calves but there are still a lot of groups with few or no calves. J.Z. (TG): Some calves are born earlier and grow bigger. They look different and look older than others.		herds.
Adult Composition		Fall bull:cow ratio: Oct. 2017: 59.2:100 (95%CI 50.1–67.8) Nov. 2019: 34.7:100 (95%CI 26.5–43.2) Oct. 2020: 64.1:100 (95%CI 49.9–79.6.)	Higher bull:cow ratio in 2020 than previous years. Increasing herds in NWT in early 1980s had ratios of 65–70 bulls:100 cows.
Body Condition & Health	P.J. (TG): A big difference from the first couple years is that it was really dry, and we used to see the caribou being stressed by the mosquitos. The animals were healthy but not as fat as in the last couple years. There was a lot more rain and it was colder in the last few years. Lots of wind so the mosquitos don't bother the caribou. So we were seeing a lot fatter caribou. They were seeing big antlers early in the season for the last few years, indicating that they're healthier since 2018. In 2020, the animals are looking healthy and fat. In the early years of the monitoring program, they were looking more normal. R.J. (TG): They are all fat. It's good, but we're still not seeing a lot of caribou.	Body condition of captured caribou (for collars) reported very good in 2021.	

Predator Populations	J.Z. (TG): We are seeing wolves chasing the calves. We are also seeing quite a lot of bears. They always hang around the water crossing because calves get weak there. Every day we are losing caribou to the wolves. We got about 20–30 wolves. The wolves don't kill bulls, just calves and cows. R.J. (TG): This was the first year they found a bald eagle nest at Contwoyto. P.J. (TG): The bald eagle range is normally a lot farther south. R.H. (KAA)[15]: They are seeing a lot of bald eagles and golden eagles in the summer in the Contwoyto area since the nineties. Some would harvest calves if they could. J.Z. (TG): One time we were watching the caribou near the Jericho Mine. Every ten minutes we could see a wolf get a calf. Regarding bald eagles: One time in Gamètì, when the caribou started to be there, the eagles started to fly all over, bothering the caribou. The caribou moved away. Those animals are smart. We are seeing more eagles moving north. They like eating fish but they	June calving composition surveys: 2012: 4 grizzly bears, 3 wolves 2015: 4 bears, 3 wolves 2018: 5 bears, 3 wolves 2019: 8 bears, 0 wolves 2021: 9 bears, 2 wolves	Trend: more grizzly bears than wolves seen on Bathurst calving grounds. Incidental sightings of predators on caribou surveys tend to have high variability; difficult to assess trends.

[15] Randy Hinanik (Kugluktuk Angoniatit Association)

	hang around waiting to grab calves. P.J. (TG): We see bears but don't see them bothering the caribou. D.H. (KAA)[16]: There are lots of grizzly bears in the Kitkimeot and they do prey on caribou.		
Range & Movement Patterns	J.Z. (TG): The herd mixed a lot with the Beverly herd and stayed out to the SE, making specific observations difficult. E.E. (NWTMN)[17]: In the past we used to hunt them all over the place in the southern end of the range. Now that the numbers are way down, we only see them during the winter hunt on the winter road. J.Z.: All the caribou stay on the west side of the Koketi (Contwoyto Lake). They don't like the east side (during the last two years, 2020–21). P.J.: The last couple years they stayed on the west side. In the past they stayed on the north side of the lake.	Before 2018: Typically saw 1–3% switching between Bathurst and neighbouring calving grounds (97–99% fidelity). 2018: 3 of 11 (27.2%) known Bathurst cows switched to Beverly calving ground. 2019: 3 of 17 (17.6%) known Bathurst cows switched to Beverly. 2020: No switches. 2021: 6 of 34 (17.6%) known Bathurst cows appear to have switched to Beverly.	2018, 2019, 2020: strong mixing of Bathurst collared caribou with Beverly through winter. Based on 2018 herd estimates, Beverly outnumber Bathurst more than 12:1.
Habitat & Environment	R.J. (TG): The mine road is leading to a lot of stress on the caribou (lots of hunters and mine traffic). J.Z.: The Jericho mine is too close to	Average fire year NWT: 500,000 Ha burned (total). 2019: 100,000 Ha 2020: 21,000 Ha 2021: 145,000 Ha	Last 3 years below average total area burned in NWT.

