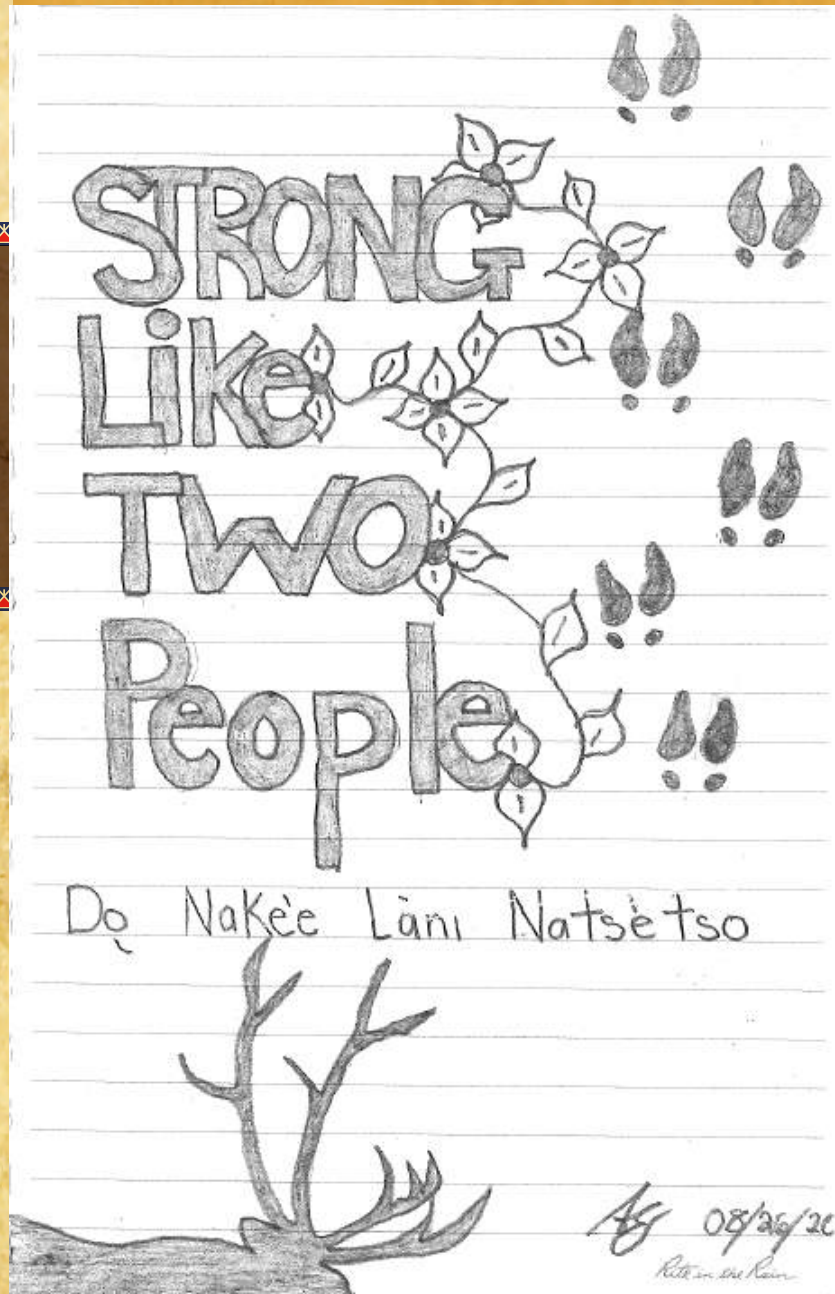


Ekwò Nàxoèhdee K'è

2020 Results



Dedats'eetsaa:
Tłıchǫ Research & Training Institute
www.research.tlicho.ca

2021

Ekwò Nàxoèhdee K'è

2020 Results

Kokètì & Deèzàatì

2020 Results

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Tìjchq Yatì

Placenames

| | |
|--------------------|-----------------------------------|
| Kokètì | Contwoyto Lake |
| Kwiìdliachjì | Fry Inlet (slingshot handle lake) |
| Ek'atì | Lac de Gras |
| Ek'adiì | Island on Lac de Gras |
| Ewaànit'itì | Courageous Lake |
| Nqdiikahtì | Mackay Lake |
| Ìiwets'aòòats'ahtì | Lac de Sauvage |

| | |
|---------------------------|------------------------|
| Deèzàatì | Point Lake |
| Dì Cho | Big Island on Deèzàatì |
| Deèzàatideè | Coppermine River |
| Wek'ehaeljìtì deh | Parent River |
| Wek'ehaeljìtì | Parent Lake |
| Saat'ootì | Redrock lake |
| Tatsotì | Grenville Lake |
| Tatsotì | Mesa Lake |
| Wek'ewhàlìtì/ Ets'àitì | Rawalpindi Lake |







Geographical Terminology Useful for Caribou Monitors

| | |
|-------------|---|
| Ekwo Nq̄okè | Caribou Water crossing (any place animal can swim across) |
| Ekwo Nāokè | Caribou Water crossing (a place caribou <i>always</i> swims across) |
| Tataà | Land between water bodies |
| Whatàa | Esker |
| Hozì | Barrenland |
| Hozì Deè | Barrenland; farthest out, "Big barrens" |
| Hozì shia | Hill or mountain on barrenland |
| Sih / shih | Hill or mountain |
| Daka | High points |
| Ts'iwì | Stands of trees (black spruce) on barrenland |
| Tì | Lake/water |
| Ta | Water; prefix of a word to do with water |
| Deh | River |
| Taɪaa | Meandering river |
| Dehti | River lake (a lake in the flow of a river) |
| Dì | Island |
| Tì'à | Bay |
| tì'ąą | Beach |
| Tabàa | Lake shore or beach |
| ɤehdah | A point of land |
| ɤehdahkw'o | Peninsula |
| Tì k'abàa | Shoreline (walking by the shoreline) |
| Wha | Sand: prefix to do with sand / or a pole |
| Nałeezee | Caribou calving grounds |
| Dechɪlaa | Treeline |
| Chɪk'è | North |
| Sazhɪ/ saɪ | South |
| k'abatsq̄q̄ | East |
| dąq̄ | West |

Wildlife Terminology Useful for Caribou Monitors

| | |
|-------------------|---|
| Hozì Ekwo | Barren-ground caribou |
| Kokètì ekwo | Bathurst caribou herd |
| Sahtì Ekwo | Bluenose-east caribou herd |
| Tq̄dziì | Woodland caribou |
| Ekwo ɬexè k'ɛɔàa | Caribou herd |
| Ekwo akwe etlee | Caribou leader / lead caribou (any sex) |
| Ts'ida akwe etlee | Cow leader |
| Wedzia | Small sized bull caribou |
| Wedziì | Bull caribou |
| Yèagoa | Young bull caribou; 3-year-old |
| Yèagocho | Bull caribou, second largest male |

| | |
|--------------------|--|
| Wedzihcho | Large male caribou |
| Nadeèzhq | Older bull caribou |
| Dets'e | Mature Cow caribou |
| Dets'èa | Young cow caribou |
| Tsia | Caribou calf |
| Ts'idaa | Young caribou (2 or 3 years old) |
| Ekwo Nàxoèhdee K'è | In the migration of ekwo |
| Nadeeᑭà | Migrating caribou |
| Ekwo na da dii | Caribou left behind during migration: "caribou that go half way" |
| Niizaa | Caribou migrating towards the forest in the fall |
| Nadèezoᑭ | Caribou migrating to the calving grounds |
| Ekwo Edè | Caribou antlers |
| Ekwo keè | Caribou tracks |
| Ekwo eto | Caribou trail |
| Ekwo ek'a | Caribou fat |
| Diga | Male wolf |
| Diga dets'è | Female wolf |
| Dìgazha/ Dìgaza | Wolf pup/ pups |
| Diga wozaa /wezaa | Wolf litter |
| Diga eᑭoo | Wolf den |
| Diga nàdè | Wolves family, community / wolves living together |
| Diga nàdèe k'è | Wolf habitat |
| Sahcho | Grizzly bear |
| Hozii edzie | Muskox |
| Nògha | Wolverine |
| Didi | Ground squirrel / barrenland squirrel |
| Dedii | Moose |
| Kw'ih | Mosquito |
| Behk'òts'jā | Arctic tern |
| Tatsò gah | Raven |
| Hatsòga | Crow |
| Ti tso | Loon |
| Det'qcho | Eagle |
| Ets'imbaa | Arctic fox |

| | |
|---|--|
|  |  |
| <p>Team C at Kokèti camp</p> | <p>Janelle Nitsiza filets a trout under the watchful eye of Therese Zoe, basecamp Kokèti (P. Kane)</p> |
|  |  |
| <p>Roy Judas drives the research boat over smooth waters back to camp, Kokèti (P. Kane)</p> | <p>John Franklin and Mercie Koadloak meets the research team, Roy Judas and Karin Clark, at Kokèti (P. Kane)</p> |
|  |  |
| <p>Jasmine Wetrade, Avery Husky and Camilia Zoe-Chocolate plots caribou collar info on map, Koketi.</p> | <p>Karin Clark, Stephanie Behrens and Roy Judas makes a travel plan for the day (P. Kane).</p> |

Foreword

This project was conducted by the Dedats'eetsaa: Tłıchq Research and Training Institute (TRTI). TRTI brings together academic, government, non-governmental organizations (NGOs), and corporate and local Tłıchq organizations to collaborate on research in social, cultural, environmental, health, and wellness concerns for the Tłıchq. The mandate of TRTI is to advance the study of Tłıchq lands, language, culture, and way of life through the promotion of research and its use in education, training, planning, and monitoring purposes.

