Ekwǫ̀ Nàxoèhdee K’è

2022 Results

Kokètì

Ek'atì

Deèzàatì

Dedats’eetsaa:
Tłı̨chǫ Research & Training Institute
www.research.tlicho.ca

2023

2022 Field Team: Bobby Migwi, Joe Mackenzie, Joseph Moosenose, Joe Lazare Zoe, Petter Jacobsen, Russell Drybones, Terrence Whane, Julian Behrens, Germaine Eyakfwo, Camilia Eyakfwo, Ahri Ekendia, Irene Lafferty, Jayden smith, Quinn Rabesca, Hardy Mantla, Tyanna Steinwand, Louisa Mackenzie, Avery Huskey, Tony Williah, Roy Judas, Janet Rabesca, Irene Lafferty, Bobby Nitsiza, Eva Mantla, Johnny Boline, Charlie Eyakfwo, Stephanie Behrens, John Nishi, Aimee Guile, Charlie Eyakfwo, Denise Lazare Zoe, Eva Mantla, Janelle Nitsiza, Louis Zoe, Therese Zoe, Ernie Wedawin, Sean Richardson, and Ete Zoe.

2021 Field Team: Michel Louis Rabesca, Joe Lazare Zoe, Russell Drybones, Jimmy P. Mantla, Roy Judas, Leon Ekendia, Richard Romie, Terrence Whane, Julian Behrens, Tyanna Steinwand, Louisa Mackenzie, Carter Wetrade, Janelle Nitsiza, Janet Rabesca, Cody Mantla, Bobby Nitsiza, Johnny Boline, Archie Zoe, Camilia Zoe Chocolate, Charlie Eyakfwo, Stephanie Behrens, Aimee Guile, JJ Simpson, and Eva Mantla.

2020 Field Team: Janelle Nitsiza, Louis Zoe, Therese Zoe, Joe Lazare Zoe, Russell Drybones, Leon Ekendia, Nora Ekendia, Joseph Judas, Joseph Whane, Bobby Nitsiza, Albina Nitsiza, Karin Clark, Roy Judas, Aimee Guile, Peter Huskey, Jimmy P Mantla, Johnny Boline, Archie Zoe, Jasmine Blackduck, JJ Simpson, Petter Jacobsen, Camilia Zoe Chocolate, Charlie Eyakfwo, Stephanie Behrens, Doreen Liske, Victor Huskey, Avery Huskey, James Lafferty, Ahri Ekendia, Louisa Nitsiza, Peter Nitsiza, Eddie Erasmus, Albert Nitsiza, and Eva Mantla.

2019 Field Team: John Franklin Koadloak, Mercie Koadloak, Russell Drybones, Leon Ekendia, Bobby Nitsiza, Roy Judas, Mike Simpson, John B. Zoe, Joe Lazare Zoe, Eva Mantla, Peter Huskey, Jimmy P Mantla, Nora Ekendia, William Apples, Archie Zoe, Albina Nitsiza, Jasmine Blackduck, JJ Simpson, Petter Jacobsen, John Nishi and Camilia Zoe Chocolate.

2018 Field Team: Joe Lazare Zoe, Russell Drybones, Jimmy Mantla, Petter Jacobsen, Roy Judas, Leon Ekendia, Tyanna Steinwand, Mercie Koadloak, John Franklin Koadloak.

2017 Field Team: Joe Lazare Zoe, Russell Drybones, Narcisse Rabesca, Petter Jacobsen, Roy Judas, Leon Ekendia, Tyanna Steinwand, Mercie Koadloak, John Franklin Koadloak.

2016 Field Team: Michel Louis Rabesca, Moise Rabesca, Sean Richardson, Archie Black, Petter Jacobsen, Domenico Santomauro, Leon Ekendia, Roy Judas, and Jorgen Bolt (Kugluktuk HTO).

Program Advisors: Joseph Judas, Joe Rabesca, Michel Louis Rabesca and John B. Zoe.
Planning & Logistical Team: Tyanna Steinwand, Lydiah Rabesca, Jocelyn Zoe, Janelle Nitsiza, Tammy Steinwand- Deschambeault, Stephanie Behrens, John Nishi and Petter Jacobsen.
GIS technicians: Terrell Knapton-Pain, Shahrooz Pirkoohi and Michael Birlea
Principal Investigator: Petter Jacobsen

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Tłı̨chǫ Government
P.O. Box 412 - Behchokǫ̀, NT - Canada, X0E 0Y0
Telephone: 1-867-392-6381 Facsimile: 1-867-392-6389

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Tłı̨chǫ Yatıì

Placenames

Kokètì	Contwoyto Lake
Kwıìdlìachı̨ı̨	Fry Inlet (slingshot handle lake)
Ek'atì	Lac de Gras
Ek'adıì	Island on Lac de Gras
Kwek'atì	This is an older name for Lac de Gras – referring to the white rocks found around the lake
Ewaànıt'ıìtì	Courageous Lake
Nǫdìikahtì	Mackay Lake
Łıwets'aɔòats'ahtì	Lac de Sauvage

Deèzàatì	Point Lake
Dı Cho	Big Island on Deèzàatì
Deèzàatìdeè	Coppermine River
Wek'ehaelı̨ı̨tì deh	Parent River
Wek'ehaelı̨ı̨tì	Parent Lake
Saat'ootì	Redrock lake
Tatsotì	Grenville Lake
Gotsokatì	Mesa Lake
Wek'ewhàılııtì / Ets'àıtì	Rawalpindi Lake

Geographical Terminology Useful for Ekwǫ̀ Monitors

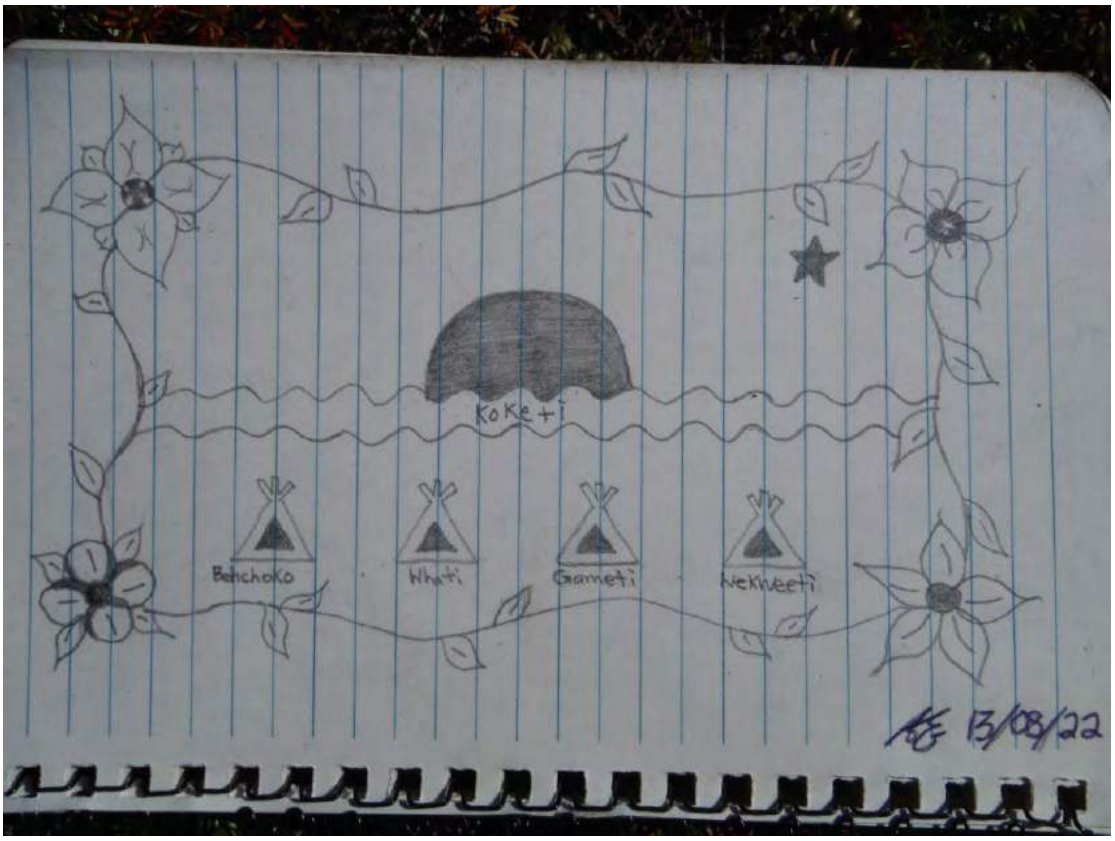
Ekwǫ̀ Nǫɔokè	Ekwǫ̀ Water crossing (any place animal can swim across)
Ekwǫ̀ Naɔokè	Ekwǫ̀ Water crossing (a place ekwǫ̀ *always* swims across)
Tataà	Land between water bodies
Whatàa	Esker
Hozìı	Barrenland
Hozìı Deè	Barrenland; farthest out, "Big barrens"
Hozìı shìa	Hill or mountain on barrenland
Sıh / shıh	Hill or mountain
Daka	High points
Ts'ıwıì	Stands of trees (black spruce) on barrenland
Tì	Lake/water
Ta	Water; prefix of a word to do with water
Deh	River
Taıɔaa	Meandering river
Dehtì	River lake (a lake in the flow of a river)
Dı	Island
Tł'à	Bay
tł'ą̀ą	Beach

Tabàa	Lake shore or beach
ɔehdah	A point of land
ʔehdahkwʼo	Peninsula
Tı k'abàa	Shoreline (walking by the shoreline)
Wha	Sand: prefix to do with sand / or a pole
Nałeezee	Ekwǫ̀ calving grounds
Dechɻlaa	Treeline
Chɻk'è	North
Sazhɻ/ sazɻ	South
k'àbatsǫ̀ǫ̀	East
dą̀ą̀	West

Wildlife Terminology Useful for Ekwǫ̀ Monitors

Hozìı Ekwǫ̀	Barren-ground ekwǫ̀
Kokètì ekwǫ̀	Bathurst ekwǫ̀ herd
Sahtì Ekwǫ̀	Bluenose-east ekwǫ̀ herd
Tǫdzìı	Woodland / boreal ekwǫ̀
Ekwǫ̀ łexè kʼeɔàa	Ekwǫ̀ herd
Ekwǫ̀ akwe etłee	Ekwǫ̀ leader / lead ekwǫ̀ (any sex)
Ts'ìda akwe etłee	Cow leader
Chıa/Tsıa	Ekwǫ̀ calf
Ts'ìdaa	Yearling (2 or 3 years old)
Wedzıìke /wedzıìkea	Cow with no calf
Dets'èa	Young cow ekwǫ̀
Dets'e	Mature Cow ekwǫ̀
Wozaà	Cow with calf
Yèagoa	Young bull ekwǫ̀; 3-year-old
Yèago	Bull
Yèagocho	Bull ekwǫ̀, biggest bull
Wedzıìhcho	Oldest bull
Wedzıì	Bull ekwǫ̀
Nadeèzhǫ	Older bull ekwǫ̀
Ekwǫ̀ nàxoèhdee kʼè	In the migration of ekwǫ̀
Nadeeɔà	Migrating ekwǫ̀
Ekwǫ̀ na da dıı	Ekwǫ̀ left behind during migration: "ekwǫ̀ that go half way"
Nììzaa	Ekwǫ̀ migrating towards the forest in the fall
Nadèezoǫ	Ekwǫ̀ migrating to the calving grounds
Ekwǫ̀ edè	Ekwǫ̀ antlers
Ekwǫ̀ keè	Ekwǫ̀ tracks
Ekwǫ̀ eto	Ekwǫ̀ trail
Ekwǫ̀ ekʼa	Ekwǫ̀ fat
Dìga	Male wolf
Dìga detsʼè	Female wolf

Dìgazha/ Dìgaza	Wolf pup/ pups
Dìga wozaa /wezaa	Wolf litter
Dìga eɔoo	Wolf den
Dìga nàdè	Wolves family / community / wolves living together
Dìga nàdèe k'è	Wolf habitat
Sahcho	Grizzly bear
Hozìı edzıe	Muskox
Nǫ̀gha	Wolverine
Dıdı	Ground squirrel / barrenland squirrel
Dedìı	Moose
Kw'ıh	Mosquito
Behk'òts'ìą	Arctic tern
Tatsǫ̀ gah	Raven
Hatsǫ̀ga	Crow
Tı tso	Loon
Det'ǫcho	Eagle
Ets'imbaa	Arctic fox



Artwork by Ahri Ekendia, August 2022.

Ekwǫ̀ Nàxoèhdee K'è - Introduction

Started in 2016, the Ekwǫ̀ Nàxoèhdee K'è ekwǫ̀ monitoring program has brought Tłı̨chǫ people to the ancestral hozìı ekwǫ̀ (barren-ground ekwǫ̀) harvesting locations on hozìıdee (barrenland). The basecamp at Kokètì (Contwoyto Lake), located in the northernmost region of Tłı̨chǫ traditional territory, is on the summer range of the Kokètì ekwǫ̀ (Bathurst ekwǫ̀) herd; the place where hozìı ekwǫ̀ migrate with their newborn calves to spend the summer.

In an ongoing commitment, the Tłı̨chǫ Government persistently engages in monitoring endeavors to comprehensively study and oversee the ekwǫ̀ herds, guided by the traditional wisdom of Tłı̨chǫ elders and harvesters. Both the Kokètì ekwǫ̀ and the Sahtı ekwǫ̀ herds undergone significant declines over the past decade. The latest calving ground surveys, carried out in June 2021, revealed that the Kokètì ekwǫ̀ population was estimated at 6,243 individuals, marking a 99% reduction from its peak recorded population of 480,000 in the 1980s. The Sahtı ekwǫ̀ population (Bluenose East herd) was estimated at 23,202 ekwǫ̀, indicating a modest increase from 19,294 animals counted in the previous survey in 2018. In an ongoing commitment, the Tłı̨chǫ Government continues our program to comprehensively study and interact with the ekwǫ̀ herds, guided by the traditional wisdom of Tłı̨chǫ elders and harvesters.

The monitoring goal is to assess the state of hozìı ekwǫ̀ within its summer range, with a specific emphasis on four primary indicators: (1) habitat; (2) ekwǫ̀ health; (3) predator presence; and (4) industrial development impacts. The program is a collaboration between the Tłı̨chǫ Government, GNWT-ENR, the Wek'èezhìi Renewable Resource Board (WRRB). Funding was provided by Tłı̨chǫ Government, Arctic Canadian Diamond Company, and the GNWT-Cumulative Impact Monitoring Program[1] (CIMP).

Photo 1: Kokètì Basecamp. Photo Pat Kane

Photo 2: Deèzàatì basecamp. Photo Petter Jacobsen

The program operates from three basecamps situated on the barrenlands (map 1). The primary basecamp is located at Kokètì, where ekwǫ̀ monitoring efforts have been ongoing for seven years, starting in 2016 (Photo 1). In the summer of 2020, an additional base camp was established at Deèzàatì (Point Lake) to oversee the monitoring of the Sahtı ekwǫ̀ (Photo 2). Establishing the ekwǫ̀ monitoring program at

[1] This project receives funding from Government of the Northwest Territories Department of Environment and Natural Resources, Northwest Territories Cumulative Impact Monitoring Program. More info can be found at: http://www.enr.gov.nt.ca/en/services/cumulative-impact-monitoring-program-nwt-cimp

Deèzàatì was based on WRRBs (2019) recommendation (#15-2019) to expand TG's monitoring to the summer range of Sahtı ekwǫ̀. Deèzàatì was selected as its the largest waterbody on the Sahtı ekwǫ̀ range within the Wek'èezhìi and because of the rich Tłı̨chǫ cultural history on the lake. In August 2022, we expanded the program to Ek'atì (Lac de Gras) and Łıwets'aɔ̀ats'ahtì (Lac de Sauvage). Basecamp was set up on an island on Łiwets'aɔ̀ats'ahtì, and we spent two weeks monitoring caribou around the two lakes and the surrounding land. The long-term plan involves establishing a research camp on Łiwets'aɔ̀ats'ahtì, and initiate research and monitoring activities on the lakes around the mines in the years ahead.

Photo 3: ENK camp on Łıwets'aɔ̀ats'ahtì (Lac de Sauvage), August 2023. Photo: Petter Jacobsen

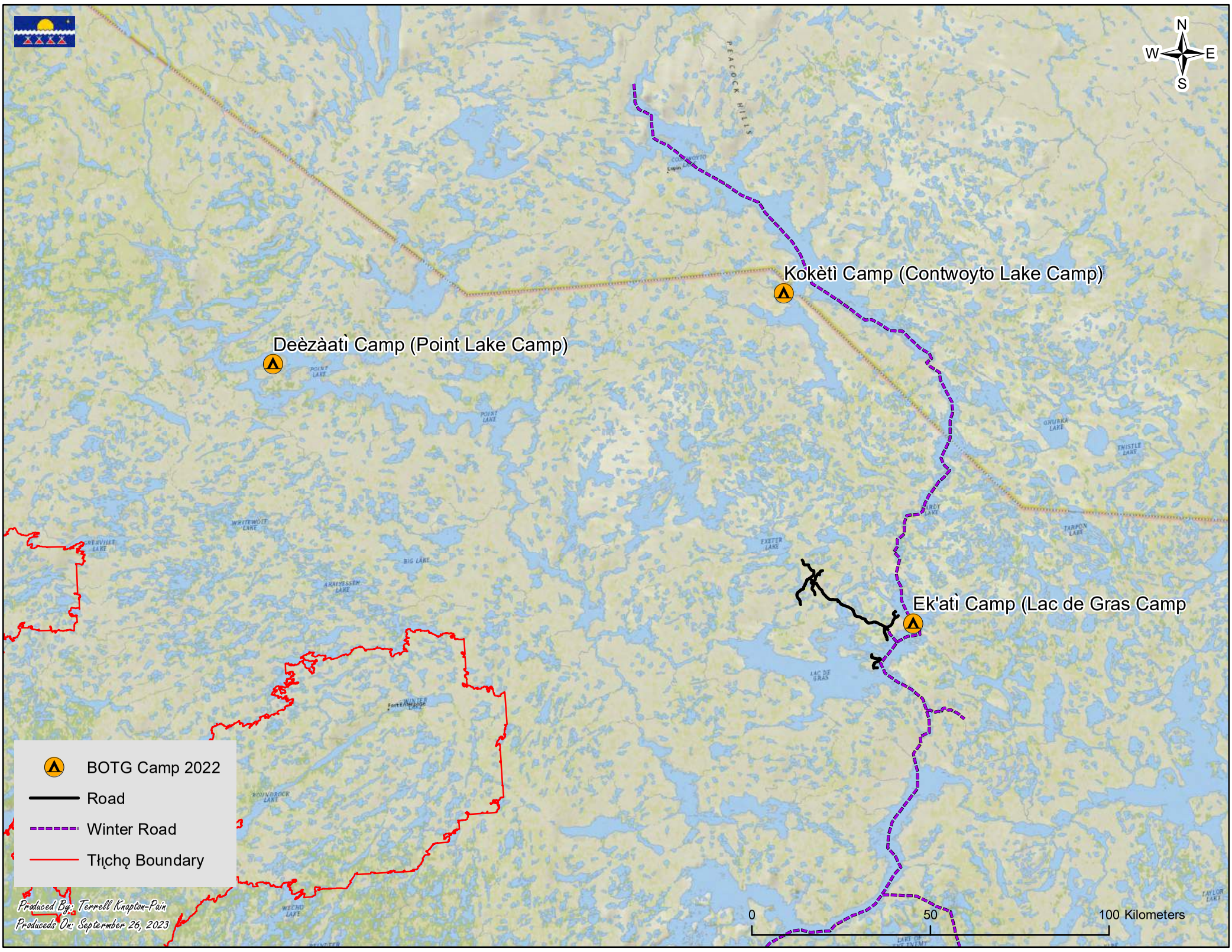
Between 2016 and 2022, the monitoring and search efforts of the teams have consistently grown, leading to more frequent and comprehensive wildlife observations. Table 1 provides an overview of the program's annual progression, highlighting the increase in monitors, field days, travel distances, and monitoring hours.