[16] Darlene Hokanak (Kugluktuk Angoniatit Association)
[17] Earl Evans (Northwest Territory Métis Nation)

	the calving grounds. It's not good. They're not using it (the mine); it should be taken apart. Everything is changing with the weather. Last year we went out to Contwoyto Lake and were surprised to see lots of ice. The weather is starting to change a lot. It's getting warmer. It's affecting how everything grows back. There's no fire out there. The caribou stay put after they calve, but then it rains and gets warmer, and they scatter all over the place as there are lots of mosquitos. The weather affects what they can eat. If the weather is bad, they have to eat other things or travel far away. R.J.: In 2020 there was ice on Contwoyto, and in 2021 it was all ice. It was a long winter there with snow until the end of July. J.Z.: One time we saw them standing in the water for hours on a calm hot day to get away from the insects. When they are bad the flies get into their mouths, noses, and ears and really bother them. They keep their heads low in the vegetation to get away from the bugs. If they walk in the willows, they keep their heads up and get bitten a lot by the mosquitos and even horse flies and black flies. They're pretty bad.	2014 was an extreme fire year with 3,500,000 Ha burned.	

	Climate change is affecting everything, even the marrow in their bones. P.J.: A large group of caribou was standing in the lake (500+ animals). Sometimes the ice/water conditions can be a problem. They fall through the ice or can't make the swim across the lake. J.Z.: Last year there were no berries. This is food for caribou and other animals like wolves and bears. One time there were a lot of forest fires and the caribou trail and breeding ground all burned, from the treeline all the way down to Yellowknife. The willow were just roots sticking out. Made for hard walking and there was no food. It was good for moose but not for caribou. One time a couple years ago at Contwoyto Lake, a couple of people got caribou that were kind of skinny; there was no food in their belly, it just smelled like ashes in their belly. There is nothing for them down this way; they are gone, maybe forever, because there is nothing for them. They come earliest around October; sometimes they have to cross ice. One time in Gamètì, I went down to the lake that broke through the ice and about 20 of them were there. They		

	tried to break the ice, but they couldn't get out. I saw the same thing happen in other places, including Hottah Lake. I kept on moving; there was lots of sand and willows in that direction. One time I went down there, and there was this whole bunch of caribou that wanted to get across, but there was a wolf. The caribou slipped in. It was a waste of a lot of caribou. Today we have a lot of animals altogether, if you look at a map of the big lakes (Hottah, Gamètì). People aren't going out and looking after the caribou because of COVID. P.J.: In the last year, we could see caribou peacefully eating; the cold windy weather made it so there were fewer bugs, and the caribou food was optimal. In past years, 2016–2017, it was hotter and dryer, so the caribou were more stressed when trying to eat. They were moving constantly. R.J.: They didn't even stay in one spot during those hot years. They spent hours in the water. 2018–2021 have been colder than previous years. In 2021 there was snow and ice on the land when we got there. P.J.: During the wet years there are a lot of mushrooms (i.e. 2019), and the caribou do eat those.		

	J.Z./P.J.: There is a lot of melting happening on the eskers, leading to ponds forming there. The sand in some places is just like jelly.		

2022 Herd Status

Based on the information shared and discussed at the 2021 Annual Review, the BCAC determined the status of the Bathurst herd to be:

Herd Status: Critical Low

Management actions are based on the herd status, which is in part determined through the use of approximate population levels. Thresholds for each status level are determined by the historic highs and lows, with input received from community and technical experts. However, it is not only the threshold value that is used to determine the herd status. All available information is used in the determination.

While there are some positive factors described by both the community and scientific presentations, the population estimate provided by ENR combined with community reports of limited caribou led the BCAC to designate the Bathurst herd status as "**Critical Low**".

In 2021, the estimated population was 6,243 (95%CI 3,950–9,134). This is significantly below the threshold of 30,000 that would move the herd status into the "Low" category.