TRTI pursues its mandate by promoting research projects and activities involving elders and youth; developing and training Tłıchq researchers; developing and using indigenous-based research design and appropriate community methodologies; publishing work in a variety of media including online at www.Tłıchq.ca; contributing to the Tłıchq Digital Database of oral history, maps, photographs, video, and other documentary resources; reviewing proposed research submitted for licensing through the Aurora Research Institute; and providing support and assistance to approved research projects while promoting collaboration with academic and corporate partners. For more information on TRTI initiatives and programs please visit <http://www.research.Tłıchq.ca>.



Photo 1: Team A & Team B at Kokètì (P. Kane)



Photo 2: Team D & Team E at Deèzàatì

Ekwò Nàxoèhdee K'è - Introduction

Started in 2016, the *Ekwò Nàxoèhdee K'è* caribou monitoring program has brought Tłıchʼo people to the ancestral *hoził ewkò* (barren-ground caribou) harvesting locations on *hoziłdee* (barrenland). The basecamp at *Kokèti* (Contwoyto Lake), located in the northernmost region of Tłıchʼo traditional territory, is on the summer range of the *Kokèti ewkò* (Bathurst caribou) herd; the place where *hoził ewkò* bring their newborn calves to spend the summer. During summer 2020, we build a second basecamp for the program located at *Deèzàatì* (Point Lake) on the range of the *Sahtı ewkò* (Bluenose East caribou herd).

Both the herd *Kokèti ewkò* and the *Sahtı ewkò* herds experience sharp declines during the last decade. The most recent *Kokèti ewkò* calving ground survey, conducted by Government of Northwest Territories-Environment and Natural Resources (GNWT-ENR) in 2018, estimated a total of 8,200 *ekwò*; a 98% decline since its estimated highest recorded population numbers of 480,000 in the 1980s. The Tłıchʼo Government continues its monitoring efforts to study and monitor the *ekwò* herds based on the traditional knowledge of Tłıchʼo elders and harvesters. The monitoring objectives are to examine the conditions of individual *hoził ewkò* as well as the health of the herd in general, on its summer range, focusing on four key indicators: (1) habitat; (2) *ekwò* condition; (3) predators, and (4) industrial development. The program is a collaboration between the Tłıchʼo Government, GNWT-ENR, the Wek'èezhìi Renewable Resource Board (WRRB) and Dominion Diamond Mines ULC (DD). Funding was provided by Tłıchʼo Government, DD, GNWT-ENR and the GNWT-Cumulative Impact Monitoring Program¹ (CIMP).



Photo 3: Team B, and Chief Charlie Football and Grand Chief George Mackenzie at *Kokèti* camp (P. Kane)

¹ This project receives funding from Government of the Northwest Territories Department of Environment and Natural Resources, Northwest Territories Cumulative Impact Monitoring Program. This article is Project CIMP94. More info can be found at: <http://www.enr.gov.nt.ca/en/services/cumulative-impact-monitoring-program-nwt-cimp>

The program has monitored *ekwò* and its habitat around Kokètì for five year. From 2016 to 2020, the teams have steadily increased the monitoring and search effort each year, which has resulted in more frequent and detailed wildlife observations. Table 1 shows the progression and increase of monitors, field days, distance travelled and monitoring hours per year of the program.

Monitoring Efforts 2016-2020

| | 2016 | 2017 | 2018 | 2019 | 2020 |
|--|-------|--------|--------|--------|--------|
|  Caribou monitors | 8 | 10 | 10 | 25 | 40 |
|  Field days | 26 | 40 | 40 | 57 | 48 |
|  Distance travelled | 481km | 1186km | 1784km | 3240km | 2561km |
|  Monitoring hours | 140 | 207 | 218 | 325 | 190 |

Table 1: Monitoring Efforts 2016-2020

Through *Ekwò Nàxoèhdee K'è*, Tłıchq travel to their ancestral harvesting locations on Kokètì and Deèzàatì, where we reconnect to cultural places and *ekwò*. This allows people “go back to the original source to remember” (John B. Zoe) the stories, language, traditional knowledge and ways of life, and maintain the relationship with the land and animals. We apply the Tłıchq research methodology, “We Watch Everything” to study current environmental conditions, cumulative impacts to *ekwò* health and population numbers, and examine the *ekwò* life cycle firsthand. The research methodology “Do as Hunters Do” is formed around traditional ways of traveling the land. In and around the lakes, we travel the land by boat and on foot to key geographical features known as *ekwò nqɔokè* (*ekwò* water crossings), where elders have always anticipated *ekwò* herds’ arrival. The monitors sit in position, in the same way a traditional hunting party would have done, to wait, and watch the *ekwò* 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.

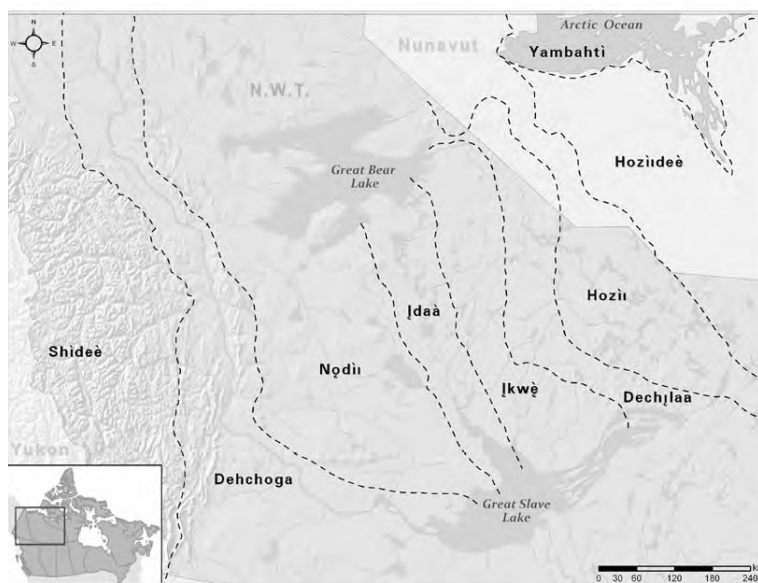
This report presents results from the program’s 2020 field season, including:

- **Results from 2020 field season;**
- **Trend Analysis from 2016 to 2020;**
- **Deèzàatì cultural places;**
- **Management Recommendations**

For information about monitoring activities and results from 2016 to 2020, please see our reports, documentaries and photos on TRTI website <https://research.tlicho.ca/research/bootsontheground>.