Through Ekwǫ̀ Nàxoèhdee K'è, Tłı̨chǫ travel to their ancestral harvesting locations on Kokètì and Deèzàatì, where we reconnect to cultural places and ekwǫ̀. Thus, the program helps Tłı̨chǫ participants to "go back to the original source to remember" (John B. Zoe) the stories, language, knowledge, and cultural ways of life. An important process to continue maintaining the relationship with the land and animals, because "our relationship with ekwǫ̀ defines who we are. It's a foundation for our nàowo – a Tłı̨chǫ concept that encompasses our language, culture, way of life, as well as our knowledge and laws" (Zoe 2012a, p. 69).

Monitoring Efforts 2016-2022

	2016	2017	2018	2019	2020	2021	2022
Caribou Monitors	8	10	10	25	40	28	46
Field Days	26	40	40	57	48	66	95 (Koketì - 60)
Distance Travelled	481 kms	1186 kms	1784 kms	3240 kms	2561 kms	3572 kms	4360 kms (Koketì - 2322)
Monitoring Hours	140	207	218	325	190	266	423 (Koketì - 235)

Table 1: Monitoring Efforts 2016-2022


N
W
E
S
Kokètì Camp (Contwoyto Lake Camp)
Deèzàatì Camp (Point Lake Camp)
Ek'atì Camp (Lac de Gras Camp
BOTG Camp 2022
Road
Winter Road
Tłı̨chǫ Boundary
Produced By: Terrell Knapton-Pain
Produceds On: September 26, 2023
0
50
100 Kilometers

We apply the Tłı̨chǫ research methodology, "We Watch Everything" to study current environmental conditions, cumulative impacts to ekwǫ̀ health and population numbers, and gain firsthand experience of the ekwǫ̀ life cycle. The research methodology "Do as Hunters Do" is formed around traditional ways of traveling the land and sharing knowledge through peoples daily activities and interactions on the land (Zoe 2012b). In and around the lakes, we travel the land by boat and on foot to key geographical features known as ekwǫ̀ nǫ̀ǫ̀kè (ekwǫ̀ water crossings), where elders have always anticipated ekwǫ̀ herds' arrival. The monitors sit in position, in the same way a traditional hunting party would have done, to wait, and watch the ekwǫ̀ and their habitat. Using traditional hunting methods as wildlife monitoring methods, and traditional hunting locations as monitoring places, we conduct research by doing what the ancestors did successfully to survive the harsh sub-arctic environment from time immemorial.

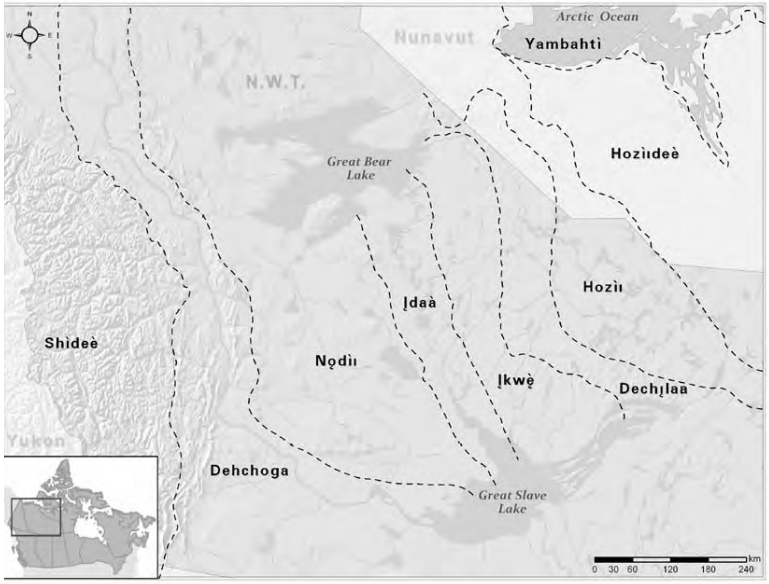
This report presents overview of the 2022 field season, including:

- **Kokètì ekwǫ̀ monitoring results from Kokètì and Ek'atì,**
- **Sahtı ekwǫ̀ monitoring results from Deèzàatì**
- **Results from monitoring around Ek'atì**
- **Trend Analysis from 2016 to 2022;**

For information about program activities and results from 2016 to 2022, please see our reports, documentaries and photos on the website https://research.Tłı̨chǫ.ca/research/bootsontheground.

Kokètì Monitoring Area and Timeline

The study area is situated entirely within hozìıdee (map 2), referring to the region beyond hozìı (barrenland); a place without trees and only low growth shrub vegetation (Andrews 2011). The area is classified as a tundra biome and is in the Arctic Tundra climatic zone. Geographically, the ekwǫ̀ monitoring area is focused around Kokètì (Contwoyto Lake), Kwìdlìachı̨̀ (Fry Inlet), and the surrounding land that can be reached within one day's walking distance from these lakes (map 3). The Tłı̨chǫ name for Contwoyto Lake is Kokètì, translated as "empty campsite lake," in reference to the many camps erected around this lake throughout history. Kokètì is located at the northernmost extremity of Tłı̨chǫ traditional land use and is situated in Hozìıdee described as "big barrens" (Andrews 2011). The lake is importantly situated directly southwest of Bathurst Inlet, home to the herds calving grounds.



Map 2: Tłı̨chǫ Landscape Units. Source: Andrews 2011

Hozìıdee is a shared region utilized by both the Tłı̨chǫ and Inuit people for harvesting hozìı ekwǫ̀ in summer and fall, fur trapping in winter, and as a trade route facilitating interactions between the two cultures. Inuit and Tłı̨chǫ have a long history of meeting at historical hozìı ekwǫ̀ hunting locations. The land surrounding Kokètì play a pivotal role in both the post-calving and summer ranges of the Kokètì ekwǫ̀. Come July, following calving, herds of cows and calves migrate from the calving grounds and join the bulls, amalgamating into larger herds. The cows lead their newly born calves to these feeding grounds around Kokètì, allowing the calves to feed, nourish themselves and grow adequately before the fall migration and the onset of winter.

Kokètì runs approximately northwest to southeast, effectively dividing the post-calving summer range of the Kokètì ekwǫ̀. The land around the large lake provides a low rolling landscape with optimal caribou habitat and refuge from biting insects; heavily influenced by winds coming off the lake. At its widest point, the lake is approximately 19 kilometres wide, and numerous eskers and islands form nǫʔokè (water crossings) that ekwǫ̀ use to cross the lake. The elongated shape of the lake creates a network of nǫʔokè along both eastern and western shores of the lake that creates corresponding ekwǫ̀ etǫ (ekwǫ̀ trails) dug deep into the ground as these etǫ are continuously used every summer. Kokètì is accessible by canoe and floatplane during the summer; in the winter months it is reached by snowmobile from Kugluktuk or via winter ice road to Yellowknife. The Tibbitt-Contwoyto Winter Road (TCWR Joint Venture) is built from Yellowknife through Kokètì for mining resupply (map 1), although the winter road access north of the Diavik and Ekati mines has not been open each year. There are currently two non-active mines (Lupin and Jericho) in the monitoring area, and several active mines south of the area (Ek'atì, Diavik, and Gahcho Kuè) as well as several abandoned exploration camps scattered across the landscape.

Photo 4: Kokètì camp in channel between Kokètì (Contwoyto lake) and Fry Inlet. August 2022. Photo: Aimee Guile.

Field Teams

During 2022, our monitoring at Kokètì took place over a combined period of 99-days between July 22nd and September 28th, during which six teams (Teams A to F) conducted shifts of three and two weeks (Table 2).

Herd Range	ENK Camp	Field Team	Field Days - 2022				
			Start	End	Personnel	# Days	Person -Days
Bathurst	Kokètì	A	22-Jul	11-Aug	8	20	160
		B	11-Aug	31-Aug	7	20	131
		C	31-Aug	20-Sep	9	20	180
	Ek'atì	D	19-Aug	29-Aug	6	11	66
Bluenose East	Deèzàatì	E	02-Sep	15-Sep	9	14	126
		F	15-Sep	28-Sep	7	14	98
Total					46	99	761

Table 2. Summary of field activities for ENK monitoring, summer and fall 2022

The teams' daily fieldwork is done by boating and walking. In total the six field teams travelled 4359 km, and spent 423 hours traveling the land and watching wildlife. At Kokètì, the teams traveled 2322 kilometres by boat and walking, and 266 hours traveling and watching wildlife (Table 3). The teams travelled the lakes by boat and walked inland to get into proximity to the *ekwǫ̀* herds. The daily monitoring locations were determined using the harvesters' knowledge of *ekwǫ̀* movement and GPS collar locations of Kokètì ekwǫ̀ provided by GNWT-ENR three times per week.

ENK Camp	Distance			Time			# Trips
	Boat (km)	Walk (km)	Total (km)	Travel (h)	Observation (h)	Total (h)	
Kokètì	1017.8	63.9	1248.7	74.0	29.6	103.6	25
	634.7	30.8	665.5	32.3	51.9	84.2	10
	385.3	23.0	408.3	27.1	20.4	47.5	7
Ek'atì	514.2	53.0	567.2	43.4	20.4	63.8	10
Deèzàatì	429.4	20.7	450.2	20.5	13.1	33.6	9
	967.4	52.4	1019.8	46.2	44.0	90.2	13
Total	3948.8	243.8	4359.6	243.5	179.4	422.9	74

Table 3: Summary of distance travelled (km) and time spent (h) during field activities for ENK monitoring, summer and fall 2022

Photo 5: Ahri Ekendia, Russell Drybones, Sean Richardson & Joe Mackenzie spotting caribou from the boat. Photo: John Nishi.

Photo 6: Ernie Wedawin splitting wood at Kokètì camp. Photo: John Nishi.

Photo 7: Youth Jaden Smith, Roy Judas, Quinn Rabesca, and Aimee Guile at Kokètì camp

Photo 8: Joe Mackenzie walking along the caribou trail, Kokètì August 2022.

Photo 9: Hardy Mantla and Germaine Eyakfwo in the boat at Kokètì. Photo: Ete Zoe.

Photo 10: Dry fish making at Kokètì camp. Photo: John Nishi.

The Silent Crisis – Dramatic Decline of the Kokètì Ekwǫ̀

In 2018, the NWT Conference of Management Authorities (CMA) listed the *hozìı ekwǫ̀* (barren ground ekwǫ̀) as *Threatened* in the Northwest Territories, based on a 2017 assessment by the Species at Risk Committee (SARC 2017). The CMA listing *threatened* means that the barren *hozìı ekwǫ̀* species in NWT is declining and there are threats that could cause the entire species to disappear in our children's lifetime. Furthermore, the listing states that "barren ground caribou is likely to become endangered in the NWT if nothing is done to reverse the factors leading to its extirpation or extinction" (SARC 2018).

For the *Kokètì ekwǫ̀*, the most recent calving ground survey, conducted in June, 2022, estimated the total herd population to be 6,843 ekwǫ̀ (Adamczewski et al. 2022 unpublished). At its historic recorded high in 1986, the Bathurst herd was estimated at about 470,000 ekwǫ̀, and the estimate of 6,843 ekwǫ̀ in 2022 represents just 1.3% of the population high. Emigration of some Bathurst ekwǫ̀ to the Beverly herd is likely an important contributing factor in the recent observed decline between 2018 and 2021. The main contributors to the continued decline are low survival rate for adult female *ekwǫ̀*, and poor reproduction rates of the herd, which include low survival rate for calves (Government of the Northwest Territories and Tłı̨chǫ Government Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground ekwǫ̀) Herd: 2019 – 2021).

This dramatic rate of decline for the *Kokètì ekwǫ̀* herd meets the criteria for being *endangered*, according to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2015). If current trends continue, the Bathurst herd will meet the criteria for *critically endangered*. In such a scenario, the herd "may not recover for decades to a size that could sustain a meaningful level of hunting" (TG - GNWT Joint Management proposal for Bathurst *Ekwǫ̀* 2019).

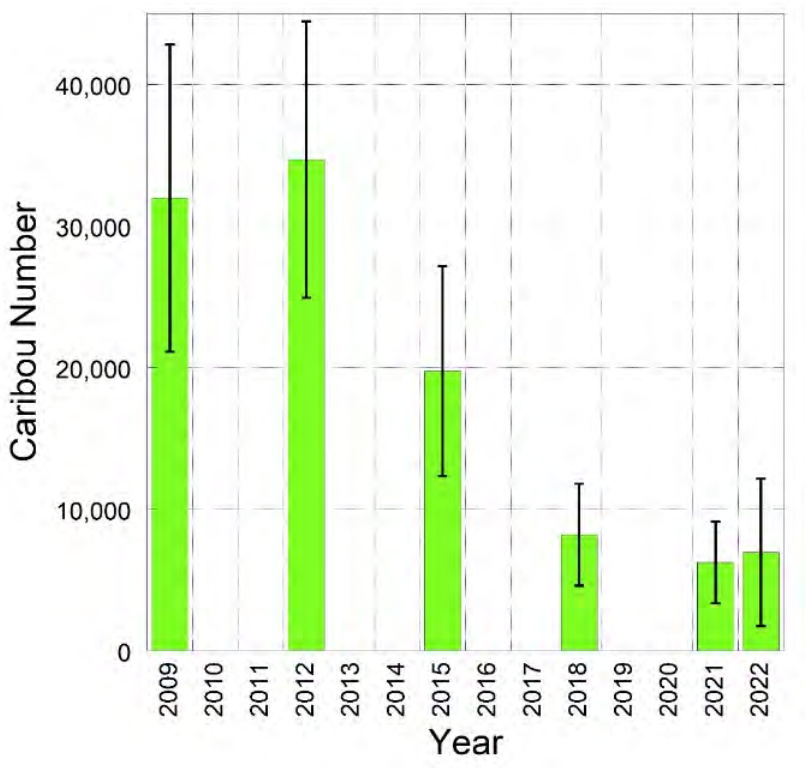


Figure 1: Bathurst herd calving population estimate 2009-2022. Source: Adamczewski et al. 2022 unpublished.

2022 Results

Caribou (ekwǫ̀) were the most abundant species seen by field teams. A total of 4310 ekwǫ̀ within 264 groups were observed at the three ENK camps (Table 3). Most ekwǫ̀ were seen at Kokètì (2655 caribou in 216 groups, followed by Deèzàatì (1024 caribou in 64 groups), and Ek'atì camp (631 caribou in 48 groups) (Table 4 and Table 5).

Table 4: Summary of animals observed at ENK field camps in 2022

			Animals Observed									
Herd Range	ENK Camp	Field Team	Caribou	Muskox	Moose	Wolf	Grizzly Bear	Wolverine	Eagle	Bald Eagle	Golden Eagle	Snowy Owl
Bathurst	Koketi	A	1971	61	1	1	3	0	1	6	2	0
		B	479	130	0	10	2	0	3	13	1	1
		C	205	92	0	3	1	0	5	3	0	0
	Ekati	D	631	0	0	0	0	0	0	9	0	0
	Subtotal		3286	283	1	14	6	0	9	31	3	1
Bluenose East	Deezaati	E	385	0	4	0	0	0	0	0	0	0
		F	639	0	4	3	0	0	2	0	0	0
	Subtotal		1024	0	8	3	0	0	2	0	0	0
	Total		**4310**	**283**	**9**	**17**	**6**	**0**	**11**	**31**	**3**	**1**

*Include animals counted and estimated - Caribou (2786, 1524) and Muskox (144, 139)

In contrast to total caribou seen, sighting rates of ekwǫ̀ were highest for the field team at Ek'atì camp, followed by Team A at Kokètì and Team F at Deèzàatì. These differences in sighting rates of caribou likely reflect the higher occurrence of Bathurst caribou in and around Ek'atì in late August compared to Kokètì, and the increased occurrence of Bluenose East caribou at Deèzàatì (Table 5) that coincides with the fall migration.

Table 5. Summary of animal groups observed at ENK field camps in 2022

			Groups Observed									
Herd Range	ENK Camp	Field Team	Caribou	Muskox	Moose	Wolf	Grizzly Bear	Wolverine	Eagle	Bald Eagle	Golden Eagle	Snowy Owl
Bathurst	Koketi	A	77	9	1	1	3	0	1	6	2	0
		B	106	10	0	6	2	0	3	10	1	1
		C	33	7	0	3	1	0	4	1	0	0
	Ekati	D	48	0	0	0	0	0	0	3	0	0
	Subtotal		264	26	1	10	6	0	8	20	3	1
Bluenose East	Deezaati	E	26	0	3	0	0	0	0	0	0	0
		F	38	0	2	1	0	0	1	0	0	0
	Subtotal		64	0	5	1	0	0	1	0	0	0
	Total		**328**	**26**	**6**	**11**	**6**	**0**	**9**	**20**	**3**	**1**

*Includes animal groups counted and estimated - Caribou (290, 38) and Muskox 14, 8)

- Muskox (Hozìı edzıe) were only seen at Kokètì and were the second most observed wildlife species with 283 individuals seen within 26 groups. Muskox group size range from 1 to 57, with average and median group sizes of 10.9 and 6.5 respectively.
- Eight moose (dedìı) were observed at Deèzàatì, one moose was seen at Kokètì, and no moose were seen at Ek'atì.
- Wolves (dìga) were most consistently seen at heard by field teams at Kokètì. Dìga were not observed at Ek'atì, and tracks of 3 wolves were seen by a field team at Deèzàatì.