Recommended Management Actions

The BCMP outlines recommended management actions for each of the five Bathurst objectives (harvest, predators, habitat and disturbance, research and monitoring, and communication and education) under each of the six herd statuses (Critical Low, Low and Increasing, Medium and Increasing, High, Medium and Decreasing, Low and Decreasing). A summary of these recommended actions can be found in the BCMP Appendix C, Table C1. The BCMP also includes one-page summaries of the management recommendations for each herd status (see BCMP, pp. 37–42).

Herd Status: Critical Low

When the Bathurst herd is critically low, there are fewer than 30,000 caribou. The herd has contracted its range to the centre of habitation and spends a large part of its annual cycle above the treeline. Caribou trails may be faint or growing over. Caribou may show signs of poor body condition, such as a patchy hide or bony appearance.

The tables in this section summarize the recommended management actions for the Bathurst herd for 2022, based on discussions at the 2021 Annual Review on Bathurst Caribou.

Harvest				
Objective: Strive for the sustainable and culturally respectful harvest of Bathurst caribou over time.				
Task	**Partners**	**Deliverable**	**Priority Level**	**Status**
Maintain a Total Allowable Harvest (TAH) of 0 in the NWT. TAH of 10 bulls in Nunavut	GNWT, NU, and member organizations	Limited tags issued under the Nunavut Agreement and Nunavut Wildlife Act	High	Ongoing since 2016 and 2020 for NWT and NU respectively
Continue implementing the TAH through the use of the Mobile Core Bathurst Caribou Management Zone (MCBCMZ) or Mobile Zone in NWT	GNWT, TG, WRRB	Define the Mobile Zone on a weekly basis during the winter months; distribute to Indigenous governments and regional offices and publish on GNWT website Regular ground-based and aerial surveillance of Mobile Zone	High	A technical working group that includes the GNWT, Tłı̨chǫ Government, and the Wek'èezhìı Renewable Resources Board regularly reviews and provides recommendations on the rules for establishing the Mobile Zone to continue to protect Bathurst caribou while enabling access to harvest adjacent herds.
North Slave Métis Alliance and Tłı̨chǫ Government continue harvest monitoring programs for Beverly herd on Tibbet to Contwoyto winter road	NSMA, TG	Annual report on activities	High	Year two of programs Tłı̨chǫ camp set up on winter road to share information on boundaries of Mobile Zone and to document harvest of Beverly herd. NSMA members drive along the winter road

				documenting and photographing their observations. If members harvest along the road, they report their harvest to the NSMA office, including the health and location of the animal.
ENR compliance and enforcement monitoring at check stations on the winter road and through ground/aerial patrols	ENR	Annual report on activities	High	Ongoing; third mobile station added to existing Gordon and Lockhart Lake check stations.

Predators				
Objective: Manage predator–caribou relationships in accordance with Indigenous values and knowledge, and consider predator reduction when predators may be limiting stability or increase of the herd				
Task	**Partners**	**Deliverable**	**Priority Level**	**Status**
GNWT and Tłı̨chǫ Government continue to implement a Wolf Management Program consisting of support for harvesters and the traditional economy, as well as an extensive research and monitoring program	GNWT, TG	Annual report, review, and evaluation of program components	High	2022 is year three of a five-year program to reduce predation on the winter range of the Bathurst herd. Management actions are listed in the Wolf Management Program Annual Report.[18] Analysis of wolf collar data clustering may be able to provide kill-rate data. This data may help fill an important data gap.
GNWT to maintain enhanced incentives for wolves harvested within the North Slave Region Wolf Harvest Incentive Area GN to offer incentive for wolf harvest	GNWT, GN	Annual report of harvesters participating in program and harvest numbers in the Incentive Area	High	Third year of enhanced incentives from GNWT. The Government of Nunavut provides a $300 incentive for harvesting wolves in the region.
Member groups develop predator monitoring and management programs as needed	TG, KAA	Annual report on activities	High	Tłı̨chǫ Government to continue implementing a wolf harvest program. 2022 is year three of a five-year program.