Kokètì Monitoring Area and Timeline

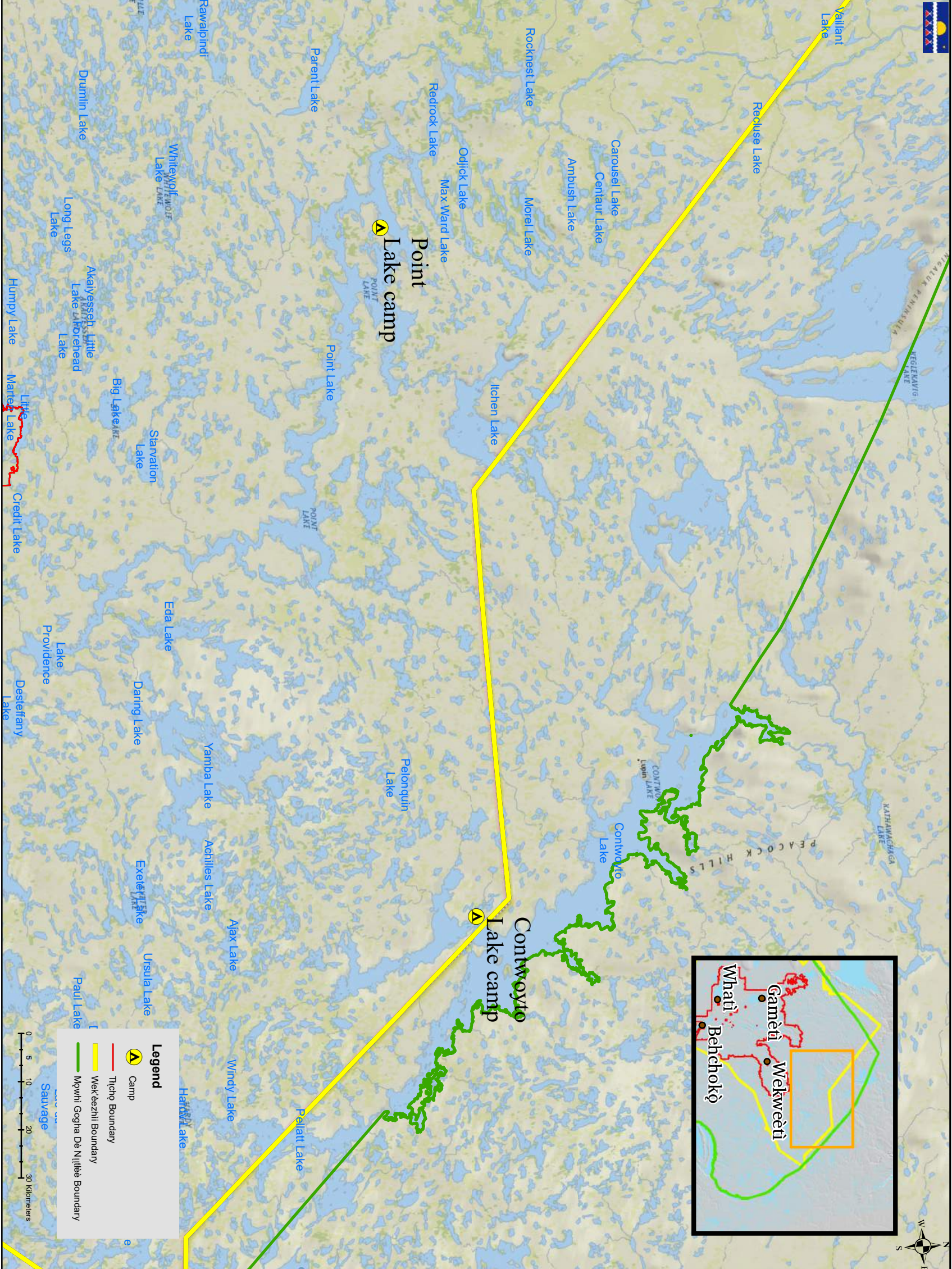
The study area is situated entirely within *hoziidee* (map 1), referring to the region beyond *hozi* (barrenland); a place without trees and only low growth shrub vegetation (Andrews 2011). The area is classified as a tundra biome and is in the Arctic Tundra climatic zone. The *ekwò* monitoring area is geographically focused around *Kokètì* (Contwoyto Lake), *Kwiidliachì* (Fry Inlet), and the surrounding land within one day's walking distance from these lakes (map 3). The Tłıchq 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 Tłıchq traditional land use and is situated in *Hozidee* described as “big barrens” (Andrews 2011). The lake is importantly situated directly southwest of Bathurst Inlet, home to the herds calving grounds. *Hozidee* is shared by the Tłıchq and Inuit people for harvesting *hozi* *ekwò* in summer and fall, fur trapping in winter, and as a trade route between the two cultures. Inuit and Tłıchq have a long history of meeting at historical *hozi* *ekwò* hunting locations.



Map 1: Tłıchq Landscape Units. Source: Andrews 2011

The areas around *Kokètì* are central to the post-calving and summer ranges of the *Kokètì* *ekwò*. In July, during post-calving aggregation, herds of cows and calves move from the calving grounds and mix with the bulls to form large herds. The cows bring their newborn calves to the feeding areas around *Kokètì*, where the calves can grow strong and feed properly prior to fall migration and the onset of winter.

Kokètì runs approximately northwest to southeast, bisecting the post-calving summer range in two and providing a low rolling landscape with optimal habitat and refuge from biting insects, who can't stand the high winds sometimes coming off the lake. At its widest point, the lake is approximately 19 kilometres wide, and numerous eskers, moraines, and islands form *nqɔɔkè* (water crossings) that *ekwò* use to cross the lake. The elongated shape of the lake creates a network of *nqɔɔkè* along both eastern and western shores of the lake that creates corresponding *ekwò etq* (*ekwò* trails) dug deep into the ground as the *etq* are 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, although the winter road access north of Diavik mine 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 (Ekati, Diavik, and Gahcho Kuè) as well as abandoned exploration camps scattered across the landscape.



Legend

- Camp
- Tl'ich'o Boundary
- Wek'ezhni Boundary
- Mowhi Gogha De Nit'ees Boundary

0 5 10 20 30 Kilometers

Scale bar

Deèzàatì (Point Lake)

The monitoring program established a base camp on Deèzàatì to monitor the *Sahti ekwò* (Bluenose East caribou herd). Establishing the ekwò monitoring program at Deèzàatì is based on WRRBs (2019) recommendation (#15-2019) to expand TG's monitoring to the post-calving and summer ranges of *Sahti ekwò*. Deèzàatì was selected because largest waterbody on the *Sahti ekwò* range within the Wek'èezhìi that monitors can travel on to access ekwò (Map 3).

In July 2020, a team of eight people were flown to the south end of Deèzàatì in an aircraft charter. We set camp on an island with a sand beach and waited. The next day, in the early morning, a helicopter flew in from Ekati mine and successfully transported the two boats (20ft Lund Alaskan) and engines; this was a key step for our program to start up on Deèzàatì. The plan for the team was to spend a week travelling the entire lake, exploring the numerous bays and inlets and find a suitable location to establish basecamp. Most of the east side of Deèzàatì is rocky and does not have sheltered location to establish a camp. Once we travelled to the western side, we reached Dì Cho (Big Island). The island is so large that it doesn't seem accurate to call it an island, instead it appears as land with a lake around it. We found a perfect location on the northwest side; a peninsula made of a narrow stretch of land, shaped as a crescent moon, creating a sheltered bay with sand beach inside (photo 5). We made camp there and spent the next five days to search for ekwò no'oke (water crossings) and associated archeological and cultural sites around the lake. On August 2nd, we pulled up the boats and flew to Kokètì camp (photo 4) to set up the basecamp and start the monitoring program on Kokètì.

From September 2nd to 28th, we returned to at Deèzàatì to start the ekwò monitoring program. We choose September as there was higher likelihood that the Bluenose East ekwò herd would have migrated to general area around the lake. Unfortunately, the Bluenose East ekwò herd were too far north of the lake, and the teams only observed two ekwò during the four weeks. The lack of ekwò gave us time to explore the area for cultural sites associated with ekwò harvesting. During the four weeks, we travelled the entire lake from the Coppermine River outflow on the southeast side and northwest onto Redrock lake and as far as we could get down the Coppermine River. Deèzàatì has a central place in Tłı̨chǫ history and land use, as families travelled and stayed around the large lake for ekwò hunting. Especially the large island Dì Cho has a central place in Tłı̨chǫ stories as people travelling to the lake established camp on the many sand beaches on the island. Throughout the lake, we identified and documented numerous archeological and cultural sites and several ekwò no'oke.