- Grizzly bears (sahcho) were only observed at Kokètì. Single bears were seen on six separate occasions.
- Wolverines (nogha) were not seen by any field team based at the three camps.
- Eagles (det'ǫcho) were seen at all three ENK camps. Bald eagles were more common than golden eagles.

The frequency of sighting rates at Kokètì range from 2 – 5 caribou groups per day. At Ek'atì, we saw around 5 groups per day, and at Deèzàatì we saw between 2 – 3 caribou groups per day.

Table 6. Summary of caribou sighting rates at ENK field camps in 2022.

			All Caribou Observations		**Team A's 'Beverly' Caribou Observations Omitted** (934 animals, 9 groups)	
Herd Range	ENK Camp	Field Team	Caribou/Day	Caribou Groups/Day	Caribou/Day	Caribou Groups/Day
Bathurst	Koketi	A	98.6	3.9	51.9	3.4
		B	24.0	5.3	24.0	5.3
		C	10.3	1.7	10.3	1.7
	Ekati	D	70.1	5.3	70.1	5.3
	Subtotal		47.6	3.8	34.1	3.7
Bluenose East	Deezaati	E	29.6	2.0	29.6	2.0
		F	49.2	2.9	49.2	2.9
	Subtotal		39.4	2.5	39.4	2.5
	Total		**45.4**	**3.5**	**35.5**	**3.4**

Photo 11: Herd of 800 caribou with mainly cows and calves, Fry Inlet, July 2022. Photo: Aimee Guile.

Kokètì Ekwǫ̀ Habitat

At Kokètì during summer 2022, habitat and forage were in overall good conditions for caribou, however vegetation became drier throughout the season. There were low water levels in lakes and little to no water in muskeg and ponds (photo 12), thus the growing season was shorter. The Kokètì ekwǫ̀ showed signs of good health during summer and fall, most of the adult caribou were in good body condition, however they were not as fat conditions as the previous years.

Photo 12: Dried up ponds, with cracks showing in the dried soil. Photo: John Nishi

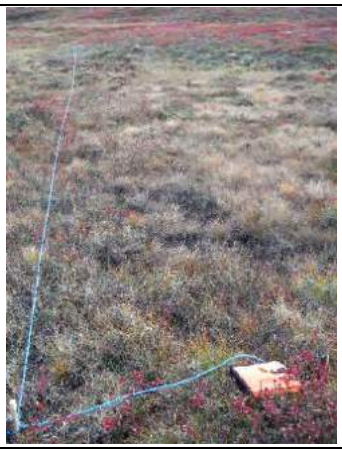


Photo 13: Dry sedge meadows, with drier grass conditions. Photo: John Nishi

In July, vegetation and forage conditions were described as average to good growth, and some rain made vegetation "nice and wet". Some of the cloudberries and blueberries started to ripen. Into August, the berries (blueberry, cranberry, cloud berry, crowberry) were becoming abundant. Overall, the production of vegetation looked average to below average. During mid-August, vegetation conditions appear to be very dry in all the plant communities. Wet sedge meadows were dry, with cracks often showing in the dried soil or organic surface. When walking in hummocky grassy meadows which would normally leave moisture on your boot or free-standing water in your tracks, there was no indication of surface water in these normally wet meadows (Photo 12 & 13). Due to dry conditions, there was a noticeable lack of mushrooms on the land, and by mid August, ends of grasses and leaves were brown. Berry species looked good, although the blueberries were past their prime (due to frosts at night), and the cranberries were filling out and getting sweet.

In the end of August, mushrooms were scarce to absent, with only two mushrooms seen during all of our hikes and walks. Leaf ends of grasses and sedges were yellow or brown, which is normal for this time of year, but above-ground biomass appeared to be sparse compared to how productive they could be under wetter conditions. When we saw caribou foraging, we have been seeing them stripping leaves of willow bushes, which are now turning yellow. For the most part, stripping willow leaves was common occurrence when watching feeding caribou.

Photo 14: Low water level shown by receding shorelines around Kokètì, August 2022. Photo: John Nishi.

Kokètì Ekwǫ̀ – Bathurst Caribou

The teams observed a total of 2655 caribou in 216 groups (Table 3, Table 4, Figure 2). Caribou groups ranged in size from 1 to 800 animals. Ekwǫ̀ were dispersed with most caribou groups (95%) occurring in group sizes of 26 or fewer animals; average and median group sizes were 12.3 and 3 respectively.

The largest group of 800 ekwǫ̀ (estimated) was observed by Team A on the 28 July in south-east Fry Inlet (Figure 3). Notably, on 31 July Team A recorded nine observations totaling 934 caribou (illustrated as red dots in Figure 2) that were on the east side of Kokètì, in the Kunik's Bay area (Figure 3), which were Beverly caribou based on the distribution of collared Beverly caribou cows that were located on the east side of the lake in late July. The 934 ekwǫ̀ seen on the east side of Kokètì were aggregated in larger groups; group sizes ranged from 3 to 500 caribou with average and median group sizes of 103.8 and 60 respectively.

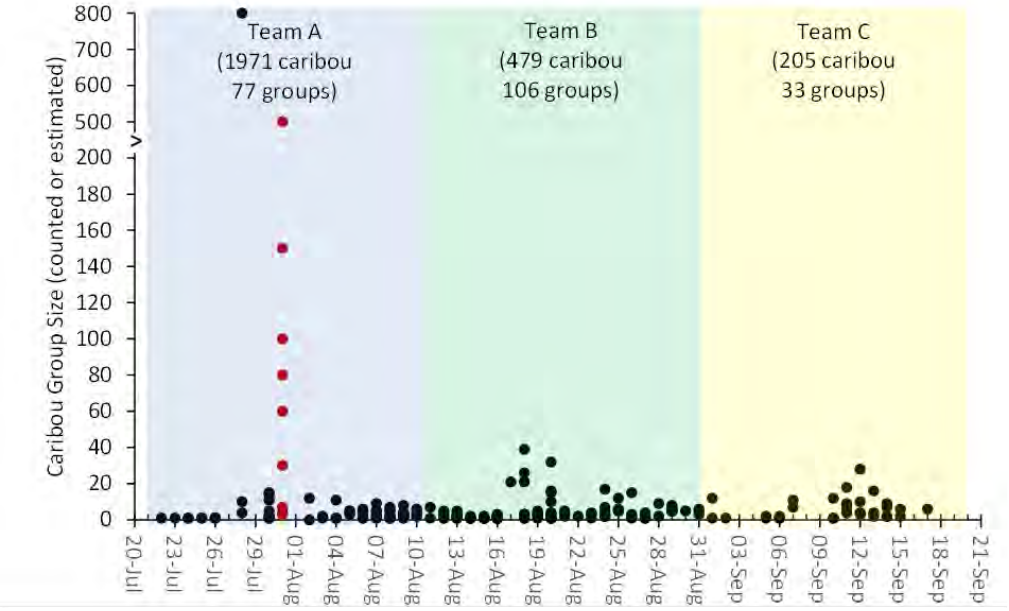


Figure 2. Distribution of ekwǫ̀ group sizes observed by three ENK field teams at Kokètì, July to September 2022. Red dots indicate caribou groups that were from the Beverly herd as indicated by movements of collared Beverly caribou on the east side of Kokètì.

Photo 15: Two cows with two calves, Fry Inlet, July 2022. Photo: Aimee Guilee.

Photo 16: *Woza* – cow with calf by Ek'atì, August 2022. Photo: Petter Jacobsen.

Kokètì Ekwǫ̀ Calf Abundance and Calf: Cow Ratios

Calf to cow ratios were derived from ekwǫ̀ observations that included at least one cow and were observed within 1 km of field teams. During summer 2022 at Kokètì, we observed 44 caribou groups, and counted 48.1 calves to 100 cows (Table 7). We consider this amount of calves in the herd during summer & fall as 'good' and 'normal', compared to low calf numbers we saw around Kokètì in recent years.

At Ek'atì (Lac de Gras) in August 2022, the observed calf to cow ratio were 34.3 calves per 100 cows. Combining the cow-calf observations at Kokètì and Ek'atì, resulted in an estimate of 39.2 calves per 100 cows for summer 2022. Around Ek'atì, the Tłı̨chǫ monitors observed a high proportion of *tsıdaa* and *yagoa* (young cows and young bulls) in many herds.

The ratio observed at Kokètì was the highest among the field camps, and reflected a single observation in July of an estimated group size of 800 caribou (Photo 11) within which observers counted 150 calves and we derived an estimate of 370 cows based on the relative proportion of bulls. This was an important observation because of the large group size, the relative high abundance of calves in the group, and the presence of 6 collared Bathurst cows (Figure 2). Field team members included Roy Judas – who has participated in ENK monitoring at Kokètì every year since 2016 – were impressed by the large number of calves in the group relative to the number of cows.

Table 7. Summary of calf:cow ratios (expressed as number of calves per 100 cows) from observations at Kokètì and Ek'atì, summer and fall 2022.

		Calves: 100 Cows			
Herd Range	ENK Camp	Average	Standard Error (SE)	Coefficient of Variation (CV)	Count (n)
Bathurst	Kokètì	48.1	16.0	0.333	44
	Ek'atì	34.3	5.3	0.153	27

The observed calf–cow ratio falls in the middle of the range reported by ENR-GNWT who observed that fall (late October) calf to cow ratios for BNE caribou from 2009 to 2021 varied between 25 and 52 calves:100 cows. For additional context, a stable caribou herd would need to have approximately 35 calves per 100 cows in late winter (March) combined with an average adult female survival rate of 85%. Because some calves will die through fall and winter, calf to cow ratios in March would most certainly be lower than calf counts in September.

Between 2018 and 2021, we have observed good habitat conditions and seen healthy caribou in generally good shape around Kokètì, and considered this as a good sign which could provide the necessary environmental conditions for the population to grow. But during these years we continued to see many herds with few or no calves. During summer 2022, was the first time we reported herds with more calves.

Body Condition & Health at Kokètì (Contwoyto Lake)

The Kokètì ekwǫ̀ showed signs of good health during summer and fall 2022. Most of the adult caribou were described as in good body condition, however they were not as fat conditions as the previous years, and some cows were described as skinny. Body conditions were improving over summer and in late August and September, bulls had gain fat reserves (Photo 17), and were comparatively fatter than females. The elder confirmed this by stating that usually at this time of year, the bulls are fat and the cows are skinnier.

In early August, generally all caribou were in good condition. Some animals had small patches of winter hair, but they are all generally looking sleek in their summer coats. Young male caribou are looking muscular and healthy, and no caribou were noticeably 'unhealthy'. Younger animals look leaner and do not tend to look as 'fat', which is likely because they are still growing and putting on muscle mass. Some of the larger bulls show good fat levels based on rounded rumps.

The caribou monitors assessed Kokètì ekwǫ̀ body condition around Kokètì, a scored 6% as fat, and 94% of the bull caribou were described as in 'good' body condition, and no skinny bulls. For the cows; 0% were described as fat, 97% were described as good; and 3% were described as skinny. All the calves were classified as good.

Table 8: summary of body condition score around Kokètì during summer and fall 2022.

Bulls

Groups	Individuals			
	Fat	Good	Thin	Total
79	16	258	0	274
	6%	94%	0%	100%

Cows

Groups	Individuals			
	Fat	Good	Thin	Total
41	0	105	3	108
	0%	97%	3%	100%

Calves

Groups	Individuals			
	Fat	Good	Thin	Total
18	0	34	0	34
	0%	100%	0%	100%

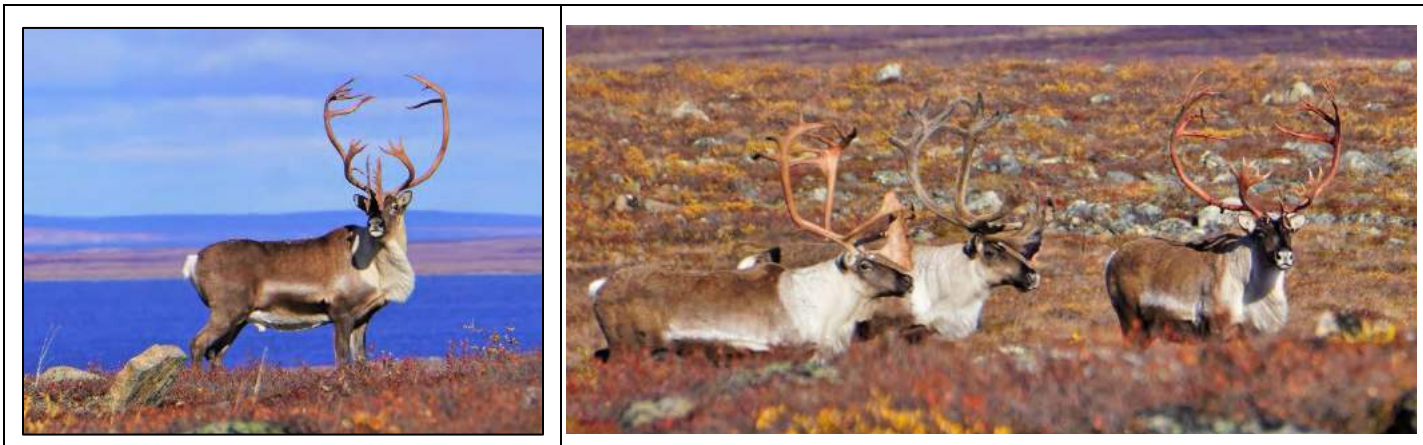


Photo 17: Bulls at Kokètì in healthy and fat body condition; notice the various stages of velvet shedding. September 2023. Photos: Ete Zoe.

Ek'atì (Lac de Gras) 2022: Body Condition & Health

Overall, the caribou around Ek'atì were healthy and in good and fat body condition. The caribou were feeding mainly on willows at end of August and the elders stated that the oily willows make them fat. As the land was dry, many caribou laying down resting in flat areas, sleeping and feeding. During last two weeks of August, there were no insects, no wolves observed and no hunters, thus caribou were observed as peacefully walking around, or laying down feeding throughout the day without any disturbance. The elder noted that the caribou has new and shiny summer coat, and they were gaining fat. No animals were in skinny condition.

The caribou monitors assessed Kokètì ekwǫ̀ body condition, and scored 65% of bulls as fat, 35% in good condition and none as skinny. For cows, 51% was scored as fat, 49% in good condition and none as skinny. For calves, 28% scored as fat, 72% in good condition and no skinny calves were observed (table 9).

In summary, for the last five years we continue to see healthy caribou in mainly good or fat body conditions. Although, the herd is critical low we are not seeing unhealthy skinny animals, but instead healthy and caribou in generally good shape.

Table 9: summary of body condition score around Ek'atì during summer and fall 2022.

Bulls

Groups	Individuals			
	Fat	Good	Thin	Total
32	124	67	0	191
	65%	35%	0%	100%

Cows

Groups	Individuals			
	Fat	Good	Thin	Total
22	44	42	0	86
	51%	49%	0%	100%

Calves

Groups	Individuals			
	Fat	Good	Thin	Total
11	7	18	0	25
	28%	72%	0%	100%

Photo 18: Bulls around Ek'atì in healthy and fat body condition, August 2023. Photo: Petter Jacobsen

Injured Bathurst Caribou

Out of the 2655 caribou seen between July 22nd and September 20th around Kokètì, five caribou were observed with lameness. These five caribou were in a group of ~800 caribou (observed on 28 July 2022, south Fry Inlet). Their legs were likely not broken, as they still could putting some weight on the injured foot.

- 1 bull: observed walking with a limp
- 2 cows: both animals had injured front right legs
- 2 calves: 1 limped on left front leg; 1 calf limped on right back leg

Around Ek'atì, one incident of lameness was observed in caribou. One young bull was observed walking with limping front leg. The caribou was walking along with an older bull. The elders discussed that the injury might have occurred when caribou were running away from Diavik mines low flying helicopter which occurred in the same area during the day before.

Photo 19: Wildlife trail camera set up by watercrossing; camouflaged by rocks and tall grass. Photo: Photo Nishi

Photo 20: Wildlife trail camera set up by watercrossing; camouflaged by rocks and willow bushes. Photo: Photo Nishi

Photo 21: Johnny Boline setting up a wildlife camera, September 2023. Photo: Ete Zoe.

Dìga and other Predators

Between July and September, a total of 14 *dìga* (wolves/*Canis lupus*) were sighted in the vicinity of Kokètì. These 14 instances of *dìga* sightings occurred on 10 distinct occasions. Interestingly, no *dìga* were observed around Ek'atì, despite the presence of numerous caribou herds in the region. Similarly, at Deèzàatì, no *dìga* were directly spotted, although tracks left by a group of three *dìga* were identified along a sandy shoreline in late September.

Of the *dìga* around Kokètì; one dìga, medium age with white fur, was seen on the esker behind camp. It looked healthy – once it saw people it ran off in very fast pace. Wolves were heard howling around camp in the early morning (5.30am) on two separate days; first a clear howl from 1st *dìga*, then two *dìga* howled in response; these were further away. The *dìga* howled for a few minutes, then it was quiet. Next day, two *dìga* howled at 3.30am. First a *dìga* howled south of camp, then a fainter response of a howling *dìga* to the north. In September, one *dìga* seemed to be attracted to camp. Initially, it was howling in the evening southwest of camp, then got closer throughout the evening and night, until it was about 50 yards from camp. Bear bangers were shot off to deter it. It moved southwest and was heard howling where we initially heard it and continued to howl at night. It was most likely a female *dìga*, because the howls were

short and low. The 14 *dìga* reported in 2022, is similar to 14 *dìga* observed in 2021. In 2020, zero *dìga* was reported, while during summer 2019, a higher number of 31 *dìga* observations were recorded. There were 16 *dìga* observation in 2018, and 16 *dìga* observed in 2017. According to our observations, the abundance of *dìga* around Kokètì seems to show consistent amount of *dìga* around Koketi, with some variations in 2019 and 2020 dependent on caribou's proximity to the lakeshore.