[18] https://www.wrrb.ca/sites/default/files/DRAFT%202021%20Wolf%20Management%20Annual%20Report%2029%20Nov%202021.pdf

				Kugluktuk Angoniatit Association (KAA) continues to support wolf harvesting on the Bathurst winter range. KAA is also supporting increased sport hunting of grizzly bears by non-resident hunters on the Bathurst Herd's calving grounds. Currently, 15 tags are available for non-resident hunters in the region, and KAA has requested an additional five tags. These tags provide incentives as there is no limit on grizzly bears taken for subsistence use.

Research & Monitoring				
Objective: Increase the state of knowledge of Bathurst caribou population dynamics, range, and ecology				
Task	**Partners**	**Deliverable**	**Priority Level**	**Status**
GNWT to continue biological monitoring activities as per Appendix A		Annual reports provided under Wildlife Research Permit requirements	High	Ongoing as per Appendix A. Most monitoring activities undertaken on annual basis; population estimates every two years.
BCAC member organizations to support Community-Based Monitoring Programs (CBMPs) and provide annual reports on activities	All member organizations	Annual report on activities Annual workshop supporting collaboration between CBMPs Increase sharing of materials created through the CBMPs Provide an update of the Caribou Guardianship Coalition	High	Tłı̨chǫ Government continuing Ekwǫ̀ Nàxoèhdee K'è program, as per Appendix B. Ongoing since 2016. ŁútsëlK'é to continue Ni Hat'ni Dene community-based caribou monitoring program. NSMA to continue to advance a Caribou Guardianship program. KAA to continue to participate in the NWMB caribou monitoring program. KAA members requested that they be able to provide better IQ to the GN biologist through better collaboration. Athabasca Denesųłiné to continue to work on community

				caribou management plan. KRWB communities are collecting opportunistic observations of caribou and predators through the KRWB caribou IQ monitoring program. Member organizations continue towards establishment of the Caribou Guardians Coalition.
Support collaboration with academic intuitions, researchers**,** and other organizations	All member organizations	Invite researchers to share their work with the BCAC Develop a research priorities list Develop a list of ongoing research	High	Participants in the annual meeting expressed interest in: • IEMA's research on the influence of the diamond mines on caribou movements • The Bathurst Camera Project

Habitat & Disturbance				
Objective: Manage land use, including human-caused physical and sensory disturbance, such that Bathurst caribou are conserved within their natural range				
Task	**Partners**	**Deliverable**	**Priority Level**	**Status**
GNWT to continue to implement the Bathurst Caribou Range Plan	GNWT	Habitat conservation – continue workshops in 2022 to identify, prioritize areas and consider legal options for protection Mobile caribou conservation measures - Draft Framework and Operation Guidance; pilot with industry partner Compensatory mitigation –	High	Year three of implementing the plan All partner organizations participate in discussions to further Bathurst caribou habitat conservation Draft Framework and Operation Guidance documents have been shared with BCAC.

		release Framework document; develop inventory of habitat offsets and appropriate compensatory measures		
Population-based responses – Consider additional actions to further limit physical and sensory disturbance on the Bathurst range, including:				
GNWT to consider implementing elements of the BCRP CLDF's Intensive Management Response within the Bathurst centre of habitation; see Table C3 in Appendix C (BCRP CLDF)	GNWT	Update Centre of Habitation (CoH) boundary with most recent caribou collar data and Indigenous knowledge sources; participate in project EAs occurring within CoH	High	Initiated in 2021
Consider applying the Mobile Core Bathurst Caribou Management zone to support the implementation of Mobile Caribou Conservation Measures	GNWT	Pilot Mobile Measures and report on lessons learned	High	Work ongoing since 2019
Define the level of protection within an area specified around priority water crossings and land bridges as identified through TK and/or community direction	All members	Identify and prioritize protections for water crossings and land bridges Update Range Plan periodically	High	GNWT has held a series of workshops focusing on habitat conservation. Tłı̨chǫ Government has documented important water crossing and land bridge locations. GNWT has done a preliminary analysis of collar data to identify important water crossing and land bridge locations. A contractor is writing a summary report,