Photo 4: Kokètì Basecamp (P. Kane)



Photo 5: Deèzàatì basecamp (P. Jacobsen)

Field Teams

During 2020, our monitoring was continuous over an eight-week (52 days) period between August 2nd and September 28th, during which time five teams (Teams A, B, C, D and E) conducted approximately three-week shifts (table 2) at Kokèti and at Deèzàati (map 2). At Kokèti, field teams conducted work from August 2nd to the September 23rd, 2020. Each team was in the field for 15 to 19 days, for a total duration of 52 days at Kokèti. At Deèzàati (Point Lake), two Teams (D and E) conducted field work from the 2nd – 28th of September, 2020. Each Team was in the field for 14 days, with a total duration of 28 days at Deèzàati (table 2)

Table 2. Timing and duration of field team stays at Kokèti and Deèzàati

| Kokèti (Contwoyto Lake) | | | | Deèzàati (Point Lake) | | | |
|-------------------------|--------|--------|--------|-----------------------|--------|--------|--------|
| | Start | End | # Days | | Start | End | # Days |
| Team A | 2 Aug | 20 Aug | 18 | Team D | 2 Sep | 15 Sep | 14 |
| Team B | 20 Aug | 8 Sep | 19 | Team E | 15 Sep | 28 Sep | 14 |
| Team C | 8 Sep | 23 Sep | 15 | Total days | | | 28 |
| Total days | | | 52 | | | | |

At Kokèti, the teams traveled 2393 kilometres by boat and walking (see tracks on map 3), and 114 hours traveling and watching wildlife (Table 3). The teams travelled the lakes by boat and walked inland to get into close proximity to the *ekwò* herds. Due to numerous bad weather days and early snow in September, monitoring by boat or walking occurred on about 50% of the total field days; daily trips were undertaken on 27 out of 52 days. Average daily distance travelled by boat and walking were 88.1 and 4.1 km respectively. Total cumulative distance travelled were 2,291.7 by boat and 101.5 km by walking for a total of 2393 km (table 3). The daily monitoring locations were determined using the harvesters' traditional knowledge and GPS collar locations of Kokèti *ekwò* provided by GNWT-ENR.

Table 3: Kokèti: Daily distances travelled by boat and walking

| | Boating | Walking | Total |
|----------------------------|---------------|--------------|---------------|
| No. Days travelled | 26 | 25 | 27 |
| % Days travelled | 50% | 48% | 52% |
| Avg. daily distance (km) | 88.1 | 4.1 | 88.6 |
| Min daily distance (km) | 3.6 | 0.5 | 4.0 |
| Max daily distance (km) | 268.3 | 9.0 | 268.9 |
| Total distance (km) | 2291.7 | 101.5 | 2393.2 |



At Deèzàati (Point Lake), two Teams spent a total duration of 28 days (table 4). The average distance of daily travel by boat and walking was 74.3 km, with a majority of distance covered by boat, and the maximum travelled distance was 238 km in a day. In total over the 28 days, the teams travelled 1782 km, and spend total of 114 hours traveling and observing the land.

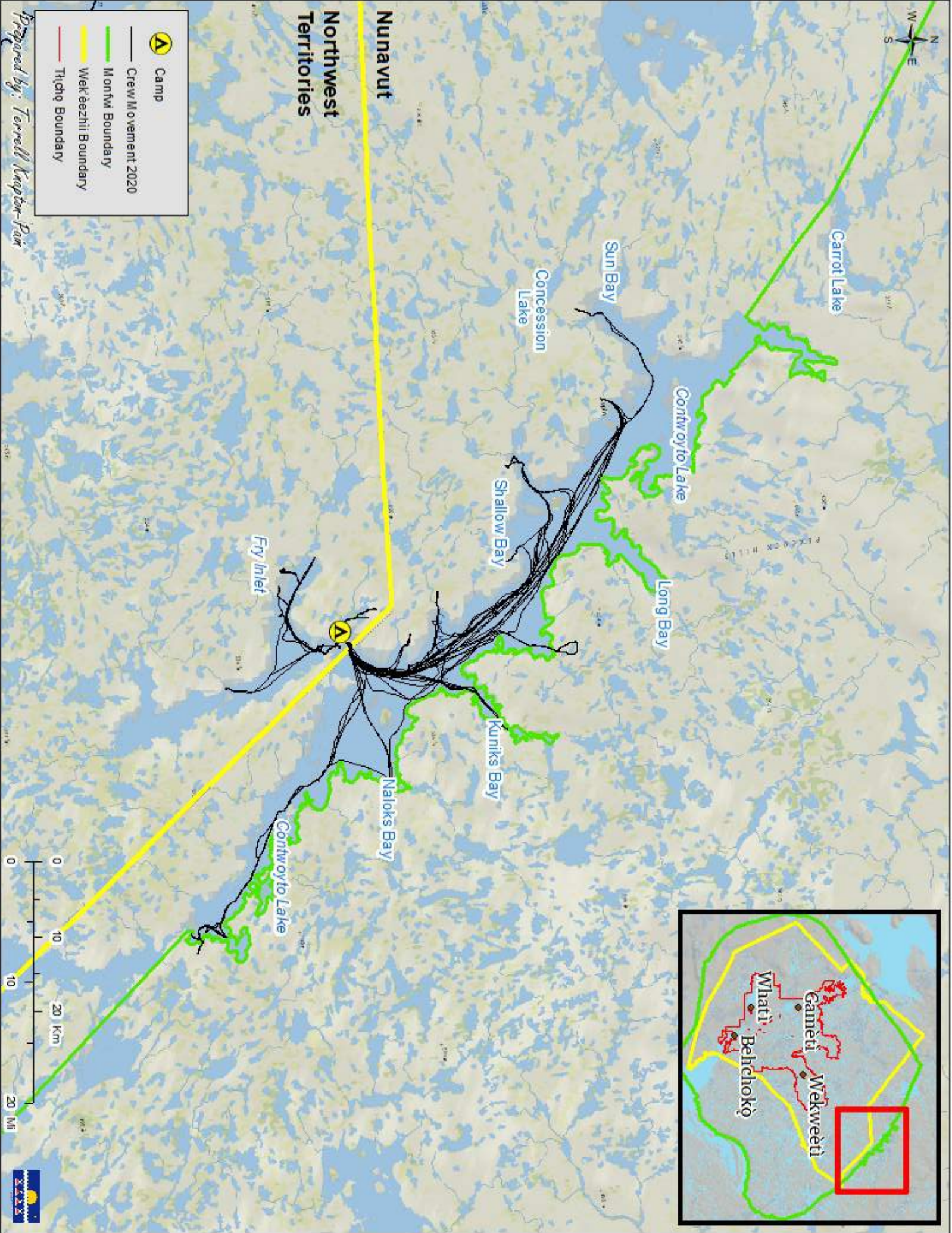
Table 4: Deèzàati: daily distances travelled by boat and walking

| | Boating | Walking | Total |
|----------------------------|-------------|-----------|-------------|
| No. Days travelled | 24 | 24 | 24 |
| Avg. daily distance (km) | 72.5 | 1.7 | 74.3 |
| Min daily distance (km) | 0 | 0 | 0 |
| Max daily distance (km) | 238 | 6 | 238 |
| Total distance (km) | 1741 | 41 | 1782 |

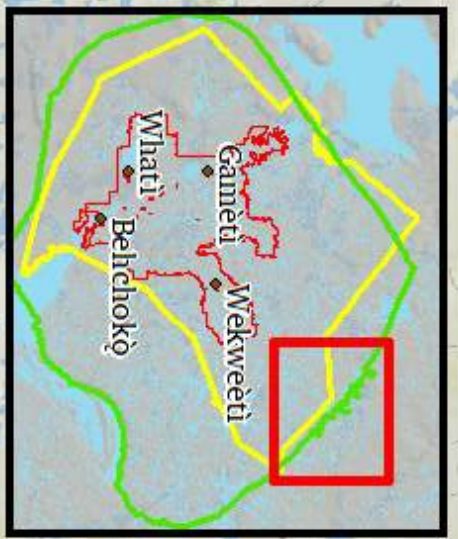


Nunavut Northwest Territories

-  Camp
-  Crew Movement 2020
-  Montwi Boundary
-  Wek'èezhi Boundary
-  Tlichiq Boundary



Prepared by: Terrell Knapton-Pain



The Silent Crisis - Kokètì Ekwò Decline

In 2018, the NWT Conference of Management Authorities (CMA) listed the *hoziì* *ekwò* (barren ground caribou) 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 ground caribou 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* *ekwò*, the most recent calving ground survey, conducted in June, 2018, estimated the total herd population to be 8,207 *ekwò* (Adamczeski et al. 2019, Government of the Northwest Territories and Tłıchǵ Government Joint Proposal on Management Actions for the Bathurst Ekwò (Barren-ground caribou) Herd: 2019 – 2021). The previous survey, in 2015, estimated the herd population to be 19,769. (Boulanger et al. 2017). A comparison between the two surveys indicates that the herd has more than halved over the past three years—a decline of 58 per cent. The main contributors to the continued and precipitous decline are low survival rate for adult female *ekwò*, and poor reproduction rates of the herd, which include low survival rate for calves (Government of the Northwest Territories and Tłıchǵ Government Joint Proposal on Management Actions for the Bathurst Ekwò (Barren-ground caribou) Herd: 2019 – 2021).