Photo 22: *Dìga* walking up esker behind camp, September 2022. Photo: John Nish

Photo 23: Large size *dìga* paw print in the sand. Photo: John Nishi

Sahcho (grizzly bears*/Ursus arctos/ "big guy"*) were only observed at Kokètì. Six individual bears were seen on six separate occasions. One *sahcho* was watching a large herd of Beverly caribou, on east side of Kokètì. It attempted to hunt down a group of caribou but it was unsuccessful. Another *sahcho* walked into camp, by moving through the bear fence, and walked to the grey water pit. Bear bangers were fired, it walked out through fence. It walked up a hill, but came back and dug out a ground squirrel from the pile of firewood and ate it. It the swam across the bay and left. Next day, it came back to camp, but walked to esker behind camp without any intervention. Shorty after, three caribou came running up from behind the esker, likely spooked by the *"big guy"*. In early September, one *"big guy"* attempted to come to camp multiple times in one day. It was skinny looking and was probably attracted to smells coming from camp. No *sahcho* were observed at Ek'atì and Deèzàatì. The six *sahcho* observed in 2022, were slightly less than the seven sahcho reported in summer 2021. And, less than eight bears were observed throughout the summer 2020, and ten sahcho reported during summer 2019. The reported observations for the last four years range from 6 to 10 animals per summer.

Eagles (*det'ǫcho*) were seen at all three camps. 31 bald eagles were observed at Kokètì and Ek'atì, and 3 golden eagles were reported at Kokètì. No wolverines were observed at any camps.

Dedìı (Moose) Observations

One *dedìı* (moose) was seen at Kokètì. It was spotted on an island across from camp. No *dedìı* were seen around Ek'atì. This is the third year *Dedìı* has been reported at Kokètì. Seven *dedìı* was observed in 2021, and 11 *dedìı* was reported in 2019. Most observation was made around the basecamp between Kokètì and Kwìıdlìachjį. *Dedìı* have not been seen by Tłįchǫ monitors prior to 2019.

Eight *dedìı* were observed at Deèzàatì. There are considerable stands of trees and taller shrubs in sheltered valleys around Deèzàatì, and it appears to be a better habitat for dedìı compared to the high barrenlands around Kokètì.

Kokètì ekwǫ̀ Indicator Trends 2016-2022

Monitoring *Kokètì ekwǫ̀* is based on periodic assessment of indicators, developed using the holistic Tłı̨chǫ concept of *"We Watch Everything"*. The elders included several interconnected indicators for monitoring ekwǫ̀ and its habitat, and table below summarize results and trends for each indicator per year.

The Ekwǫ̀ Nàxoèhdee K'è monitors reported a trend of warm and dry habitat, with high calf abundance in 2016 to 2017, shifting to a trend of cold, wet weather. During the four years, 2018 to 2021, monitors reported ekwǫ̀ habitat and food in generally excellent condition due to much rain and wind, and that ekwǫ̀ health has been observed as "good", including fat bulls and cows, but low calf abundance during the last four summers, from 2018 to 2021 (Table 10). During summer 2022, the previous year's climate trend of wet and cold started to change. The summer was dry and warm. There were good forage conditions but short growing season, dry and windy conditions, few or none insects & lower water levels.

Although, the good conditions of ekwǫ̀ habitat and ekwǫ̀ body condition, reported from 2018-2022, provide the necessary environmental conditions for the population to grow. However, the monitors observe many groups with few or no calves, and GNWT ENRs calving ground survey shows a continued decline of the *Kokètì ekwǫ̀* herd from 8207 ekwǫ̀ in 2018 to 6243 in 2021 (Adamczewski et al. 2022).

Indicators Over Time

	2016	2017	2018	2019	2020	2021	2022
Weather and Vegetation	Warm, Dry	Mix Dry/Wet	Wet, Windy	Wet, Windy	Wet, Windy	Cool, Windy	Dry, Windy, No insects
Caribou Health	Normal, Many Injured	Normal	Early Fat, Bulls Healthy	Early Fat, Bulls Healthy	Healthy, Fat Animals	Healthy, Fat Animals	Healthy Animals
Calf Abundance	Normal, High	Normal, High	Normal, Low	Low	Low	Low	Normal, Good
Wolves Observed	1	18	16	31	0	13	14
Moose Observed	0	0	0	11	0	7	1

Table 10: Trends of monitoring indicators 2016-2022

During the **summers of 2016 and 2017**, warm and dry weather conditions were prevalent and resulted in dry, "crusty" ekwǫ̀ forage. The summers were similarly warm and dry except for periods of rain and cold temperatures (table 11). During a few of that season's heat waves (especially in August, where temperatures at *Kokètì* reached 30 degrees Celsius) *ekwǫ̀* forage was dry and crusty. Harassment by biting insect was high during these days, and we observed herds walking into the wind on high elevation to minimize insect harassment. Ekwǫ̀ were in "normal" body condition, but were unable to build up fat reserves in July, due to high insect harassment. During 2016 to 2017, monitors observed that ekwǫ̀ had "normal" and average body condition, and ekwǫ̀ groups had at times high calf abundance, with most cows accompanied by calves, resulting in nearly a one-to-one calf-cow ratio.

Photo 24: Herd standing on ridgeline facing into wind to avoid the high biting insect harassment. July, 2017. Photo: Petter Jacobsen.

During the summers of 2018 and 2019; the weather trends turned cold, windy, and with frequent rain showers. The vegetation quality was good and tundra flowers and mushrooms were visibly abundant, as compared to previous years. This was optimal environmental conditions for ekwǫ̀, with consistently good foraging conditions and with much less insect harassment. The herds had more time to feed uninterrupted and build up fat reserves, without the need to continuously run from biting insects. With the continuously cold and windy weather, the bulls started to accumulate fat reserves on their rumps and lower back and grew large and wide, dark-coloured, palmated antlers earlier in the season (in mid-July), compared to earlier years. During July and August, the Bathurst herd showed signs that it was in strong and normal health. Thus, ekwǫ̀ were healthy, and bulls were building fat reserves in mid-July. Although weather and forage conditions were favourable for ekwǫ̀ fitness, however, in summer 2018 the positive trend had changed and we observed a declining trend in calves.

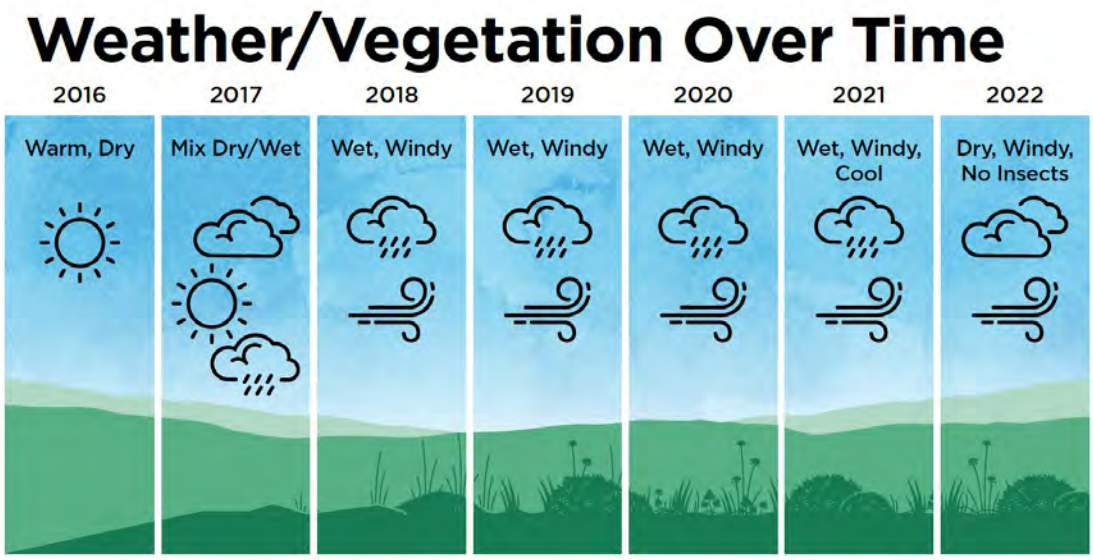


Table 11: Summer weather/vegetation conditions over time: 2016-2022.

While forage conditions were favourable in the **summer of 2019**, and the herds went into the fall in good physical condition, the majority of cow groups had few or no calves at all—a continuing negative trend in calf population from 2018. Interestingly, though the summers of 2018 and 2019 brought favourable weather conditions for vegetation growth—which consequently improved ekwǫ̀ health—those two years also saw declines in calf abundance.

The **summers of 2020 and 2021** were comprised of similarly favorable weather conditions for ekwǫ̀; with continuously cool temperatures, strong winds and frequent rain. This weather created good vegetation quality and low activity of biting insect. Consequently, the monitors reported healthy and strong animals throughout the summers. While forage conditions were considered 'good' and ekwǫ̀ showed healthy body

conditions, the calf to cow ratio remained low; similar to previous two years. With the favorable environmental conditions and strong animal health, we expected that more calves were born and survived the summer. However, that was not the case for the summers of 2020 and 2021.

The **summer of 2022**, had good forage conditions but short growing season, and some vegetation was drying up at end of summer. The lack of rain and wet ground was comparatively different than the last couple years, with very few mushrooms observed. There summer was characterised as dry windy conditions which resulted in few or a lack of insects. The water levels in lakes and ponds were deceasing and became very low at the end of fall.

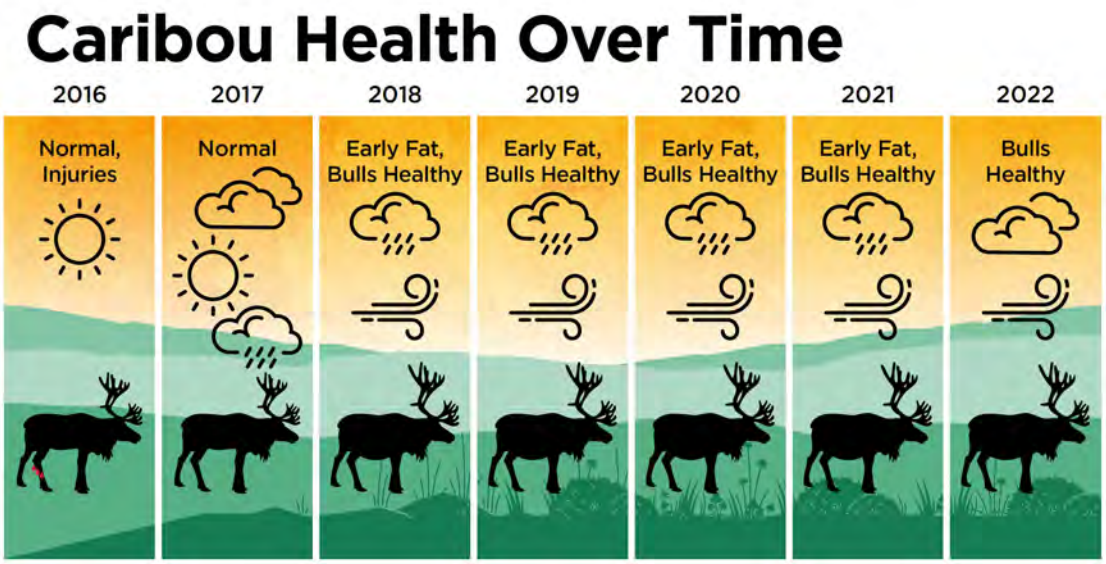


Table 12: Ekwǫ̀ Health over Time: 2016-2022

Over the six years of monitoring at Kokètì, more calves were seen during the first three years (2016-2018) of the program and comparatively fewer calves have been seen in recent years (2019-2021).

In 2019, we applied a more systematic way of observing cow-calf groups and estimated an overall calf:cow ratio of 31 calves per 100 cows (i.e., 0.307 + 0.056 SE); this would be considered low, because it suggests that by summer less than one-third of breeding-aged females had a calf. Eighty-nine (89) *ekwǫ̀* groups were used to estimate an overall calf:cow ratio. During summer 2018, we observed a high number of yearlings (calves born in 2016 and 2017) and we anticipated that summer of 2019 would show an increase in calf abundance as those yearlings matured and became able to have offspring (ekwǫ̀ females will generally get pregnant for the first time when they are 2+ years old, and have their calf when they are 3 years old). That was not the case as the negative trend continued with low numbers of calves observed.

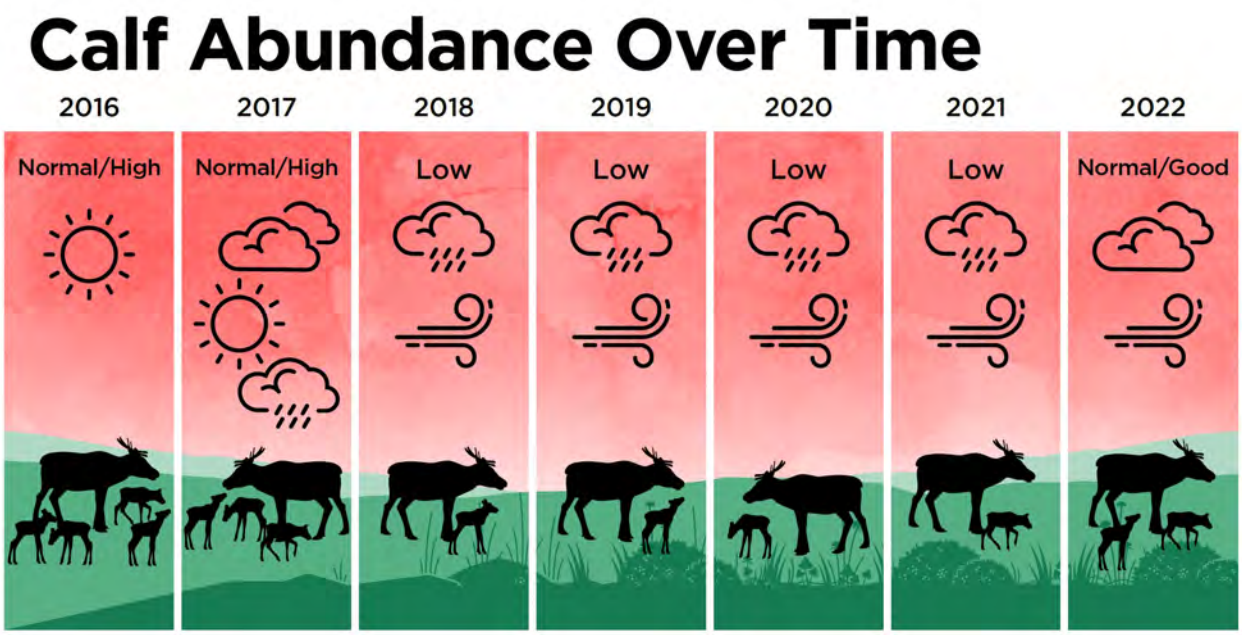


Table 13: Calf Abundance over Time: 2016-2021.

In 2020, we estimated an overall calf:cow ratio ratio of 29.1 (± 6.2 SE) calves to 100 cows based on a total of 37 *ekwǫ̀* groups observed (Figure 6). The group sizes ranged from a single animal to an estimated group of 328. The observed calf to cow ratio was considered low and would likely indicate a declining population trend, if it truly representants the whole *Kokètì ekwǫ̀* herd. However, during summer 2020 fewer *ekwǫ̀* were seen and group sizes were smaller than previous years.

In summer 2021, more calves were observed compared to the previous two years. We estimated an overall calf:cow ratio of 39 calves per 100 cows, which is a higher proportion of calves compared to 29 calves to 100 cows observed in 2020, and 31 calves per 100 cows observed in 2019. The higher ratio of calves seen in 2021 indicates better calf survival in summer compared to those previous years. However, the mixing of Beverly herd with the *Kokètì ekwǫ̀* around Kokètì in August may explain the higher proportion of calves seen in 2021.

In 2022, the teams reported more calves than we have observed since 2016. During the summer, we observed 44 caribou groups, and counted 48.1 calves to 100 cows. This amount of calves in the herd during summer & fall is considered 'good' and 'normal', compared to low calf numbers we have seen around Kokètì in recent years. Around Ek'atì (Lac de Gras) in August, we observed many *Kokètì ekwǫ̀* herds and counted 34.3 calves to 100 cows. Combining the cow-calf observations at Kokètì and Ek'atì, resulted in an estimate of 39.2 calves per 100 cows for summer 2022. Around Ek'atì, the Tłı̨chǫ monitors also observed a high proportion of *tsıdaa* and *yagoa* (young cows and young bulls) in many herds.

Photo 25: Treeline landscape; guardian team walking up the hills from Redrock lake, September 2022. Photo: Petter Jacobsen

Photo 26: Bull with shedding velvet and bloody antlers swimming across Redrock lake, September 2022. Photo: Janelle Nitsiza

Photo 27: Caribou herd swimming across Redrock Lake. September 2022. Photo: Janelle Nitsiza

Sahtı Ekwǫ̀ Monitoring Results from Deèzàatì

During fall 2022, two teams of Tłı̨chǫ guardians stayed at the lake from September 2nd to 28th. This fall, monitoring of Bluenose East caribou was conducted around the lake for the first time by the ENK teams; previous years was challenged by COVID-19 travel restrictions and lack of caribou around the lake. A school class from Chief Jimmy Bruneau School (CJBS) joined the ENK team at Deèzàatì from September 10-15th 2022. Located on the northern barrenland, the large lake Deèzàatì (Point Lake) was accessed by the canoe trails from the treeline, as people traveled here for ekwǫ̀ harvesting and trapping since time immemorial. As Tłı̨chǫ have traveled here each *ekwǫ̀* hunting season, the lake Deèzàatì has a rich cultural history. Located along the treeline, the lake contains two ecosystems; a full forest cover exists on its western shores, towards Redrock lake, while most of the eastern and northern part of the lake is open barrenlands. In between are several pockets of coniferous trees, growing in sheltered bays and along creeks. This combination provides two integrated ecosystems that sustains families of harvesters throughout the year, by providing both access to resources from the forest and from the barrenland. By knowing what to look for, and know-how for making tools, shelters and acquiring fresh meat from the available resources, the unique location of the lake becomes, what the elders often refer to, as the "bank" or the "store". Since time immemorial, the continued use of this unique location has created a rich cultural landscape. The elder Joe Zoe's family represents an illustrative example of the importance of this cultural landscape; they lived a couple of years at northwest side of Deèzàatì and along the Coppermine River at Red Rock Lake. His parents, grandparents, and brothers lived in the forested part of the lake and his sister was born there. In the fall time, when the caribou arrive, the people would set snares among the trees to catch caribou. They also tried to catch calves and young caribou to acquire the soft calf hide for making clothes.

"If you have 3-4 kids, you need soft hide to make clothes for all your kids" - Joe Zoe

According to elders, the placename Deèzàatì originates from the word *woza*, which describes a female *ekwǫ̀* with a *tsıa (calf)* during summer (pers comm Joe L. Zoe). Thus, the meaning of the placename, speaks to a location to travel to at a certain time of the year where you can meet *ekwǫ̀* cows and their calves. Additionally, the placename represents a time and place where the *ekwǫ̀* are at a certain age and subsequently the hide is in correct conditions to prepare clothes for the small kids in one's family.