				which should be available by summer 2022.
Continue to define areas of important winter habitat as identified through TK and/or community direction for consideration in Values at Risk hierarchy for actioning fires		Areas identified and submitted to ENR, Forest Management Division	High	Tłı̨chǫ Government held workshops with elders to document unburned winter range. GNWT makes fire management decisions in accordance with its fire management policy. The policy allows for caribou habitat to be designated as values at risk[1].
Update the level of disturbance within the range	GNWT	Report on the level of disturbance within the range Use the Cumulative Land Disturbance Framework to inform land use decisions.		Cumulative Land Disturbance Framework has been developed and continues to be used in land use decision-making processes.
BCAC member organizations are encouraged to participate in the development of the draft Nunavut Land Use Plan (DNLUP)	All members	Member organizations to report on participation and submissions.	High	The public hearings for the DNLUP have been postponed to summer and fall 2022. BCAC member organizations are able to attend virtually or in person.
BCAC members will participate in EAs occurring in the Centre of Habitation	All members		High	Ongoing
BCAC members will explore potential for expanding Committee into a more formal organization	All members	Development of an independent Bathurst Caribou Committee	High	Ongoing

[1] In the fire management policy, "values at risk" refers to human life and the specific or collective set of natural or cultural resources and improvements/developments that have measurable or intrinsic worth and that could or may be destroyed or otherwise altered by fire in any given area. Values at risk are considered as inputs or criteria in an overall assessment of fire management response. In the policy, there is a hierarchy of priorities for values at risk in which human life and property are highest priority.

Communication & Education				
Objective: Strengthen awareness and support for Bathurst caribou conservation and culturally respectful hunting and land use among people and communities				
Task	**Partners**	**Deliverable**	**Priority Level**	**Status**
GNWT and Indigenous governments and Indigenous organizations continue to promote initiatives to improve harvest practices and reduce wounding and wastage for harvest occurring outside the Mobile Zone	All members	Social media posts, posters, signs, radio programs in Indigenous languages Sight in Your Rifle events Hunter education program delivery	High	Hunter education program available online and will be piloted in schools in 2022
GNWT continue to support harvest of alternate species through Community Harvester Assistance Program (CHAP)	GNWT	Financial support provided to Indigenous governments	High	CHAP funding available annually from GNWT ENR; CHAP program currently under review and revision through public process
Indigenous governments and Indigenous organizations continue to promote cultural practices, on-the-land knowledge-sharing opportunities, and harvest of alternate species	All members	Transmission of local and Indigenous knowledge practices	High	Ongoing
GNWT, Indigenous governments and Indigenous organizations to implement recommendations from the Respected Harvesters Gathering	All members	Follow up on key recommendations: *commitment to work together and improve communication *better coordination among monitors, Guardians and ENR	High	First gathering held December 7–8, 2021 Report of Gathering has been finalized. Follow-up leadership meeting held January 20, 2022

		officers *promote community hunts, hunter accountability, and alternative harvesting opportunities *collaborative public messaging		