Between 2009 and 2018, the *Kokètì* *ekwò* population declined by 74 per cent. This dramatic rate of decline for the *Kokètì* *ekwò* 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 Ekwò 2019). The next survey for the Bathurst herd is scheduled for June 2021.

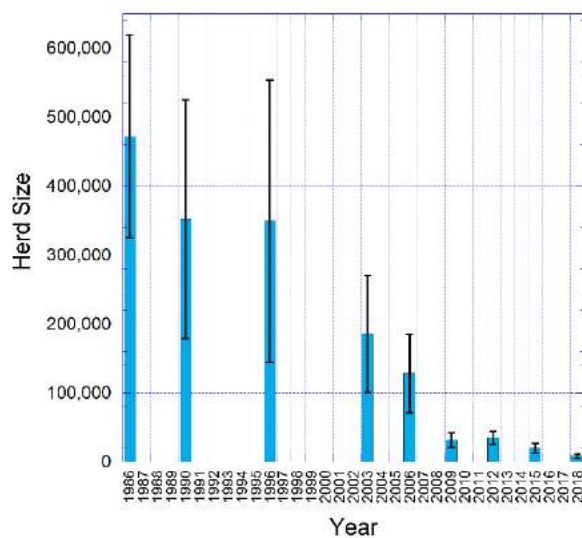


Figure 1: Bathurst herd calving population estimate 1986-2018

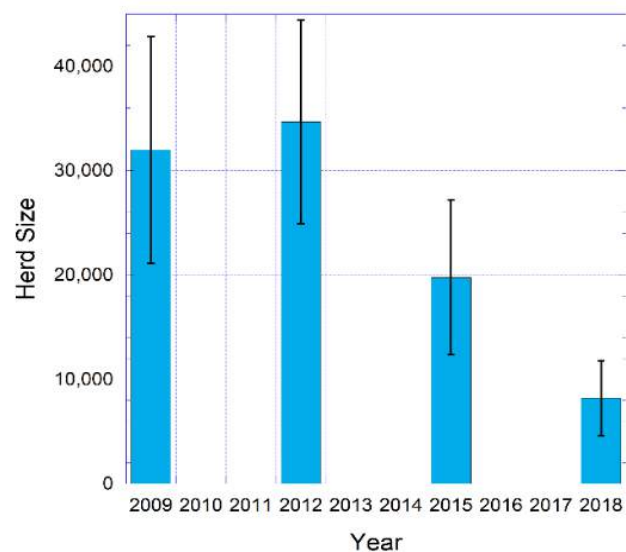


Figure 2: Bathurst herd calving population estimate 2009-2018

Source: Government of the Northwest Territories and Tłıchǵ Government Joint Proposal on Management Actions for the Bathurst Ekwò (Barren-ground caribou) Herd: 2019 – 2021.



Michel Louis Rabesca paying the water upon first arrival at Deèzàatì (P. Jacobsen)



Joe Lazare Zoe feeding the fire at Kokètì, on camp opening day (P. Jacobsen)



Louis Zoe by rock tipi ring on esker, east side of Kokètì (J. Nitisza).



Moccasins on the ground (JJ. Simpson)



Team E taking a break after a long hike at Deèzàatì (JJ. Simpson)



Petter Jacobsen and Joe Lazare Zoe plotting collar info on map during lunch break, Deèzàatì (JJ. Simpson)

2020 Results

At Kokèti, the teams observed a total of 89 *ekwò* groups (table 5) (Bathurst *ekwò/Rangifer tarandus groenlandicus*) and the total number of *ekwò* observed was 1313 individuals (table 6). The total individual count represents the cumulative sum of all *ekwò* in groups seen by the field teams. The group sizes ranged from a single animal to an estimated 328 *ekwò*. The *ekwò* groups and individuals observed were not distinct; because on many occasions the same groups of *ekwò* were seen on consecutive days. Thus, wildlife groups and individual sightings represent a relative index of abundance and not a population estimate. *Ekwò* groups were observed throughout the field season, however many of the large herds were located to the northwest of Kokèti for large part of the August and September, and inaccessible by the field teams. Additionally, poor weather conditions in mid-September, with snow and frost, made *ekwò* observations challenging.

Table 5: Groups of wildlife observed at Kokèti.

| | Ekwò* | Muskox* | Moose | Wolf | Grizzly Bear | Wolverine | Eagle | Bald Eagle | Golden Eagle |
|--------|-------|---------|-------|------|--------------|-----------|-------|------------|--------------|
| Team A | 34 | 17 | | 0 | 1 | 0 | 0 | 11 | 1 |
| Team B | 38 | 3 | 0 | 0 | 4 | 1 | 1 | 1 | 0 |
| Team C | 17 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| Sum | 89 | 23 | 0 | 0 | 7 | 1 | 1 | 12 | 3 |

In total, the teams observed 89 groups of *ekwò* over 48 field days. All other wildlife observations were recorded, as follows:

- *Hozii edzie* (muskox/*Ovibos moschatus*) were the second most abundant wildlife species observed with a total of 22 groups seen comprising 429 individuals. Group size ranged from 1 to 52 muskoxen.
- In sharp contrast to previous years, no *didi* (moose) or *diga* (wolf/*Canis lupus*) were observed
- There were seven groups of *sahcho* (grizzly bears/*Ursus arctos*) observed through August and September at Kokèti. Except for a sow accompanied by a yearling seen by Team B on the 23 August, all other grizzly bear observations through August and September were of a single animal
- One group of three *nògha* (wolverine/*Gulo gulo*) was observed by Team B on 3 September (Table 6). The other field teams did not see wolverine.
- Sixteen individual *det'qcho* (eagle) were observed throughout the field season by the three teams; 12 were bald eagles, 3 were golden eagles, and one unknown was not classified

Table 6: Counts of animals observed at Kokèti

| | Ekwò* | Muskox* | Moose | Wolf | Grizzly Bear | Wolverine | Eagle | Bald Eagle | Golden Eagle |
|--------|-------|---------|-------|------|--------------|-----------|-------|------------|--------------|
| Team A | 398 | 268 | 0 | 0 | 1 | 0 | 0 | 11 | 1 |
| Team B | 725 | 125 | 0 | 0 | 5 | 3 | 1 | 1 | 0 |
| Team C | 190 | 36 | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| Sum | 1313 | 429 | 0 | 0 | 8 | 3 | 1 | 12 | 3 |

Indicator 1: Habitat

Summer is a key season for ekwò. Adults need to eat growing plants in order to regain body mass lost in the winter and spring, so they are in prime condition for the fall breeding season. Bulls need to grow muscle and antlers, and accumulate fat for the rut and to survive the coming winter. For adult females, summer grazing conditions are also crucial for meeting their nutritional demands to regain muscle and store fat on their bodies as well as for continuing production of energy-rich milk for their calves. For calves, the nutrition they get from nursing from their mothers is obtained from green vegetation through the summer, and young subadult ekwò need nutrition from green plants to reach adult body size and sexual maturity.

Weather and Vegetation

In contrast to previous years, monitoring did not take place in July, due to public health orders. Therefore, we have no observations from the start of the summer. In August, the summer habitat conditions and ekwò forage around *Kokèti* and *Kwiidliachjì* were described as very healthy, largely because the vegetation was lush, moist and productive. The consistent rain and moist soil, resulting in plentiful, high-quality forage, which was particularly evident by the richness and good quality of lichen, grasses, shrubs and dwarf birches. During August and September, the high frequency of rain showers drenched the ground and the vegetation remained moist and fresh, and provided plentiful forage for ekwò. The moist vegetation also produced an abundance of mushrooms and berries (photo 6), which were described as “big”.



Photo 6: Therese Zoe picking berries by Koketi camp (P. Kane)

Ekwò and Biting Insects

Biting and parasitic insects may influence ekwò feeding behavior and activity levels, which in turn may affect body condition and pregnancy rates of ekwò. Biting insects like mosquitoes and black flies will feed on the blood of ekwò to get the protein and iron they need to produce eggs. Parasitic insects such as warble flies and bot flies rely on ekwò to complete the larval stages of their life cycles; warble fly larvae grow and develop under the skin of ekwò until they emerge, and bot fly larvae mature in the nasal passages and throat pouches of ekwò until they are coughed out.