Photo 28: ENK Team and CJBS class, September 2022: Top: Robert Nitsiza, Julian Lafferty, Angel Koyina, Doreen Apples, Janelle Nitsiza, Ibeh Zoe-Chocolate. Middle: Leegah Lafferty, James Lafferty, JayZ Wetrade, Chris Stanbridge, Tylene Tsatchia, Louisa Mackenzie, Avery Huskey. Bottom: Russell Drybones, Terrence Whane, Louis Zoe, Therese Zoe, Tony Williah, Keagan Tlokka

Photo 29: ENK and CJBS class Top: Avery Huskey, Russell Drybones, James Lafferty, JayZ Wetrade, Julian Lafferty, Tylene Tsatchia. Bottom: Chris Stanbridge, Robert Nitsiza, Terrence Whane, Louis Zoe, Angel Koyina

Sahtı Ekwǫ̀ – Bluenose East Caribou

"W*e have been here for many years now watching and protecting caribou, looks like they are coming back now*" - Joe Zoe.

In total, there were two field teams at Deèzàatì (Point Lake) from September 2-28, 2022. At the end of August, numerous Sahtı ekwǫ caribou herds migrated southward towards Deèzàatì and in September the herds were around the lake and surrounding area. We observed a total of 1,034 caribou in 64 groups. Average and median group sizes were 16 and 8 respectively, and maximum group size was 200 caribou. After two weeks of watching caribou migrating along their trails around at Deèzàatì, Joe Zoe, an elder from Gametì who has hunted caribou on the barrenlands all his life, described a sense of confidence that the caribou are "coming back." While watching a group of caribou on the north side of Deèzàatì, Joe Zoe explained that the caribou are now coming back to their old trails at Deèzàatì, "*They are following their old trail, that they used many years ago*."

"*It's looking good now, for a while they were gone, but it looks good now."*

"They are coming back to their old trails - they never forget them" ... "They always come back."

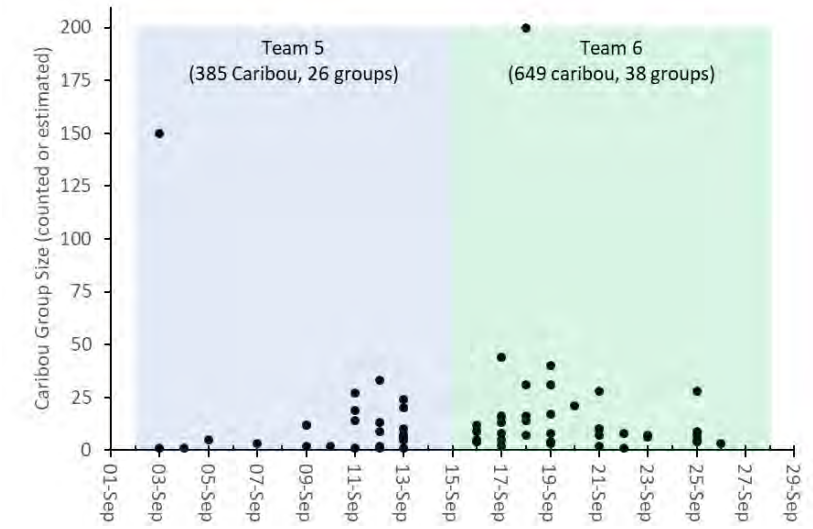


Figure 4: caribou group sizes in September at Deèzàatì

Tsıa – Calves

When the teams observed groups of cows and calves in the hills around Deèzàatì, the elder pointed out that these are *woza*; the Tłı̨chǫ term for a cow with calf.

"*The first caribou you will see are woza, the cow and its calf...then the larger herd is coming*".

Elder Joe Zoe added more details of herd behaviour and explained that when you see bulls, they are often by themselves, but when a cow with calf is seen they will be the first of the larger herds. Consequently, when he uses the term w*oza,* it means that the whole herd is coming; the cows, calves, and everyone are following.

Photo 30: *Woza* – cow with calf, September 22, 2022. Notice the large body size and tall antler on the calf. Photo: Petter Jacobsen

Photo 31: *Woza* – cow with calf, September 26, 2022. Notice the large body size and tall antler on the calf. The cow has recently rubbed off antler velvet revealing the hard boney antlers underneath that are still stained red from blood of the antler velvet. Photo: Petter Jacobsen

Through September 2022, we estimated 38.4 calves per 100 cows (± 7.0 Standard Error), based on 31 groups in which at least 1 cow was seen (table 14). For these 31 groups, we counted 195 cows and 76 calves. The average and median group size were 13 and 8 respectively; and maximum group size was 44 respectively.

The calf-to-cow ratio of 38.4 is considered a low-to-average ratio for fall. The observed ratio falls in the middle of the range reported by GNWT-ECC (Adamczewski et al. 2016) who observed that fall (late October) calf to cow ratios for BNE caribou from 2009 to 2021 varied between 25 and 52 calves to 100 cows.

		Calves : 100 Cows			
Herd Range	ENK Camp	Average	Standard Error (SE)	Coefficient of Variation (CV)	Count
Bathurst	Koketi	48.1	16.0	0.333	44
	Ekati	34.3	5.3	0.153	27
	Combined	39.2	6.8	0.172	71
Bluenose East	Deezaati	38.9	8.4	0.216	25

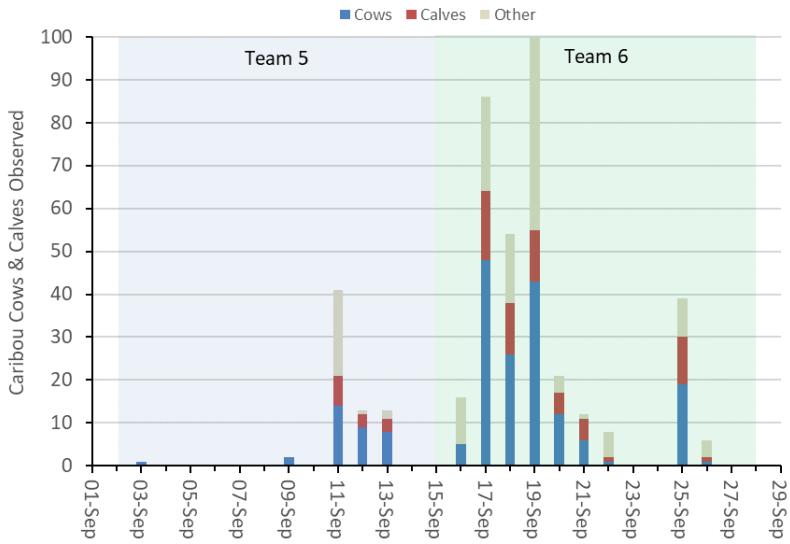
Table 14: Summary of calf:cow ratios (expressed as number of calves per 100 cows) from observations of ekwǫ̀ at three ENK monitoring camps, summer and fall 2022.

For additional context, a stable caribou herd would need to have approximately 35 calves per 100 cows in late winter (March) combined with an average adult female survival rate of 85% (DeCesare et al. 2012). Because some calves will die during summer through to winter, calf to cow ratios in March would most certainly be lower than calf counts in September.

In this year's observations, all the calves were considered healthy, with no visible injuries. Calves are not usually fat as they spend their energy to grow, and at the end of September, many calves had grown

larger in body size. At times, it was challenging to differentiate between a calf and yearling; as the calf legs and body had grown and the calf's antler had grown longer than what is considered a "normal" short antler of a calf (photo 30 & 31). In later fall, the calves belly also start to grow as they transition from only drinking milk from its mom to eating grass and vegetation.

Figure 5: Caribou cows and calves observed from 1 – 28 of September, 2022



At the end of September, in the larger herds of 20-50 caribou; the team observed less than half of the cows with a calf. The elders explained that there were fewer calves because of the many young caribou, both *yagoo* (young bulls) and *tsıdaa* (young cows), in herds observed. In one herd of 150 *ekwǫ̀*; we noticed that the calf to cow ratio was quite low (i.e., 4 calves to 20 cows).

"Not enough calves; because there are too many young caribou.
Too much *yagoo* and *tsıdaa*" Roy Judas

However, several times, we observed smaller groups of 4-8 caribou, consisting of only cows and calves, and in these small groups most cows had a calf. The caribou monitor Roy Judas added that,
"*When its small herd, we see many calves. When it is a big herd, we see few calves*"

Photo 32: *Woza* swimming across Red Rock Lake, September 2022. Photo: Janelle Nitsiza

Photo 33: *Woza* walking along shore of Red Rock Lake, September 2022. Photo: Janelle Nitsiza

Photo 34: *Yagoo* (young bulls) and *tsıdaa* (young cows) in a herd of *Sahtı ekwǫ̀* in the high hills north of Deèzàatì. September 2023. Photo. Petter Jacobsen.

Yagoo & Tsıdaa - Young Bulls and Cows

In many herds, there was a high proportion of younger 2-year-old caribou, both yagoo (young bulls) and tsıdaa (young cows). In some herds, we observed especially a high proportion of tsıdaa (young cows). Late in September, we saw that most large herds, most collared Bluenose East caribou, had migrated south to Rawalpindi Lake and moved away from Deèzàatì, however, we did continue to observe several smaller groups consisting only of bulls around Deèzàatì. The bulls were mostly bedded down and feeding on hillsides. Many of the bull herds, consisted of a high proportion of *yagoo* (photo 34 & 35). The elder explained that it is a good sign to see many *tsıdaa* and *yagoa*; it means that most calves and yearlings survive overwinter and should help the population grow.

Photo 35: *Yagoo* (young bulls) and tsıdaa (young cows) in a herd of *Sahtı ekwǫ̀* in the hills north of Deèzàatì. September 2023. Photo: Petter Jacobsen.

Body Condition and Health

The *Sahtı ekwǫ̀* showed signs of being in very good shape; and all the adult bulls and cows were described as good and fat, by the monitors. For the bulls; they had large antlers, white neck mane, new and clean coat, and had rounded rumps and backs, due to thick fat layers on their backs. Of the 136 bulls in 31 separate groups observed, the monitors described 76% as fat, and 24% as good; and no skinny bulls. For

the cows; they had new clean coat, and straight and rounded backs, due to the fat layer on their back. Of the 143 cows observed in 24 different groups, the monitors described 73% as fat, and 27% in good condition; and no skinny cows. For the 38 calves observed, 87% were in good condition and 13% as fat. An observation from the elder was that most adult caribou showed very large bellies. No thin calves were seen. Watching the fat bull, the elder Joe Zoe described that *"The caribou don't put the fat inside the body and in the meat - the fat goes outside their body, on their back".* Out of all the 1,034 caribou observed, two caribou were injured. One bull had an injured back right leg, and he was limping after the herd. One cow had an injured front right leg.

Bulls					Cows				
Groups	Fat	Good	Thin	Total	Groups	Fat	Good	Thin	Total
31	104	32	0	136	24	104	39	0	143
	76%	24%	0%	100%		73%	27%	0%	100%

Calves				
Groups	Fat	Good	Thin	Total
16	5	33	0	38
	13%	87%	0%	100%

Table 15: summary of body condition score around Deèzàatì during fall 2022

Through September, we saw little to no harassment of caribou due to biting insects. We did not see any wolves following and chasing the herds, and there are no hunters, as the few hunting tags are used during winter. Without any disturbance, we watched the animals eating peacefully throughout the day. Elder Joe Zoe explained how this is different compared to earlier years:

> "*Before (until the 2000s) when we hunt on barrenlands around Rawalpindi Lake, the caribou did not have large bellies as we see now; before people [hunters, outfitters] were bothering caribou, chasing them around, and they could not settle down to relax in one area as now. Now we see them eating and resting all day; their belly get big".*

Photo 36: Bulls in healthy body conditions: large antlers, white neck mane, large belly, rounded rumps, and backs, due to thick fat layers on their backs. Notice the large bellies on the bulls, September, Deèzàatì. Photo: Petter Jacobsen.

Photo 37: Bull in healthy body conditions, showing large reddish colored antlers, September, Deèzàatì. Photo: Petter Jacobsen

From second week of September, we started to observe the velvet peeling from the antlers. During third and fourth week of September, many caribou were observed with skin hanging from the antlers, and with red and bloody antlers. Some bulls were rubbing their antlers on trees and tall willows to remove the velvet. The elder, Louis Zoe, mentioned that caribou migrate into the tree line to remove the velvet off their antlers, and thus, people should not use and burn the trees that ekwǫ̀ scrap their antlers on.

During first week of September, elder Louis Zoe shared concerns about the velvet still being on the ekwǫ̀ antlers. He mentioned that when the velvet starts to peel, it is usually followed by a period of days where the weather changes by warming up again from the colder fall weather in September. That usual time period in mid-September with several consecutive warm and sunny days is a vital part of healing and hardening the new antlers.

Louis also shared stories he heard by elders about calf and cows; when a calf is young, they crave the scent of the tree line. They are eager and cry to their mothers to migrate into the tree line to see and smell the trees.

Sahtı Ekwǫ̀ Habitat

During September, on the fall range of the *Sahtı ekwǫ̀*, the vegetation and caribou food was described as overall in good conditions. In early September, the vegetation was generally moist and had grown well throughout the summer. By mid-September, the grasses and sedges were described as average or poor condition and had turned yellow and brown color. However, caribou were seen feeding on grasses in wet muskeg fields and on yellow grass by shorelines of lakes. During last two weeks of September, the lichen (*adzìì)* showed very good quality and described as moist and fluffy.

Photo 38: Fields of moist, fluffy *adzìì* covering the ground on Dı Cho. Photo. Petter Jacobsen.

Photo 39: Moist, fluffy *adzìì* covering the ground. Photo. Petter Jacobsen.

We saw caribou feeding extensively on lichen in September, and lichen was growing in large amounts all around the lake. On Dı Cho (Big Island, Deèzàatì) there are large flat fields covered in lichen (Photo 38 & 39). The elder explain that they eat the lichen mixed with cranberry leaves, feeding in between the willow bushes. By mid September, the leaves had fallen off the willows and dwarf birch, and the caribou mostly avoided feeding on the bushes. In late August, we observed caribou eating mostly the leaves and branches of willows; the elder explained that dwarf willows have high oil content in late fall, thus caribou gain fat from eating willows. Later in September, when leaves have fallen, caribou eat mostly lichen and cranberry leaves.

The fall was an interesting time, as there was no insect activity, with blackflies or mosquitos not observed. It was generally cold, windy, and drier than usual. Additionally, early summer experienced a lack of rain and ground conditions were dry. In September, there were a high abundance of cranberries on the hills. Mushrooms were hardly observed, likely because of low water levels, overall less rain and dry ground.

The water level had dropped extremely low in September. On September 5th, we hiked from south shore of Deèzàatì towards Whatì (small lake south of Deèzàatì) to find elder Louis Zoe's old trail. When the boat got closer to land, we could see the high-water mark line and how low the water level was in comparison. The GPS map showed that we should have been on water, but the water level had reduced drastically and it was dry land instead (Photo 41). We parked the boat and walked over the rocks that should have been under water.

Photo 40: Ernie Wedawin walking over a dried-up pond, and very low water level on Deèzàatì. September, Deèzàatì. Photos: Petter Jacobsen.

Photo 41: Team walking over rocks in a bay that was under water in previous years, south shore Deèzàatì, September 5th. Photo: Janelle Nitsiza.

Industrial Disturbance

On the *Sahtı ekwǫ̀* fall range around Deèzàatì, the teams found garbage and debris left behind from mining industry. Currently there is an active exploration company (Golden Planet). During summer 2021, the company did extensive mineral exploration by helicopter during July and August over the northeast side of Deèzàatì and around the river from Itchen Lake. During summer 2022, the company conducted archeological survey throughout their claim area.

The most obvious remnants left from mining industry are by the outflow of the river from Itchen Lake; the exploration camp left behind their camp which has now collapsed and the esker east of the river is scattered with garbage and debris from the old camp (Photo 32). It mostly consists of lumber from old cabins, but also plastic wrappings and other garbage that was scattered around by the wind. There were old fuel drums (Photo 44) found at several locations around Deèzàatì; most are found in proximity to current or older mining exploration companies' activity.

Photo 42: Garbage and debris left behind from exploration company along esker on Deèzàatì. Photo: Petter Jacobsen

Photo 43: Joe Zoe investigating cut marks in the bedrock, north shore of Deèzàatì, close to Golden Plant exploration company. Photo: Petter Jacobsen.

Photo 44: Old fuel drums found at several locations around Deèzàatì, often close to shoreline. Photo: Petter Jacobsen

Ek'atì – Lac de Gras

During August 2022, the Tłı̨chǫ team travelled to Ek'atì (Lac de Gras) and Łiwets'aɔ̀ats'ahtì (Lac du Sauvage). We set up camp on an island on Łiwets'aɔ̀ats'ahtì, and spent two weeks exploring the two large lakes and the surrounding land. We used two boats to travel the lakes and hike inland to various locations closer to caribou. During August, numerous Bathurst caribou herds migrated south from Kokètì (Contwoyto Lake) and were in the hills and lowlands northwest of Łiwets'aɔ̀ats'ahtì. This is the first time, Tłı̨chǫ citizens have been on the lake in summer time for several decades, and first time the ENK program monitor caribou around the Ekati and Diavik diamond mines.

The Tłı̨chǫ name for Lac de Gras is Ek'atì, which translates to 'fat lake' an older name for the lake is Kwek'atì referring to the frequently found white rocks (Photo 45) around the lake that resembles white fat; hence the name 'fat lake.' The Tłı̨chǫ placename for Lac du Sauvage is Łıwets'aɔ̀ats'ahtì, which refers to the fish in the lake (łıwezǫǫ -trout) and translates to 'side lake of the little spot where fish swim in a circle' (Whaèhdôö Nàowoò Kö 2001: 129).

Photo 45: A 'white fat' rock that gave the placename Kwek'atì.