APPENDIX A – GNWT monitoring activities

Indicator(s)	Rationale	Desired Trend	Adaptive Management Options	How Often	Notes
1. Estimate of breeding cows and extrapolated herd size from calving ground photo survey	Most reliable estimate for abundance of breeding cows and total number of cows; can be extrapolated to herd size based on sex ratio.	Stable or increasing trend in numbers of breeding cows and herd size in 2023/2024.	If trend in breeding cows increasing, continue as before; if trend stable to negative, re-consider management and earlier population survey (2023 vs 2024).	Every 2 years or 3 years	Last survey: 2021, next survey in 2023 (as herd trend is declining).
1b. Fixed-wing reconnaissance survey west and east of Bathurst Inlet at or near the peak of calving, and a corresponding helicopter/ground-based composition survey	• Assess separation of Bathurst and Beverly caribou at calving • Assess relative abundance and distribution of Bathurst caribou relative to distribution of collared cows • Estimate composition of breeding females, newborn calves, non-breeding females, yearlings, and young males	A comparatively low rate (≤ ~5%) of emigration by Bathurst cows to the coastal calving area of the Beverly herd that is east of Bathurst Inlet.	Subsequent calving reconnaissance surveys (and/or photographic survey) may be planned depending on observed distribution of caribou cows west and east of Bathurst Inlet.	June 2022	This survey is planned for June 2022 only. Distribution of collared Bathurst cows may be influenced by amount of spatial overlap with Beverly caribou in winter.
2. Cow productivity; composition survey on calving ground in spring (June)	Proportion of breeding females in June at peak of calving establishes initial productivity or approximate pregnancy rate.	Proportion of breeding cows at least 80%.	Low ratio indicates poor fecundity and suggests poor nutrition in previous summer; recent high values for BNE herd suggest increased pregnancy rates.	Annual	Part of calving ground photographic survey. Annual survey to monitor initial productivity, to compare to later calf:cow ratios.
3. Fall sex ratio and calf:cow ratio; composition survey (October)	Tracks bull:cow ratio and fall calf:cow ratio. Fall calf:cow ratio provides an index of calf survival from birth through initial 4.5 months.	Bull:cow ratio above 30:100; calf:cow ratio consistently more than 40:100.	If bull:cow ratio below target, consider reducing bull harvest. Low fall calf:cow ratios suggest poor calf survival.	Annual	Sex ratio needed for June calving ground extrapolation to herd size. Higher bull:cow ratios 2020 and 2021 suggest higher bull survival.
4. 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.	At least 35–40 calves:100 cows on average.	Sustained ratios ≤ 30:100, herd likely declining; may re-assess management.	Annual	Calf productivity and survival vary widely year to year, affected by several variables, including weather.
5. Caribou condition assessment from summer Tłı̨chǫ Ekwǫ̀ Nàxoèhdee K'è Program	Condition assessment provides overall index of nutrition/environmental conditions over time.	Continuing observations of healthy caribou and good calf:cow ratios.	Sustained poor condition suggests unfavourable environmental conditions and possibly decline.	Annual	Hunter-killed caribou condition assessment is currently not possible with a zero harvest of Bathurst caribou. Visual assessment in summer is possible.
6. Cow survival rate estimated from OLS model and annual	Need survival of 83–86% for stable herd. Increased collar number to 50 cows should	Continuation of least 85% averaged over 3 years to	If cow survival continues at 85%, or better, herd likely stable; if it declines and stays	Annual	Population trend highly sensitive to cow survival rate; recovery will depend on

survival estimates from collared cows	improve annual estimation.	2025.	below 80%, decline likely.		sustained cow survival of at least 85%.
7. Total harvest from this herd by all user groups (numbers and sex ratio)	Accurate tracking of all harvests is essential to management and to knowing whether management actions are effective.	All harvests reported accurately and within agreed-upon limits.	Re-assess recommended harvest annually; if herd appears to decline, re-assess harvest limit.	Annual	Multiple factors other than harvest may contribute to decline, but harvest is one factor that humans can control.
8. Maintain up to 70 satellite/GPS collars on herd (50 on cows, 20 on bulls)	Collar information is key to reliable surveys, tracking seasonal movements and ranges, monitoring survival and herd fidelity.	Additional collars added every March/April to maintain up to 70 collars on herd.		Annual additions to keep total of 70	Information from collared caribou is essential to monitoring and management of all North American caribou herds.
9. Wolf harvest on Bathurst range	Ongoing wolf removal program (2 of 5 years complete) on Bluenose-East and Bathurst winter ranges to increase adult and calf caribou survival.	Increased harvest of wolves, evidence of depletion of wolf abundance.	Re-evaluation of wolf removal targets as more information is gained on wolf numbers, ecology, and evidence of management effectiveness.	Annual	Herd overlap in winter likely means mixing of wolves associated with those herds and may influence effectiveness of wolf removals.