Monitors recorded weather conditions and biting insect activity three times daily (Figure 3a); in the morning (~0800h), afternoon (~1400h), and evening (~2000h). The biting insect activity index was a categorical value ranging from 0 to 3, with 0 indicating no activity of insects and 3 reflecting high activity. The biting insect activity index was consistently low through August, except for one short period, and then virtually no observed activity throughout September (Figure 3a). The low biting insect index was likely due

to the steadily declining trend in temperature through August combined with high and variable wind conditions (Figure 3 b and c). The declining temperature and strong wind continued into September, with freezing temperatures, frost and snow first observed on the September 13th. Based on these cool and windy conditions through most of August and September, biting insect activity was low to negligible. In turn, ekwò could spend more time feeding peacefully instead of continuous movements to avoid biting insect.

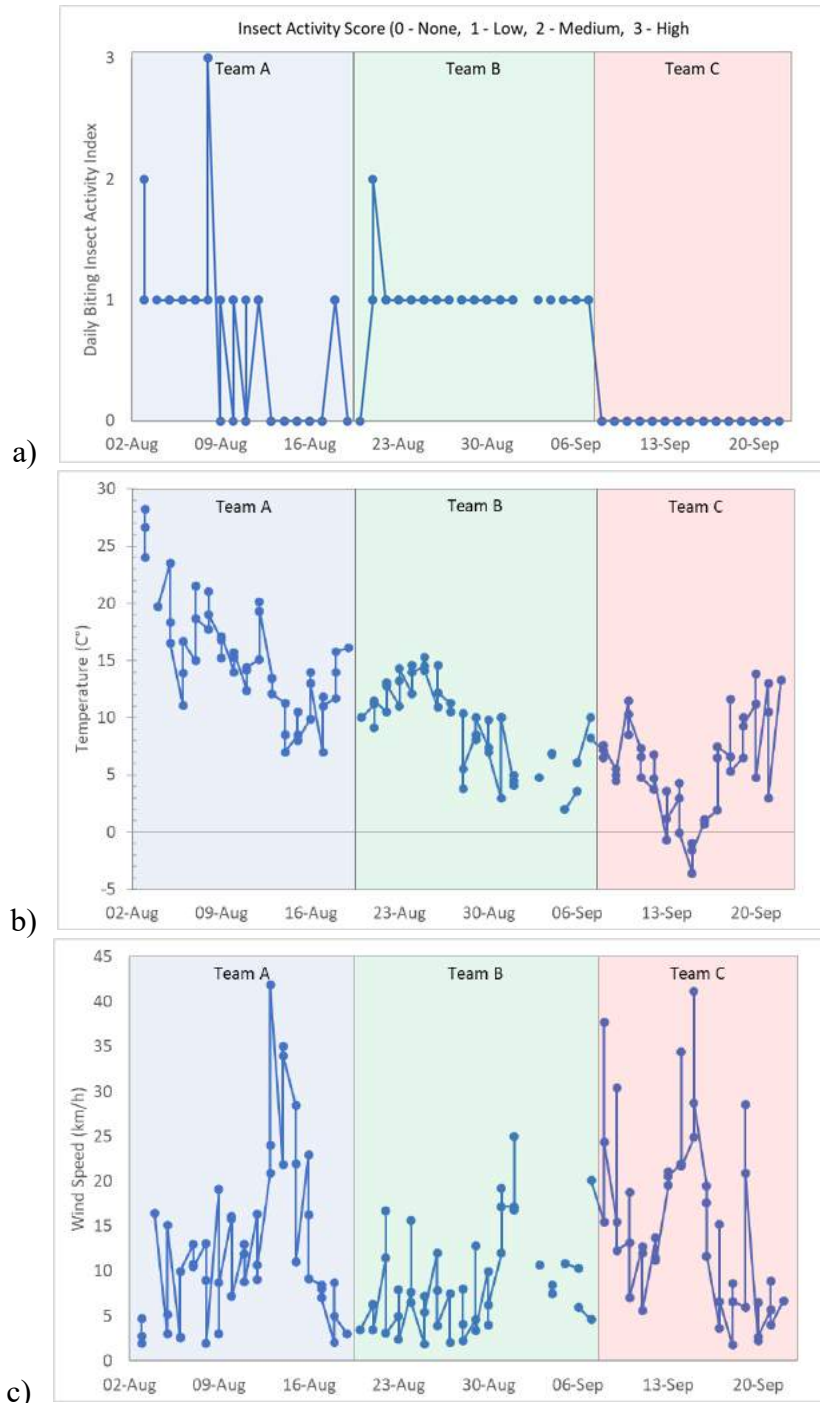


Figure 3: Trend in a) daily insect activity index, b) ambient temperature, and c) wind speed for August and September.

Indicator 2: Ekwò

At Kokèti, a total of 89 groups of *ekwò* were seen that ranged from a single animal to an estimated group of 328 (observed on 30 August) (Figure 4). The total number of *ekwò* observed by all three field teams was 1,313. The average and median *ekwò* group sizes were 14.8 and 5 respectively.

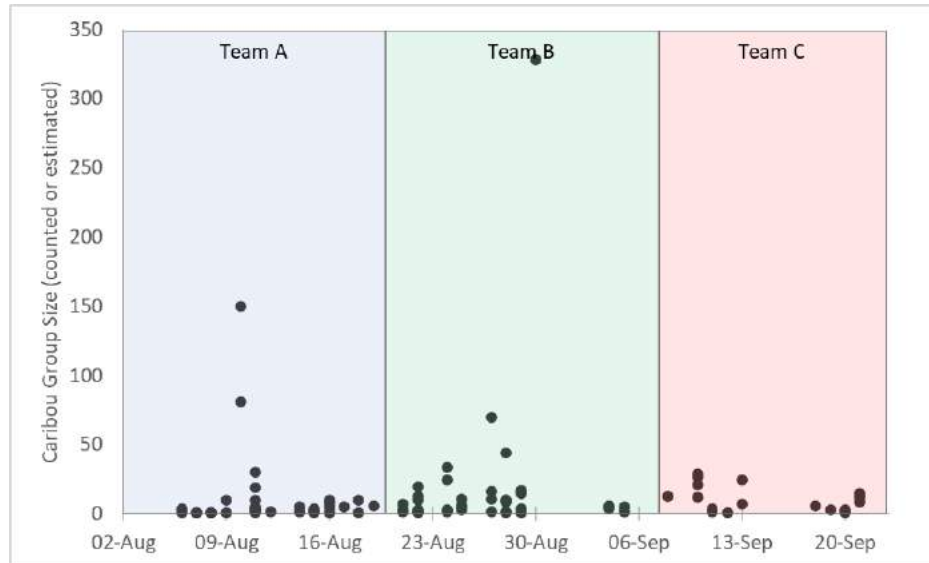


Figure 4: Group sizes of Bathurst *ekwò* observed during the 2020 field season (sample size = 89 groups; range 1-328; average = 14.8; median = 5).

Ekwò Calf Abundance and Calf: Cow Ratios

Of the 89 *ekwò* groups observed by the field teams, 37 groups were used initially to estimate an overall calf:cow ratio (Figure 5). The 37 *ekwò* groups were selected based on the criterion that at least one adult female *ekwò* was identified within the group. The *ekwò* groups in which Teams classified cows and calves were generally small. One group comprised 328 *ekwò* and the remaining 36 groups ranged in size from 1-81 animals (Figure 5). Based on the sample of 37 groups, the average and median group sizes were 19 and 5 *ekwò* respectively, and there were no differences in *ekwò* group sizes between Teams.



Photo 7: Herd of bulls on August 10th. (C. Zoe-Chocolate)

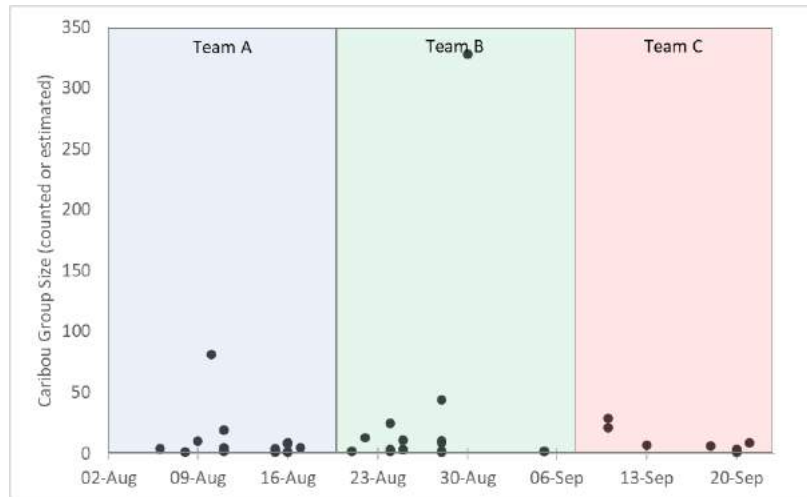


Figure 5: Ekwò group size in which monitors classified at least one adult female (cow) (n=37). These observations were used to estimate calf:cow ratios for Bathurst ekwò at Kokèti

On average 5 cows and 2 calves were classified in a group, with an observed ratio of 29.1 (± 6.2 SE) calves to 100 cows (Figure 6). However, the 37 groups included observations of ekwò observed from more than one kilometer away (8 groups), as well as sightings with no distances recorded (n=12). Of the eight ekwò groups seen from > 1km, calves were only seen in two groups.