In 'Placenames as Indicator of Biogeographical Knowledge' (Tłı̨chǫ Government 2014a), the late elder Pierre Wedzin described this fishing site associated with several other resources at this lake;

> *When hunting muskox, ... I saw six wolf pups ...The six pups just stayed put. They did not attempt to flee. ... Wolves do not leave their dens. The mom came back. ... Fox are the same. ... [Near] that area where the mine [BHP] is, it is called lits'aòa, [spot where fish swim in a circle]. I was there with a birch canoe with my late uncle Bruneau ... [we] hunted for ducks and caribou...a great many people lived there for the caribou. ... We would go there every summer and every year, every year.*
>
> Pierre Wedzin (95/05/24) in Tłı̨chǫ Government 2014a: 19

The elders refer to this general area of the barrenland as the freezer or a bank; as it is a place with high biodiversity that people rely on, caribou, muskox, whitefox, ducks, and fish. Fishing has always been an important resource, especially in times when caribou was hard to find. In 'Caribou Migration and the State of Their Habitat' (Tłı̨chǫ Government 2014b), the late elder Pierre Wedzin described caribou travelling and caribou hunting at Ek'atì*;*

> *ʔek'atì, that which they call ʔek'atì, every year I work on it. When I was younger every year I work there ... [We were at the end of ʔek'atì and] I killed a ɔekwǫ̀. ... It was on this point that a great many people lived for the ɔekwǫ̀. It was from there that he paddled after me. That point was called ʔek'adiìlǫ. ... At the end of ʔek'atì where there was a river flowing, that river flowing from ʔek'atìtata was where my uncle had shot ɔekwǫ̀ for himself. ... At the end of ʔek'adiìtso a great many people lived there; a great many people. We lived there for the ɔekwǫ̀. ... There was no lack of ɔekwǫ̀. But today, this mine that is there, it is hard to predict if wildlife will continue [to be there].*
>
> *Pierre Wedzin (95/05/11)* in Tłı̨chǫ Government 2014b: 45

Ek'atì is currently the location of two diamond mines (Ekati mine and Diavik mine). Joe Zoe explained the elder's story of how "following the caribou trails would lead to diamonds". When walking the regrown network of caribou trails on Ek'adiì (island where Diavik mine is), watching the mine in the background, Joe explained how the "white people" followed the caribou trails that lead them to find the diamonds. He explained how the first exploration companies used the Tłı̨chǫ trails, portages and campsites to the barrenlands and followed the caribou trails to where they found the minerals.

Caribou Food and Regrown Migration Trails

Once the team walked the land around the lakes, it became apparent that the caribou trail we saw had not been used for a long time, as vegetation was regrowing in the trail and a faint line in the vegetation was the only remnant of the trail. The elders explained that, prior to the mines, the Bathurst herd spent summer and fall in the area around Kokètì towards Ek'atì, and during fall migration

Photo 46: *Tataa* (land crossing) between Ek'atì (Lac de Gras) and Łıwets'aɔòats'ahtì (Lac du Sauvage). Notice Ekati mine Misery pit camp on upper left, and section of winter road to Lac du Sauvage crossing the tataa. August 2022. Photo: Petter Jacobsen.

Photo 47: The river between Ek'atì (Lac de Gras) and Łıwets'aɔòats'ahtì (Lac du Sauvage). The river is the start of the Coppermine River; flowing from Lac du Sauvage into Lac de Gras, and further north towards the Arctic Ocean by Kugluktuk. August 2022.

The Ek'atì tataa was a main migration route towards the treeline. The area around Ek'atì and Łı*wets'aɔòats'ahtì* contains many geographical features that funnels caribou migration between the many lakes into tataa and ekwǫ̀ no'oke. There was a large network of trails, referred to as *Babiche*, used by caribou every year since time immemorial. The term *Babiche* refers to the material used as lacing on snowshoes, and due to its intricately interwoven connections, the caribou trail network resembles the pattern of *Babiche*. The elder explained the Tłı̨chǫ Yati for caribou trails;

- *Ekwǫ̀ Tı̨lı* means a trail that caribou used one time, and
- *Ekwǫ̀ Eto* means trails that have been used for a long time.

The Tłı̨chǫ team spent two weeks at the lake, and generally the caribou food showed good growth, and good quality at all the locations the teams visited around the lakes. Despite the presence of abundant and high-quality caribou food, it appears that caribou migration patterns avoid areas in close proximity to mining infrastructure; a majority of the herds avoid crossing the 30 km Misery Road and the Lac du Sauvage Road. During August 2022, the elders explained that caribou choose to stay a distance away from these mining operations, and are moving in a south easterly direction around the mining operations.

The following text describes three locations investigated by the Tłı̨chǫ guardian team.

Tataa between Ek'atì (Lac de Gras) and Łıwets'aɔòats'ahtì (Lac du Sauvage)

The narrow geography of the tataa (land crossing) between the two large lakes, Ek'atì (Lac de Gras) and Łıwets'aɔòats'ahtì (Lac du Sauvage), acts as a funnel for caribou migration. The *tataa* lead caribou from the north side of Ek'atì to the south east side, and towards *Ek'atì tataa* towards Mackay Lake and Courageous Lake. The majority of the *ekwǫ̀ eto* has not been used by caribou herds for several years, possibly over 10 years. Vegetation is visibly regrowing in the trail, to a degree that in cases a faint shaded line is the remaining sign that *ekwǫ̀ eto* went across this *tataa*.

On the *tataa* by the river crossing, the general vegetation, and caribou food, showed good growth, moist conditions, and in good quality. There is an abundance of caribou forage on both sides of the river across the *tataa*. There is not any visible dust on the vegetation; and the team considered vegetation to be in good quality for caribou to feed here.

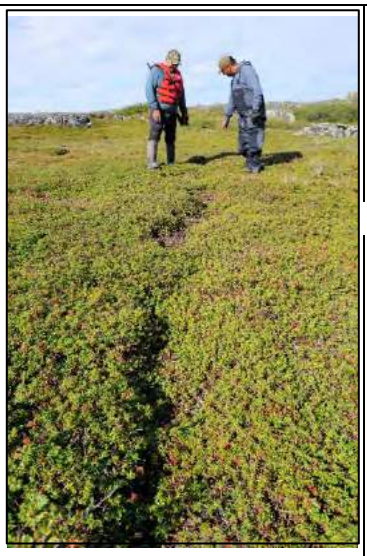


Photo 48: Regrown caribou trail on west side of river between Lac de Gras and Lac du Sauvage, Bobby Nitsiza and Roy Judas investigating. Photos: Petter Jacobsen. August, 2022.

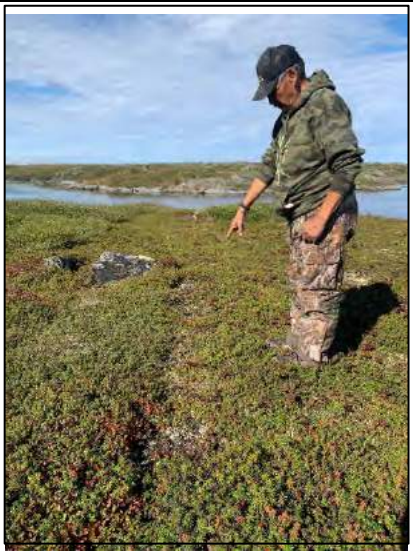


Photo 49: Regrown caribou trail on east side of river between Lac de Gras and Lac du Sauvage; Joe Zoe investigating. August, 2022.

Photo 50: Regrown caribou trail on west side of river between Lac de Gras and Lac du Sauvage, August, 2022.

South of the Misery Road

The team walked from the north shore of Ek'atì, in a northern direction towards the Misery Road. The *ekwǫ̀ eto* on the south side of the Misery Road was regrown. The area south of Fox pit and Misery Road is good caribou habitat, according to the elders. At the location approximately 10km south of infrastructure, is good habitat for caribou containing sloping hills with good forage and habitat. There is no visible dust on the vegetation, as we walked from the shoreline up the hills approximately 10km south of the mining infrastructure.

The area contains good caribou food, but the *ekwǫ̀ eto* are regrowing. It appears that the majority of the caribou herds do not cross the Misery Road; and thus, do not migrate through and feed in this area anymore. The elder explained his observations, "You can see by the poop, but no poop on that side [south of road]". A faint line in the vegetation is what remains of the old caribou trail (photo below). According to the elder,

> "The Misery Road is blocking caribou migration"
>
> "When they first started [mining operations] it was good, with lots of caribou around. Sometimes caribou crossed the road. But caribou know this area, so they have changed their route"

Photo 51: Regrown caribou trail south of Misery Road. August, 2022. Photos: Petter Jacobsen.

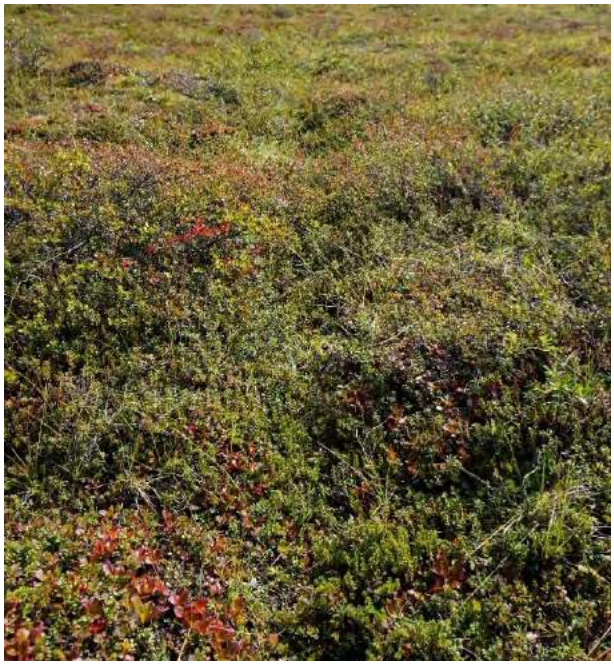


Photo 52: Regrowth of vegetation in the caribou trail south of Misery Road. August, 2022.

Ek’adıì (island on Lac de Gras with Diavik mine)

Ek’adıì is the large lake on Ek'atì, where Diavik mine has its large-scale mining operations. Ek’adıì has an extensive network of *ekwǫ̀ eto* from west to east, along the northern side of the island. The island contains good feeding grounds; however, it appears that the large caribou herds have not migrated to the island for many years. During summer, *ekwǫ̀ eto* along the island are actively regrowing as the herds do not walk on the trails and beat down the vegetation growth. In the muskeg, the vegetation is growing back into the trails and faint shaded lines are the remains of *ekwǫ̀ eto*. The elder Joe Zoe stated that,

“Now its an empty land”

In late August, caribou food on the northwest side of the island was in good quality. By the shoreline, the caribou food (willows, grasses and dwarf birch) showed good growth and were in moist conditions. Also, lichens and other vegetation showed good growth and appear to be moist and in good condition. Four caribou bulls were observed feeding on the vegetation above the shoreline on one evening. According to the elders, the bulls tend to move to the shoreline in August to feed on the willows.

On the northwest side of the island Ek’adıì, approximately 5-7km from Diavik mine, no dust was visible on the vegetation. The elder Joe Zoe mentioned that any dust could have been cleaned off by recent rain, and the dust is likely on the ground absorbed into the soil. Furthermore, the elder explained,

> “Dust fly all over and get spread out thinly over the area. Nothing, no trees, to stop the dust spreading.”

Photo 53: On Ek’adıì, Joe Zoe holding a mix of caribou food, Ek’adıì, August 2022. Photos by Petter Jacobsen.

Photo 54: On Ek’adıì; caribou food in good condition. Joe Zoe holding dwarf birch. Ek’adıì, August 2022.

Photo 55: Joe Zoe standing among the regrown caribou trails on Ek’adıì. August 2022.

Caribou Trails at Kokètì

In contrast to the regrown trails around Ek'atì, below are photos of caribou trails around Kokètì from August 2022. These trails demonstrate persistent usage, as evidenced by the erosion of vegetation regrowth, with exposed roots becoming visible in the trail, worn down by the repeated trampling of caribou hooves.

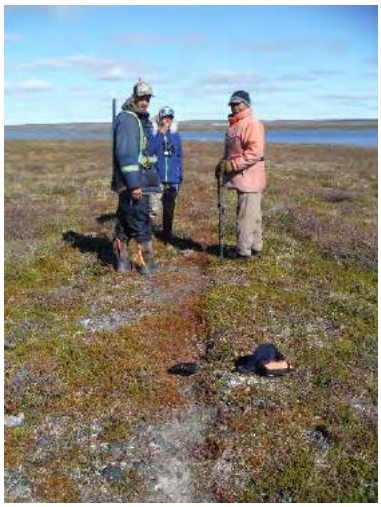


Photo 56: Recently used caribou trail on south east side of Kokètì, Russell Drybones, Ahri Ekendia and Joe Mackenzie investigating, 23 August 2022. Photos: John Nishi.	Photo 57: Recently used caribou trail on south east side of Kokètì, 23 August 2022.	Photo 58: Recently used caribou trail on southeast side of Kokètì, 23 August 2022.

Summary: Caribou food

Overall, during last two weeks of August, caribou food displayed healthy growth and exhibited generally high quality in the vicinity of the lakes Ek'atì (Lac de Gras) and Łıwets'aɔòats'ahtì (Lac du Sauvage). It's worth noting that the team maintained a safe distance of approximately 3-5 kilometers away from the mining infrastructure and operations, which prevented us from assessing quality of caribou food within that proximity of the mining operations. At the locations we visited around the lakes, the caribou food was described as abundant and good quality for caribou forage. It appeared to the team, that caribou chose to remain at a distance away from the mining operations, where we observed them grazing and resting.

The fall of 2022 experienced a very low water level and dry conditions. Some of the muskeg that usually are water-logged were dried up and had caribou laying down resting there; in places that usually are wet and containing high insect activity. During the last two weeks of August, the team did not observe any predators; the elders noted that it was strange to see so many caribou and no wolves. Additionally, there was no harassment by biting insects. Subsequently, we watched hundreds of caribou spread out over the land, every day feeding and walking peacefully and undisturbed throughout the hills around the lakes.

Most of the caribou observed were considered as in good and fat conditions, and with large bellies, especially the bulls. We watched the bulls come down to the lake, walking slowly along the shoreline feeding mainly on the willows, which at this time of the year has a high oil content. The elder, Joe Zoe, explained that they feed on the oily willows during late August to build up their fat reserves for winter. Later in September, once the leaves had fallen, the bulls avoid the willows and feed mostly on lichen instead.

Although, the caribou food showed good growth and high quality around the lakes Ek'atì and Łıwets'aɔòats'ahtì and that locations closer to the mines, such as Ek'adìì, showed abundant and good quality forage, the elder explained that the majority of caribou avoid these areas and stay a distance away from mining operation; instead moving in a southeast direction around Łıwets'aɔòats'ahtì.

Diavik's Low Flying Helicopters over Bathurst Caribou

On August 25th, the Tłı̨chǫ team noticed a helicopter from Diavik mine conducting low flying aerial surveys on northwest side of Łıwets'aɔòats'ahtì. The low flying helicopter survey was flying directly over groups of caribou. The helicopter was flying at 20 metre (65 ft) and slinging a white 'torpedo' at 10 metre (35 ft) above ground (Photo 59). The helicopter flew east-west transects lines that were about 50 metres spaced apart and approximately 5 km in length.

During August, several large herds of Bathurst caribou were spread out northwest of Łıwets'aɔòats'ahtì. The daily collar updates from GNWT-ECC showed numerous male and female caribou collars around the lake. The Tłı̨chǫ team saw the helicopter while monitoring caribou on the north shore of Łıwets'aɔòats'ahtì. For several days the team watched caribou along the north shore, following numerous herds of cows and calves along the *what'àa deh*, the tall wide esker running through the area.

While watching the herd from the esker, the team observed the helicopter flying over an esker and onto a low flat field where a caribou herd with bulls, cows, and calves were feeding. The helicopter slinged a "torpedo" about 10 metre above the caribou. After the helicopter passed, the herd started moving away from the flat field and to the hillside. The helicopter continued to fly the transect lines 30-40 times back and forth over the same small area, flying at the same low altitude over ground. After approximately two hours, we moved towards the proximity of the helicopter path, in which, the helicopter flew away.

Photo 59: Diavik's helicopter slinging the 'torpedo' 10 metre above ground, August 25th, 2023, Lac du Sauvage. Photo: Petter Jacobsen

While observing the helicopter, the team communicated the ongoing flying to TG staff at the Behchokǫ office, who immediately contacted Diavik and expressed our concern of the impact of low flying aerial survey to caribou. After continuous dialogue with Diavik, the Diavik survey crew decided to only fly in areas with no caribou collars starting the following day. Additionally, Diavik's survey crew visited our camp, met with the elders and our team to listen to our concerns. Following the meeting, daily morning planning meetings occurred with representatives from ECC, TG and Diavik with the objective to find any areas to fly with no caribou. As the days passed, more Bathurst caribou herds migrated to the area around Łıwets'aɔòats'ahtì and southeast towards Mackay Lake, which left very few survey blocks void of caribou. Eventually, caribou presence covered most of Diavik's planned survey blocks, and eventually Diavik made the decision to stop their surveying for the summer. However, Diavik restarted the low flying survey program in April 2023. Prior to them starting their program, several mitigation measures were recommended by TG and GNWT-ECC to reduce any disturbance to caribou that could be in the area, including following guidelines in GNWT-ECCs *Mobile Caribou Conservation Measures - Operational Guidance* document.

Photo 60: Bathurst caribou resting in a dried-up sedge meadow on the northwestern shoreline of Lac du Sauvage. August 2023. Photo: Petter Jacobsen.

Photo 61: Bathurst caribou resting on the esker, northwestern shoreline of Lac du Sauvage. August 2023. Photo: Petter Jacobsen.

Larger Context of Caribou Management

The Tłı̨chǫ elders expressed their strong concern that activities of mining companies may cause disturbance to the *Kokètì ekwǫ* (Bathurst caribou) at this critical time for the herd. The herd has status as *Critically Low* because the population size is ~6200 animals (Adamczewski et al. 2022). The elders asked that the broader context of caribou conservation and management be considered; Tłı̨chǫ people have suffered from strict hunting restrictions on the Bathurst herd since 2010, followed by a total allowable harvest (TAH) of zero Bathurst caribou in Wek'èezhìi since 2016. In addition to the direct effects of restricting caribou harvest for the Tłı̨cho, this has had other negative socio-cultural consequences. The hunting ban has resulted in several years of not going on the land to harvest Bathurst animals, and consequently is having a profound impact on the transmission of knowledge, language, and cultural practices from the elders to the younger generations. These traditions are intricately linked to ekwǫ̀

hunting practices, including the skills of meat processing and hide preparation. Furthermore, other stringent management measures have been put into effect by the GNWT-ENR and Tłı̨chǫ Government, such as aerial shooting of *dìga* (wolves) in 2019, the ongoing *dìga* harvest incentive program, and the Tłı̨chǫ community-based *dìga* harvesting. These measures are implemented to aid in the recovery of the *Kokètì ekwǫ*. However, Tłı̨chǫ elders and monitors are raising questions why mining companies are permitted to disturb caribou cows and calves during this critical period.