APPENDIX B – Tłı̨chǫ Government monitoring activities

Programs	Indicators	Rationale/Methods	Desired Outcome	Timeframe
Ekwǫ̀ Nàxoèhdee K'è	Health (body condition and injuries)	Knowing the condition of caribou can give an indication of how well the overall herd is doing and how well they are feeding. When caribou are observed their body condition is rated based on if they are skinny, average, or fat.	More fat and average ratings	Annually (July to September)
	Calf Abundance (calf to cow ratio)	An ekwǫ̀ herd with an average adult female survival rate of 85% would need to have approximately 35 calves per 100 cows in late winter to have a stable population growth rate. Calf abundance in summer would need to be comparatively higher.	High confidence and representative sampling of caribou herds based on ground observations. Summer ratios of at least 35–40 calves per 100 cows	Annually (July to September)
	Predator Abundance	Dìga, sahcho, and nòǫ̀ha are the main predators of ekwǫ̀. If there are high numbers of predators when herds are declining, we know that they are feeding on ekwǫ̀ and their numbers will not increase.	Low observations/ balanced number of predators	Annually (July to September)
	Habitat (weather and vegetation)	Summer weather conditions, including trends in temperature, wind speed and precipitation, have direct and indirect influences on ekwǫ̀ health and fitness for the coming months of the rut and the long winter migrations. Summer weather influences plant growth and forage quality, which, in turn, influences ekwǫ̀ nutrition and body condition and fitness. It is important when we are on the land to observe and assess the vegetation and caribou forage.	Rich, moist soil producing succulents, good quality lichens, grasses, shrubs, and dwarf birch	Annually (July to September)
	Insect Activity	Biting and parasitic insects may influence ekwǫ̀ foraging behaviour and activity levels, which in turn may affect body condition and pregnancy rates of ekwǫ̀.	Low insect activity is desirable so that ekwǫ̀ can feed well through the growing season	Annually (July to September)
	Industrial Infrastructure and Activity	Industrial activity can be a sensory disturbance for caribou that can negatively impact animals' ability to rest and feed properly. Industrial infrastructure may negatively impact the herds' ability to migrate to seasonal feeding grounds and can fragment their seasonal ranges.	No industrial obstacles that fragment habitat, and less industrial activity causing sensory disturbance	Annually (July to September)
Ekwǫ̀ Harvest Monitoring Program	Harvest Management	Overharvesting may contribute to the decline of many caribou herds; we want to prevent that for caribou and see them become plentiful again. It is important that harvesting is consistent with the WRRB determination for a harvest of zero Kokètì Ekwǫ̀.	Compliance with WRRB determination for zero harvest	Annually (December to May)

	Health (body condition and injuries)	Hunters tend to target healthy, fat animals to feed their families. It is important to note if ekwǫ̀ are unhealthy because it could indicate the health of the larger herd. Observations of body condition and injuries would focus on ekwǫ̀ outside the MCBCCA.	Hunters' observations of ekwǫ̀ with rounded rumps, lots of fat, and good carcass conditions and meat quality	Annually (December to May)
	Predator Abundance	We will work with Tłı̨chǫ hunters and monitors to help track predator observations. Monitoring the relative occurrence of predators seen by hunters and monitors while harvesting caribou helps to understand the ongoing level of predation.	Low sightings of wolves (including wolf-killed caribou) and wolverines	Annually (December to May)
Dìga Harvesting Program	Number of Dìga Killed	Increased harvesting of dìga decreases their abundance on the landscape and predation on ekwǫ̀ which gives a better chance for ekwǫ̀ numbers to recover.	Sustainable amount that allows for the recovery of ekwǫ̀	Annually (January to April)
	Ekwò Abundance and Composition	Participants of the Dìga Harvesting Program complete questionnaires by ENR and are asked how many ekwǫ̀ are observed; watching the amount of ekwǫ̀ can give insight on the interaction and relationship between dìga and ekwǫ̀.		Annually (January to April)
	Catch-Per-Unit-Effort (CPUE)	Trends in CPUE metrics, such as the number of km traveled or hours driven on snowmobiles by hunters, will be used to assess relative occurrence of dìga numbers.	A decrease in CPUE of wolves would be predicted if wolf occurrence (density) has declined because of wolf management actions	Annually (January to April)