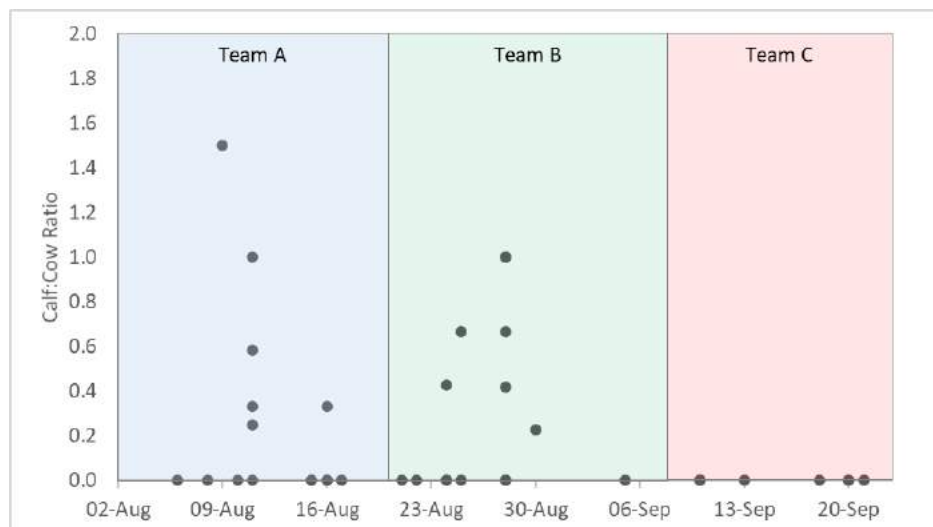


Figure 6. Calf to cow ratio in 37 caribou groups that had at least one adult female (cow), mean = 0.291 (+ 0.062 Standard Error), sample size = 37.

We think there was more uncertainty in classifying cows and calves at greater distances, and that calves may not be easily and consistently seen in ekwò groups that were watched from more than a kilometer away. Consequently, we also estimated an average calf to cow ratio based on ekwò groups that were within a kilometer (≤ 1 km) from the observers (figure 7). This distance criterion reduced the sample size to 17 ekwò groups. The average number of cows and calves classified in a group were 9 and 3 respectively. In this sample of 17 groups, the observed ratio was 27.5 (± 8.5 Standard Error) calves per 100 cows.