Some Lessons Learned

This incident in summer 2022 demonstrates a couple interesting experiences that should be considered when managing disturbance to caribou:

(1) From the mining company, there was a **lack of planning** for caribou to be present in the survey area. The fact that the company, who has operated on the barrenland for two decades, did not plan for the possibility for caribou herds to be in the survey area during six weeks in August and September, shows the need for a stronger emphasis on wildlife impacts when planning low level geological surveys. GNWT-ECC shares weekly caribou collar locations to the mining company, and there was a very high likelihood of caribou presence in the survey area August and September, which could have been incorporated into the survey planning at an early stage.

(2) **Advanced communications** and **collaborative planning** between industry, GNWT-ECC and Indigenous Governments should be done to anticipate potential disturbance scenarios and develop mitigation strategies to minimize any potential delays or cancellations of geological surveys. Low level helicopter surveys do not need a land use permit for the activities, and companies are not required to communicate plans to conduct low flying surveys. This type of planning should be included in a Wildlife Management and Monitoring Plan.

(3) The incident shows the importance of **Indigenous guardian programs** present on the land; the ENK program allows the Tłı̨cho Government to independently watch, report and communicate activities that may cause disturbance to the land and wildlife. If the Tłı̨chǫ guardians had not been on the lake and reported the activities, Diavik's helicopter would have continued to fly for six weeks in August and September over the Bathurst caribou herd, at a time where they are highly sensitive to disturbance (GNWT 2019).

Given the declining Bathurst herd, it becomes even more crucial that management actions collectively aim at supporting the survival and well-being of the herd. This underscores the need for a comprehensive and collaborative planning to minimize impacts of human disturbance on caribou to ensure sustainability of the *Kokètì ekwǫ.*

Garbage from Mining Industry and Outfitter Camps

On the *Kokètì ekwǫ̀* fall range around Ek'atì, the teams frequently came across garbage and debris that was left behind from mining exploration companies and other activities by industry:

- **Mining equipment**: on the southwest shore of Ek'atì there is an entire abandoned exploration camp (Lat: 64°34'54.8"N; Long: 111°11'09.7"W). The entire camp consists of several large cabins equipped with tools and gear used by the exploration company and it appears that minimal gear

had been removed but rather left to deteriorate on the land. All the equipment for drilling and exploration had been left standing on the tundra around the camp, operating wires are still attached on the operating equipment. Such wire can be harmful for caribou, it can get tangled into the caribou antlers and the animal could get tangled and stuck in the location.

- The camp was operated by Alexei Josafatow and Taylor Hill, according to documents (found in the camp) from the Mine Health and Safety Act dated 2008 and expired in 2013. For about ten years, the equipment has been sitting on the ground, and not been cleaned up and removed.

The elders and ENK program recommends that the camp and equipment be cleaned up to avoid harm to wildlife and potential oil spills from operating equipment. Our team plans to return to the site during fall 2023 to continue monitoring the area.

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<td>Photo 62: mining equipment left standing on the tundra. operating wires are still attached on the operating equipment. Photos by Petter Jacobsen.</td>
<td>Photo 63: equipment left standing on the tundra by the exploration company.</td>
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</table>

- **Steel wire**: by the river between the two large lakes, Ek'atì (Lac de Gras) and Łıwets’aɔòats’ahtì (Lac du Sauvage) we found old rusted steel wire in several places. Part of the wires were in places submerged in water, while remining wires were laying on shore. Such wire can be harmful for wildlife and caribou; it can get tangled into the caribou antlers and the animal could get tangled and stuck in the location.

- **Garbage:** other pieces of equipment were found at various locations around the two lakes consisting of: plastic containers, wires, lumber, and various other items.

The ENK program recommends that any items left behind by the mining industry is to be cleaned up and not simply left behind to contaminate the land.

		
Photo 64: Equipment found around lake. Photos: Petter Jacobsen	Photo 65: Lots of steel wire found by the river	Photo 66: Old rusted steel wire by the river between Ek'atì and Łiwets'aɔòats'ahtì

- **The outfitter camp on the east shore of Ek'atì;** (Lat: 64°32'11.1"N; Long: 109°58'46.4"W) called the "Courageous Lake camp" has been left idle for at least ten years, since harvesting restrictions was introduced on the Bathurst herd in 2012.
- The camp contains several canvas-covered tent frames that are severely deteriorating, with scattered garbage littering the land surrounding the campsite. There are two large Quonset huts that still stand, although the interior of these structures is deteriorating rapidly. Along the beach, substantial piles of fuel drums containing gasoline and diesel are present; some of these drums are empty, while others still hold fuel. Unfortunately, a few drums are currently leaking gasoline and diesel into the ground and the surrounding vegetation. It appears that the owner, John Andre, left everything intact, including tools, food, and equipment inside the Quonsets, and has not returned to address the cleanup or maintenance of the area.
- **Outfitter camp located on the west side of Ek'atì;** (Lat: 64°34'54.8"N; Long: 111°11'09.7"W). This camp, also owned by John Andre, consists of four wooden cabins. Notably, these cabins do not contain any equipment, but there are several oil drums on the ground outside, leaking fuel into the soil and the surrounding vegetation (photo 68 of black diesel drums below).

The ENK program strongly recommends that any items, particularly the fuel drums, which have been left behind by mining industry and outfitters, be promptly cleaned up and not left to potentially contaminate the land and water.

		
Photo 67: Old fuel drums left on the beach; some spilling fuel into ground at John Andre's outfitter camps on northeast side of Ek'atì. Photos: Petter Jacobsen		Photo 68: Old fuel drums left at John Andre's outfitter camp. Notice black soil and dried vegetation around drums where fuel has spilled onto the ground.

CJBS school class at Deèzàatì, September 2022.

Louis Zoe looking over portage towards Deèzàatì

CJBS school class playing handgames at Deèzàatì camp.

Louis Zoe, Russell Drybones and Bobby Nitsiza boating on Deèzàatì.

Joe Zoe showing his daughter Denise Lazare Zoe the remains of his dads hunting campsite.

Joe Zoe by artefacts of an old Tłı̨chǫ campsite on Deèzàatìdeè (Coppermine River).

Methodology

"We Watch Everything" - Traditional Knowledge Framework

Ekwǫ̀ Nàxoèhdee K'è is an applied interdisciplinary research project that bridges observations on biological indicators with the cultural knowledge of local hunters. We use this "biocultural approach" to emphasize the Tłı̨chǫ and Inuit knowledge (*Inuit Qaujimajatuqangit—IQ*) of the ecosystem we live in. Biocultural approaches explore the link between biological and cultural diversity, and their interdependency with one another (Pretty *et al.*, 2009; Pilgrim and Pretty, 2010). Our framework of research is based on two methodologies developed over the course of the program, named, respectively, "We Watch Everything" and "Do as Hunters Do."

"We Watch Everything" is a theoretical framework of Traditional Knowledge research founded upon participatory ethnographic research and a set of theoretical concepts shaping the way information is collected, analyzed and interpreted. The use of language, indigenous ontology and perspectives on nature form the pillars of the framework.

Language of Nature

Knowledge of nature is culturally situated and derives from the environmental adaptations of the culture that gave it meaning. Our human experiences of nature are thus tied to their cultural interpretations. Seen through different cultural lenses, a single process in a physical environment may have two (or more) quite different meanings. Furthermore, a person's response towards environmental processes will depend on his or her pre-existing ideas and values within their culture. Thus, the beliefs one holds of the environment direct one's actions towards nature (Ingold 2000; Sharp and Sharp 2015).

Developing a traditional knowledge environmental monitoring framework requires that we recognize and adapt the values and ideas within an indigenous perspective on nature. Using cultural practices related to ekwǫ̀ to direct the monitoring, and indigenous perspectives on nature permeate as a framework, we can glimpse into a different worldview of interactions with the land—one that is as ancient as the people who first hunted ekwǫ̀ in the landscapes of Kokètì, Ek'atì and Deèzàatì.

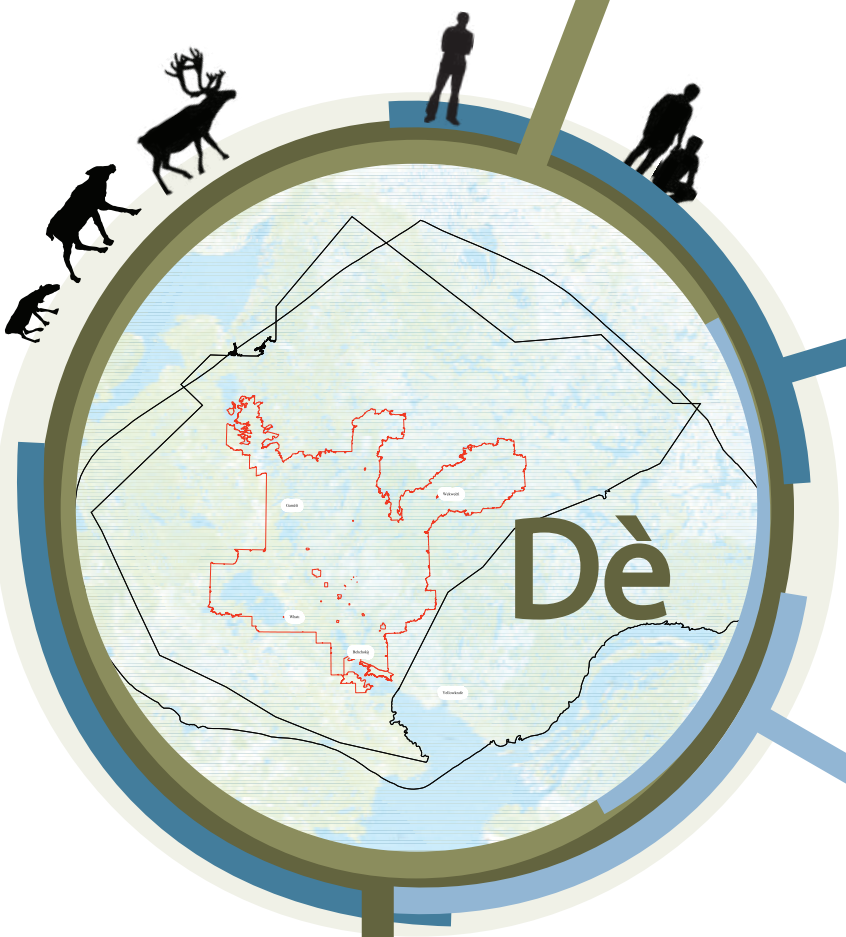
Land-based Theoretical Concepts

To achieve an indigenous perspective, the program employs Tłı̨chǫ words and cultural perspectives deeply ingrained in Tłı̨chǫ ontology. While such theoretical concepts are abstract, they have a very concrete physical practice in the day-to-day thinking of Tłı̨chǫ harvesters. An example is the concept of *dè*. *Dè* has a broader meaning than "land," because it refers to a whole ecosystem or environment; "however, where the word ecosystem is based on the idea that living things exist in association with non-living elements, the Dogrib term *dè* expands the meaning of "association" to encompass the knowledge that everything in the environment has life and spirit" (Legat, Zoe & Chocolate, 1995). *Dè* is not an independent object "out there," existing separate from culture and our daily lives, but rather is an all-encompassing, holistic system, of which indigenous culture is an integral part. As Allice Legat explains, "*dè* includes everything because all entities are in the state of existing and have spirit" (2012: 79). Surrounding the concept of *dè* we defined four key theoretical concepts underlying the program's traditional knowledge framework. These are **sentience, interdependence, communication**, and **time immemorial** (see Figure 10).

TRADITIONAL KNOWLEDGE FRAMEWORK

SENTIENCE

We acknowledge diverse forms of communication between beings in dè, which may be unfamiliar to Western perspectives. Spiritual communication is legitimate knowledge that informs of the presence and abilities of animals and natural elements. We accept that knowledge revealed through spiritual communication is valid and can be used as hunters have always used it.



TIME IMMEMORIAL

We recognize that we engage with an ancient land. Since time immemorial, the people have focused their attention on knowing the seasonal rhythms of sentient animals and geographical and climatic details throughout their land. We recognize that we follow an ancient tradition of walking the same trails, watching the same caribou herd and using the same hunting locations as people have always done.

RESPECT

We recognize all beings, such as caribou, fish and birds, as sentient, intelligent beings capable of communication, memory and personal agency. Furthermore, inanimate beings, such as the wind, are also sentient and can act on choices and influence other beings. We engage in a social relationship with animals and the elements (living and nonliving) when we travel on the land. By respecting the land and water when we camp or travel, through small acts such as paying the water, we follow the elders' teachings and engage with dè as hunters have done since time immemorial.

INTERDEPENDENCE

Humans, caribou and living and nonliving elements of the land live in a dynamic interdependent relationship. For the Tłı̨chǫ, dè is not separated into the biological, social or supernatural spheres, as it is in Western concepts. We recognize the interdependent relationships of all beings and elements of the land.

Acting upon the principles of sentience, interdependence, communication and time immemorial, team members perform individual and collective rituals. One of the simplest and yet most powerful of these is "pay the land." Paying the land is done to neutralize our passage and become aware of our dependence on nature as human beings. This ritual involves simple acts of placing tobacco, or other valuable objects, in the water upon one's first arrival to a place. Other rituals are propitiatory in nature and performed to ask for safety. "Feeding" the fire is a ritual performed collectively to mitigate ones' presence and ask for safe passage and for harmony to be maintained (photos on page 33). Through such actions, the team communicates and engages with the land on a social level; "the land, then, is a living entity with powers that should be respected if harmony is to be maintained" (Legat 2008: 37). During such engagement, the land is comparable to ones' parents, who provide everything for the people's sustenance. Tłı̨chǫ use the word *Dè Gogha Nàeɔ̀ı̨* ("the land shows favour to us") to understand how the land feels about our presence

Field Methods: "Do as Hunters Do"

"Do as Hunters Do" is the practical implementation of the "We Watch Everything" framework. "Do as Hunters Do" is a useful memetic English phrase that helps to emphasize that our research methodology emulates traditional indigenous ekwǫ̀ hunting in the barrenlands, although no real hunting occurred during the program. Using a participatory action research (PAR) approach, members of the "hunting party" travel to specific locations on the barrenlands to find ekwǫ̀ together, collectively participating, experiencing, and sharing knowledge. Using a PAR approach, the researchers become part of the "hunting team" under the direction of the elders and the local harvesters, as traditionally done in Tłı̨chǫ culture. This form of PAR research can be defined as a process of self-investigation shaped by collective decision-making among the team members.

The essence of "Do as Hunters Do" is the recognition that a TK monitoring program does not need to develop new methods; rather, it should learn from and adapt to the cultural practices developed, since time immemorial, by experienced indigenous harvesters to sustain their communities in the arctic environment. In order to comfortably live in the Arctic, Tłı̨chǫ and Inuit hunters developed sophisticated ways of looking at the landscapes surrounding them and locating animals as well as other food sources. Thus, the program uses hunting locations as places of observations, and hunting techniques as the method of observation.

Photo 69: Team positioned on What'àa (esker) next to a well used animal trail. Photo: Pat Kane.

Hunting Locations as Places of Observation

The "Do as Hunters Do" field methods unfold through a set of techniques and concepts that are specifically related to the landscapes of *Kokètì*. These were incorporated as effective tools within our research framework.

Observations at Nǫ̀ǫ̀kè

Nǫ̀ǫ̀kè (watercrossings) are the closest points of contact between land across waterbodies, used by *ekwǫ̀* to cross the numerous large lakes dotting the tundra. *Nǫ̀ǫ̀kè* is a Tłı̨chǫ term for water crossings; it literally means "swim across", and a *nǫ̀ǫ̀kè* can be any place that *ekwǫ̀* or any other animal use to swim across. Tłı̨chǫ also use the more specific term *naǫ̀oke* to refer to a place where *ekwǫ̀ always* cross, such as the crossing between *Kokètì* and *Kwìdlìachı̨̀*. As part of our methodology, waiting at these crossings allows the researchers to "Do as Hunters Do."

Nǫ̀ǫ̀kè refers to the interface between water, land, and ekwǫ̀ movement. When the herds travel over the vast land, they need to walk around large waterbodies on their migration routes. But at times they prefer to swim across water bodies rather than walk the long way around. In those circumstances, they often enter the water at the point of shortest distance to the other side; although the presence of large boulders or perceived hazards, may influence where the herds decide to cross.

Observations from Daka

Daka (high points) across the landscape such as *hozìı shìa* (hills on barrenland) and *what'àa* (eskers) are extensively used by the team to monitor *ekwǫ̀*, locate features such as favourable habitats, track the progression of predators and other species, and as points of observation with limited insect harassment.

Observations at Tataa

Tataa is an important word to understand *ekwǫ̀* migration. It refers to movement patterns of *ekwǫ̀* over land formations relative to water bodies, and literally means "in the midst of waters" (Whaèhdôö Nàowoò Kö 2002:21). The large lakes and numerous water bodies encountered on the migration routes create obstacles that the herds must travel around. A *tataa* is a channel of land between lakes—a land corridor that allows *ekwǫ̀* to move between lakes along their migration routes. The concept of *tataa* is also used by the elders to refer to a migration route (Whaèhdôö Nàowoò Kö 2002:21).

Hunting Techniques as Methods of Observation

The location of our main camp, close to the *naǫ̀oke* (water crossing) between *Kokètì* and *Kwìdlìachı̨̀* in Northwest Territories, was located at the northernmost range of Tłı̨chǫ land use. In the past, people travelled by birch bark canoes and later with canvas canoes along the waterways from their settlements south of the treeline to this location purely for *ekwǫ̀* hunting. They followed shorelines by boat, then beached at known *ekwǫ̀* water crossings. Families set their camps short distances from the crossings, so as not to disturb the potential movement of *ekwǫ̀*. From camp, hunters walked to hill tops or eskers, where they waited and watched for any movement on the land surrounding the crossing.

The Ekwǫ̀ Nàxoède K'è program has sought to revive ancient traditions and trails by applying similar techniques and concepts. Observations from the *daka* (hilltops) such as *hozìı shìa* (hills on barrenland) and *what'àa* (eskers) are the main tools applied by the team to locate *ekwǫ̀*. Advised by local hunters, our

main camp was established approximately two kilometres north of the main *naɔokè*. This location has been used for centuries by Tłı̨chǫ and Inuit. One kilometre west of the main campsite, there is a long, tall esker, stretching in a north-south direction, where we did as hunters have always done; wait and watch the land for animal movement surrounding the *naɔokè*.

Waiting

The *"Do as Hunters Do*" methodology is based on walking the land and waiting at strategic places, such as at higher elevations with a viewpoint or known *nǫɔokè*; places where ekwǫ̀ are expected to migrate. As *ekwǫ̀* herds are constantly moving, it is necessary to meet them on their travels, and hunters have identified the best locations to meet them. They regularly travelled to these locations and simply waited.

Waiting also provided an opportunity to feel and become acquainted with the land. Every day, the team sat on the high esker west of the camp for hours, watching, listening, and feeling the weather. Sitting on the esker between two and eight hours each day, in morning, midday and evenings, we had the opportunity to experience weather systems moving over us. Living in close contact with the land fosters a connection with elements of *dè* that goes beyond ordinary observations.

Waiting is therefore intended as a vigilant watch—a state of mind in which the team members engage personally with the landscape. Such prolonged personal engagement with the daily weather conditions, physical movement over various terrains and close encounters with local animals, shapes the mental state of each team member, and thus the overall team's ability to monitor ekwǫ̀.

Time

The *"Do as Hunters Do"* methodology requires ample time due to its ground-based approach. Time is required, for example, to adjust to the daily and seasonal weather patterns. Weather decides everything on the barrenlands; the wind and waves direct all movements and actions; thus, plans get delayed and remade constantly. The most appropriate tool we can employ is time, implemented by waiting and watching. A long-term approach is necessary to get more than momentary observations, and to fully understand the life of ekwǫ̀ on the land. Long-term monitoring, defined over years of repeated research periods, allows the researcher and the hunters to discern ecological patterns.

Walking

Walking is simultaneously the slowest form of transportation and the most intimate form of movement over any landscape. As a research method, walking provides the team with the time necessary to watch for details and identify clues of presence left behind by animals. The teams walked between five and 20 kilometres per day. After 73 days of field work at Kokètì, we had covered 3572 kilometres by foot and boat. The long walks into the surrounding landscape were made from *daka (high point)* to *daka*, from one high point to the next, often following eskers. As we reached a *daka*, such as an esker or hilltop, we sit, watch over the surrounding landscape, and wait. If no animal movements were seen for one to three hours, we proceeded to the next *daka* and continued watching. This is the same method as hunters use when hunting for ekwǫ̀ on the barrenlands in the fall.

Monitoring Indicators: *"We Watch Everything"*

Monitoring is based on the periodic assessment of key indicators, which were developed using an interdisciplinary approach. Based on the holistic Tłı̨chǫ concept of *"We Watch Everything,"* the elders highlighted several related indicators to be included for an analysis of ekwǫ̀ and habitat assessment. The resulting list of monitoring indicators include: (1) habitat; (2) *ekwǫ̀*; (3) predators, and (4) industrial development.

Indicator 1: Habitat

- Daily weather pattern (temperature, wind direction, humidity, barometric pressure)
    a. *Ekwǫ̀* behaviour in response to weather
    b. Daily insect activity in response to weather
- *Ekwǫ̀* and predator behaviour in response to weather/ insect activity
- Conditions of vegetation and *ekwǫ̀* forage
- Effects of environmental changes on habitat and *ekwǫ̀*

Indicator 2: *Ekwǫ̀*

Ekwǫ̀ health

- Unhealthy: skinny; bony; fatigued
- Healthy: normal conditions. No bones visible on rump and back. Layer of fat shows on the neck and back, and back to rump. Look at tail: if it's short, then the animal is fat and healthy

Hide colour

- Unhealthy: discoloured; patchy
- Healthy: nice colour; no patches. In July: white-coloured hide (shed winter coat in June- July); August: darker color and shorter hair (new winter coat is coming)

Walking posture

- Unhealthy: limping, or walking with lagging head
- Healthy: prancing, or normal posture; head straight or slightly down when walking

Injured animals

- Number of *ekwǫ̀* injured in the herd
- Types of injuries
- Signs of disease

Calves

- Calf-to-cow ratio
- Number of cows without calves
- Number of twins: sign of a healthy herd, as the cow is healthy enough to support two calves—demonstrates cows have not been under stress, and good habitat quality

Indicator 3: Predators

- Number, signs of and location of *ekwǫ̀* predators
- Relationship between *ekwǫ̀* and predators

Indicator 4: Industrial Development

- *Ekwǫ̀* behaviour and movement affected by visible presence, noise, scent from industrial infrastructure and activities

Finding Ekwǫ̀

The main challenge for monitoring *ekwǫ̀* is finding *ekwǫ̀*. In general, *ekwǫ̀* migrate southwest, from their calving grounds west of Bathurst Inlet, in late June/early July, toward the general area of *Kokètì* and *Kwìdlìachɻ̀*, and remain in that area throughout July and August, and into September. However, at a finer scale, the herd's movements are very unpredictable. In our field program, the knowledge of the team's harvesters and scientific radio collar data received every two days allowed us to locate the herds and position ourselves in the right location.

Collar Data

Collar information provides a specific geographic location of male and female *ekwǫ̀*. Every second day, GNWT-ENR biologists provide collar information to the TG's GIS technician, who plots the info onto a grid map of our monitoring area. The info from the grid map is communicated to the team researcher, over satellite phone or as a text message using a Garmin Inreach device, who plots the collar data on a grid map either while on the land (photo 32) or in camp (photo 33). The collar information provides the location of collared *ekwǫ̀* at a specific time approximately every second day. The challenge for the program is knowing where the herds are throughout the days in between.

Photo 70: Johnny Boline, Cody Mantla and Tyanna Steinwand plotting caribou collar location on map in camp. Photo: Katie Orlinsky.

Photo 71: Janet Rabesca, Joe Zoe and Roy Judas discussing caribou locations over map in the boat on Contwoyto Lake. Photo: Katie Orlinsky.

Local Knowledge

Since herds can move long distances each day, local knowledge was necessary to identify where to best position ourselves to intercept *ekwǫ̀* before they moved to areas inaccessible by our transportation methods; boating and walking. Building camp near frequently used *nǫɔokè* and waiting is the traditional and most efficient way to ensure meeting *ekwǫ̀*. Local knowledge identified which locations would be best suited to have a semi-permanent camp. John Franklin and Mercie Koadloak, who have lived most of their lives on *Kokètì*, pointed out the best camp locations, and where to go by boat and foot to meet the herds. Their detailed local knowledge of geography and topography, by land and water, was vital for our team's ability to best position itself.

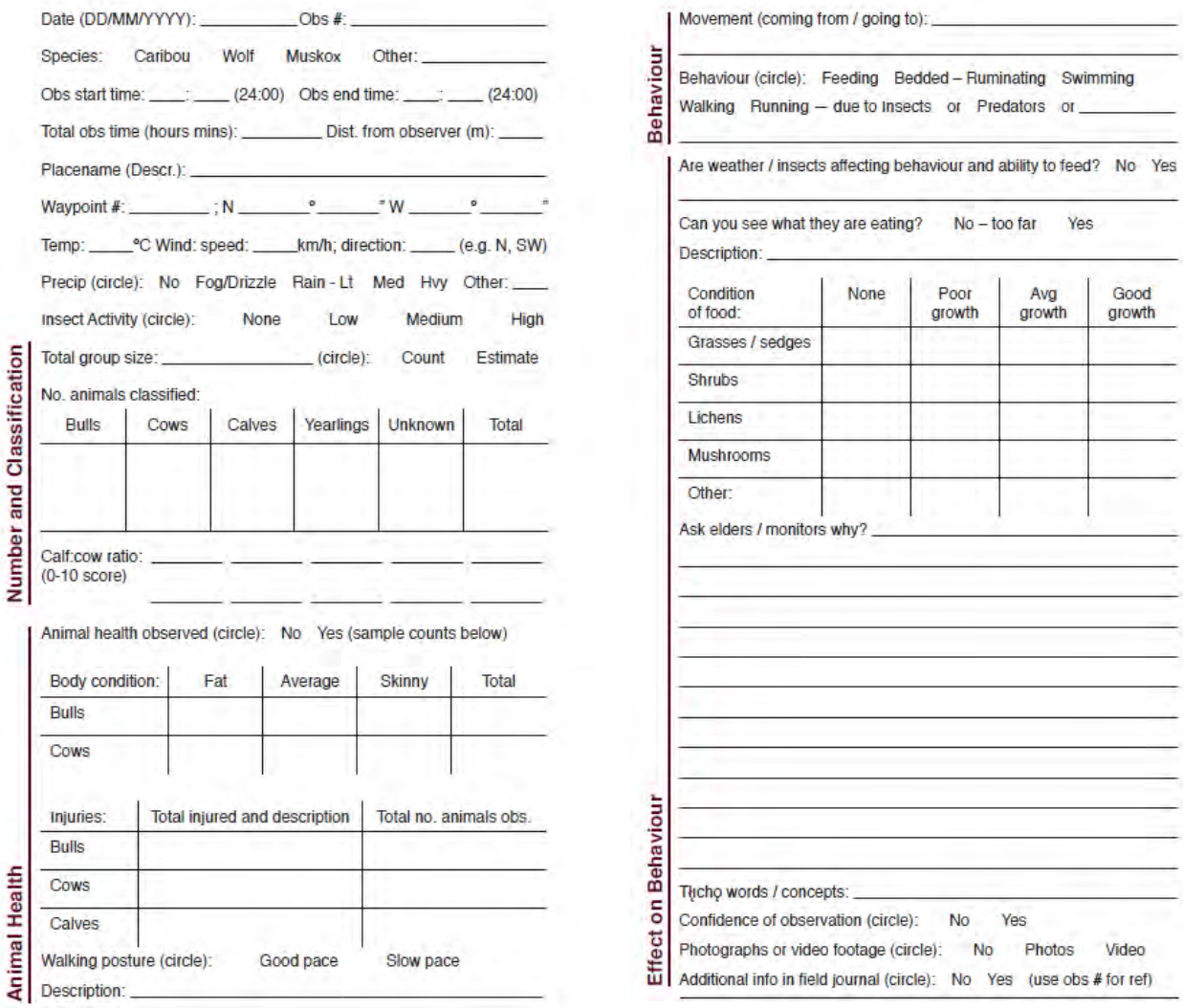
We learned that the success of the program is dependent on doing, as close as possible, what local harvesters and elders have always done on the lake: travel similar routes; set camp at the same historical

campsites and walk the same trails. The task of monitoring is an act of trying to position oneself at places where one anticipates *ekwǫ̀* will move through. In Tłı̨chǫ, *Kokètì* literally means empty campsite lake, and refers to the many old campsites that have been made at the lake over time. These campsites were chosen for a purpose; namely, for protection from wind or proximity to hunting locations. The program used the same sites for the same reasons.

Field Notes Protocols

Field notes protocols were created to provide consistency between the researchers' observations. Table 12 outlines information collected during each wildlife observation. The templates provide consistency to the daily observations and experience of each team. The template systemizes the direct wildlife recording, while the notes of elders' explanations are flexible and open-ended, to allow for different durations of each observation and adjusting to the elders' descriptions. The field books are printed in Rite-in-the-Rain™ waterproof paper.

Table 16: Template for wildlife observations



Date (DD/MM/YYYY): _____ Obs #: _____

Species: Caribou Wolf Muskox Other: _____

Obs start time: ____: ____ (24:00) Obs end time: ____: ____ (24:00)

Total obs time (hours mins): _____ Dist. from observer (m): _____

Placename (Descr.): _____

Waypoint #: _____ ; N _____° _____" W _____° _____"

Temp: _____°C Wind: speed: _____km/h; direction: _____ (e.g. N, SW)

Precip (circle): No Fog/Drizzle Rain - Lt Med Hvy Other: ____

Insect Activity (circle): None Low Medium High

Number and Classification

Total group size: _____ (circle): Count Estimate

No. animals classified:

Bulls	Cows	Calves	Yearlings	Unknown	Total

Calf:cow ratio: _____ _____ _____ _____ _____
(0-10 score)
_____ _____ _____ _____ _____

Animal Health

Animal health observed (circle): No Yes (sample counts below)

Body condition:	Fat	Average	Skinny	Total
Bulls				
Cows				

Injuries:	Total injured and description	Total no. animals obs.
Bulls		
Cows		
Calves		

Walking posture (circle): Good pace Slow pace

Description: _____

Behaviour

Movement (coming from / going to): _____

Behaviour (circle): Feeding Bedded – Ruminating Swimming
Walking Running – due to insects or Predators or _____

Are weather / insects affecting behaviour and ability to feed? No Yes

Can you see what they are eating? No – too far Yes

Description: _____

Condition of food:	None	Poor growth	Avg growth	Good growth
Grasses / sedges				
Shrubs				
Lichens				
Mushrooms				
Other:				

Ask elders / monitors why? _____

Effect on Behaviour

Tłı̨chǫ words / concepts: _____

Confidence of observation (circle): No Yes

Photographs or video footage (circle): No Photos Video

Additional info in field journal (circle): No Yes (use obs # for ref)

Summary of 2022

2022 was a very busy year for the program; as we operated three camps (Kokètì, Ek'atì and Deèzàatì) on the barrenlands on both the *Kokètì ekwǫ̀* (Bathurst caribou) summer range and the Sahtı ekwǫ̀ herd fall range at Deèzàatì (Point Lake). We had six field teams out over a three-month span, and 46 Tłı̨chǫ persons participated in the program and so had the opportunity to spend 2-3 weeks immersed in Tłı̨chǫ culture on the barrenlands. A school class from CJBS with 10 students were also at the Deèzàatì camp for 10 days in September. This large operation was organized by the Tłı̨chǫ Government team Jocelyn Zoe, Lydiah Rabesca, Janelle Nitsiza, Stephanie Behrens, Tyanna Steinwand, Tammy Steinwand and Petter Jacobsen, with support from many other dedicated staff and organizations.

Throughout July, August and September we had three monitoring teams on the *Kokètì ekwǫ̀* summer range at Kokètì (Contwoyto Lake). In the final last two weeks of August, we had a single team at Ek'atì. Additionally for the duration of September, we had two teams at Deèzàatì to monitor the Sahtı ekwǫ̀. The camp at Deèzàatì was closed on September 28th.

Between 2018 and 2021, we observed favorable habitat conditions and the numerous caribou populations encountered displayed overall good health around Kokètì. This positive trend indicated the presence of favorable environmental factors that could support population growth. However, despite the promising indicators, we consistently observed numerous herds with few or no calves during these years. The summer of 2022 marked a notable shift, as it was the first instance when we documented an increased number of calves. Although, the herd has a critical low status, it's noteworthy that we have not observed emaciated or unhealthy skinny caribou; instead, the caribou have been generally healthy and in good condition. The positive environmental factors and considerable presence of young caribou around Ek'atì could be a sign of optimism for the critically low population of the herd.

Between July and September, a total of 14 *dìga* (wolves/*Canis lupus*) were sighted in the vicinity of Kokètì. Interestingly, no *dìga* were observed around Ek'atì, despite the presence of numerous caribou herds in the region. Similarly, at Deèzàatì, there were numerous caribou herds while no *dìga* were directly spotted, although tracks left by a pack of three wolves were identified along a sandy shoreline in late September.

At Kokètì, one single dedìı (moose) was spotted on an island opposite the camp. Interestingly, this marks the third year that dedìı has been reported at Kokètì. In 2021, seven dedìı was recorded, while we saw 11 dedìı in 2019. It's important to note that the presence of dedìı had not been seen by Tłı̨chǫ monitors prior to 2019. No dedìı were observed around Ek'atì, whereas we saw eight dedìı at Deèzàatì. The sheltered valleys surrounding Deèzàatì has substantial stands of spruce trees and taller shrubs, creating a more suitable habitat for dedìı when compared to the high barrenlands encompassing Kokètì. In 2021, we did not encounter any instances of dìga or dıdı, which stood in contrast to the high number observations in earlier years.

Sahcho (grizzly bears/Ursus arctos/ "big guy") were only observed at Kokètì. A total of six individual bears were observed on six distinct occasions. The six *sahcho* recorded in 2022 showed a slight decrease from the seven *sahcho* seen during the summer of 2021. Additionally, this was lower than the eight bears spotted throughout the summer of 2020, as well as the ten *sahcho* reported in the summer of 2019. Over the past four years, the documented *sahcho* sightings have ranged from 6 to 10 animals per summer. *Det'ǫcho* (eagles) were observed across all three camps. 31 bald eagles were noted at Kokètì and Ek'atì,

while an additional 3 golden eagles were reported at Kokètì. It is worth noting that the bald eagle's summer range typically is confined to forested landscapes and does not extend into the barrenland regions. Although first reported by Kokètì residents in 2005, bald eagles have since established themselves as a permanent predator on the *Kokètì ekwǫ̀* summer range.

Program Plans for 2023

Our plans for summer 2023 include the following:

- Establish a 3rd camp at Lac de Gras/ Lac du Sauvage (Ek'atì).
    - Start-up monitoring caribou and habitat in the vicinity of the Ekati and Diavik mines
    - Assess impacts from mining on caribou habitat and behavior.
    - Identify a location and build camp infrastructure, including two cabins.
- Operate the caribou monitoring camps at Kokètì in July and August to continue monitoring *Kokètì ekwǫ̀*
- Operate the Deèzàatì camp in September to monitor *Sahtı ekwǫ̀*.
- Train more Tłı̨chǫ people in "monitoring and research" on how to observe and assess caribou health, herd numbers and habitat conditions.
- Develop collaborative partnership with various universities to include TK in research on ekwǫ̀ and northern ecosystems.

Continued Monitoring Topics

In upcoming field seasons, the program will persist in monitoring the following areas:

- Trends in the health of the Kokètì ekwǫ̀ herd,
- Tracking the abundance of calves,
- The quality of habitat and available forage.
- The influence of climate change on both habitat and *ekwǫ̀* behavior.
- The relationship between *ekwǫ̀, dìga*, and indigenous harvesters.
- The impacts of industrial development on ekwǫ̀ habitat.

Further Research Topics

We suggest that further research related to *ekwǫ̀* decline should include:

- How the loss of cultural practices associated with less *ekwǫ̀* harvesting, meat processing and hide preparation affect social and cultural identity in northern communities?
- How this loss of opportunities to pass on the knowledge, language and culture of the hunt affect the social and cultural identity of younger generations in northern communities?
- How does the inability to hunt *ekwǫ̀* affect food security concerns in Tłı̨chǫ and other indigenous communities?

Ekwǫ̀ Nàxoèhdee K'è has given participants, old and young, the opportunity to live in close contact with *ekwǫ̀* and gain direct experience with the land and animals. This program has, however, also been an emotional journey for many harvesters. While happy to see *ekwǫ̀*, all felt the visual impact of lower population numbers than ever; others felt nostalgia and sadness at the fewer opportunities to maintain their traditional practices. Elder Joe Zoe summed up the feelings of all on the real implications to his community from the *ekwǫ̀* decline: *"how can I be happy [to see ekwǫ̀], when my wife and kids back home are hungry".*

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Tłı̨chǫ Government
Culture and Lands Protection

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Tłı̨chǫ Government
Box 412
Behchokǫ̀, NT
Canada X0E 0Y0
Phone: (867) 392-6381
Fax: (867) 392-6389

www.tlicho.ca