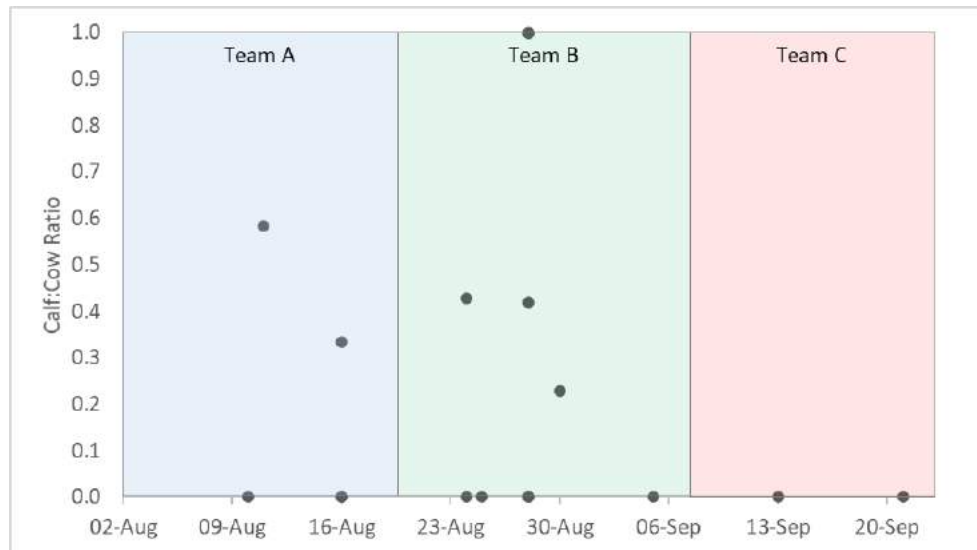
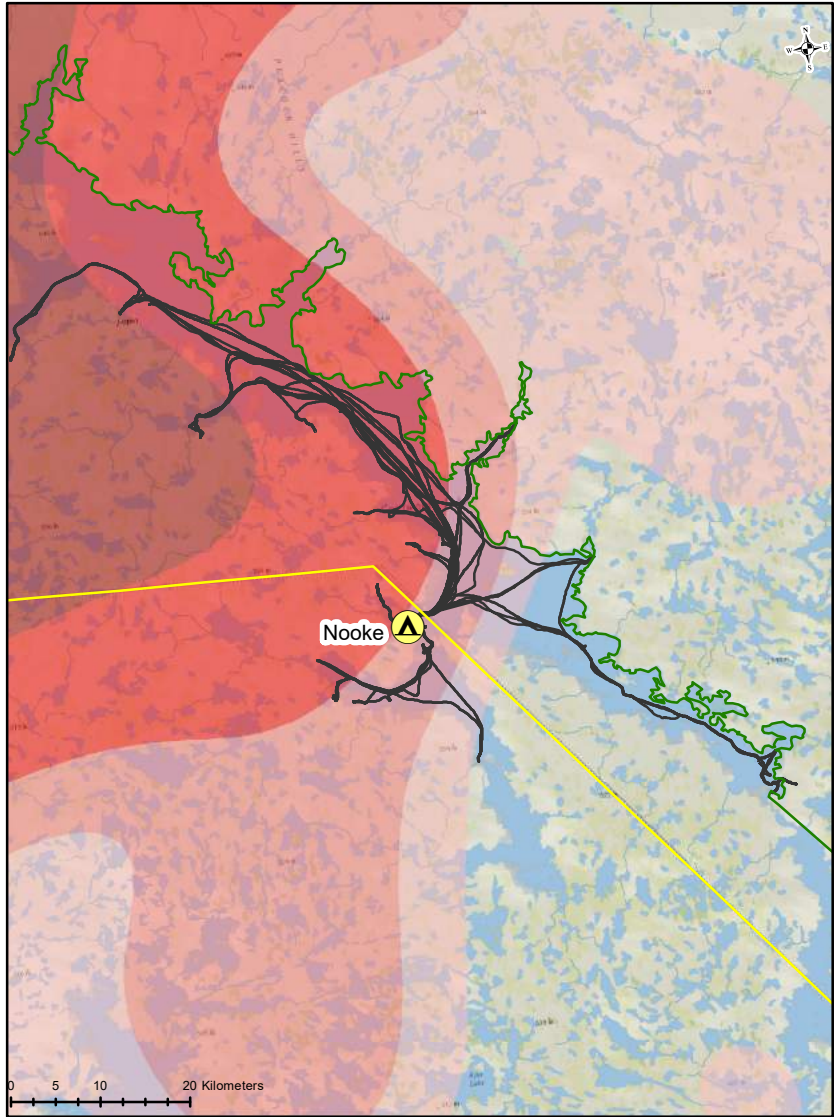
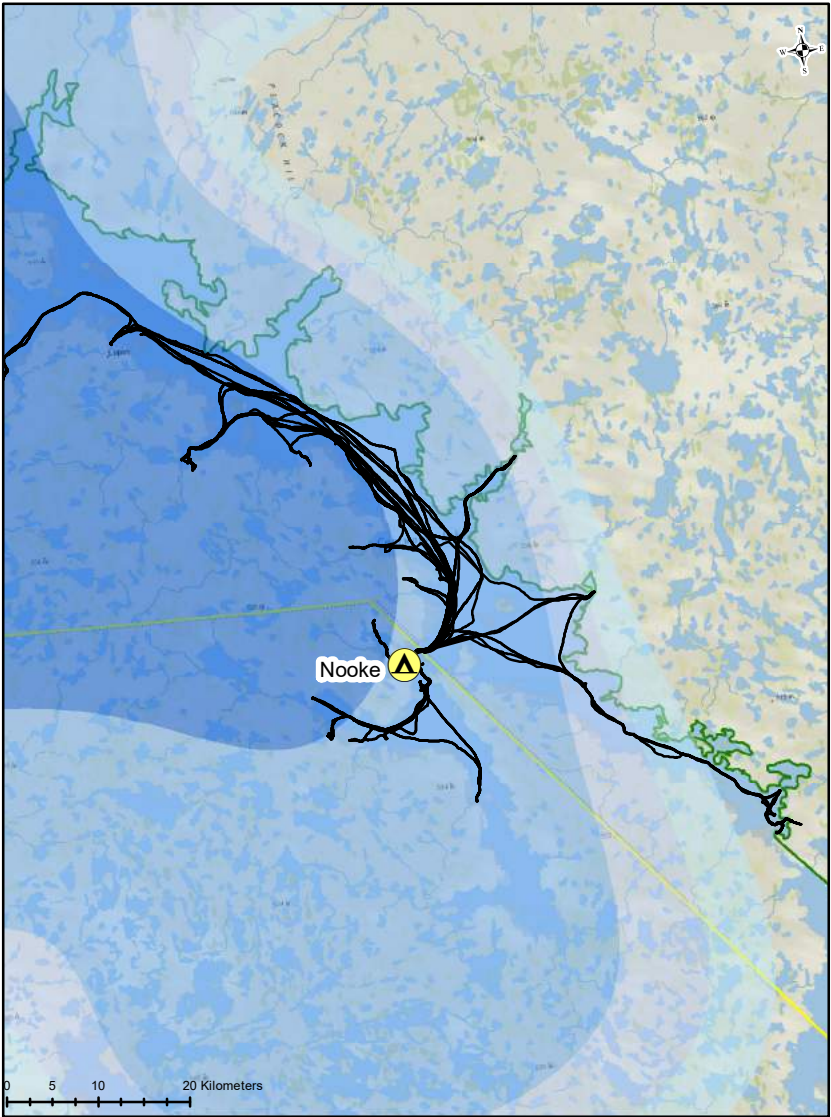
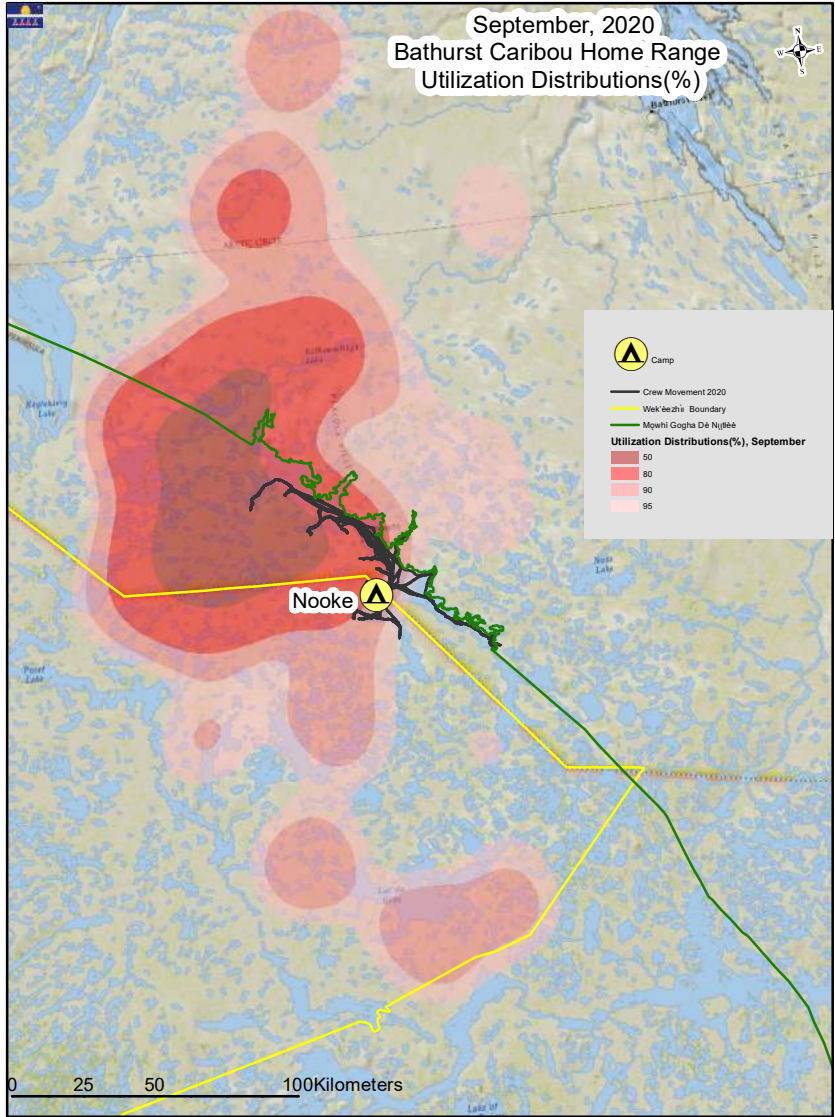
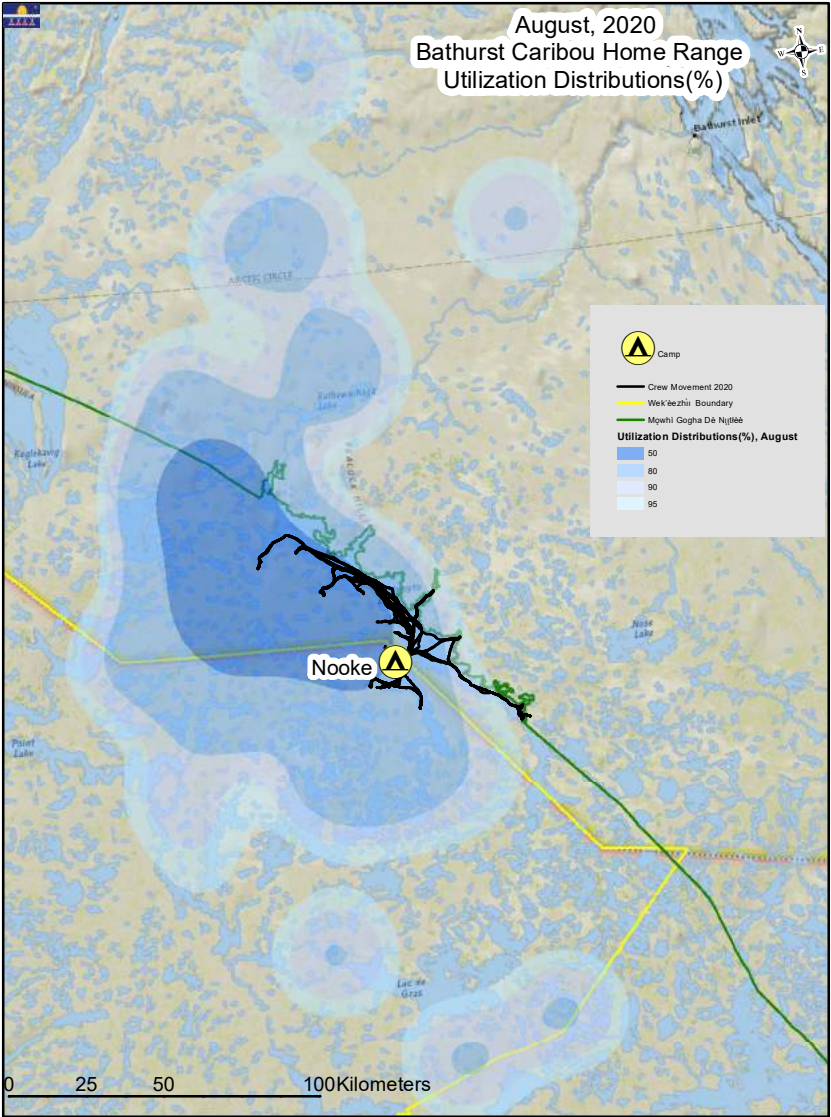


Figure 7: Calf to cow ratio in 17 groups that were ≤ 1 km from monitors, mean = 0.275 (+ 0.085 Standard Error), $n = 17$.

The observed calf to 100 cow ratio (i.e., 28-29) in August and September was low, and would likely indicate a declining population trend if it were truly representative of the herd. In comparison, a composition survey conducted by Adamczewski et al. (2020) on July 10 and 11, resulted in an estimated ratio of 44.1 calves: 100 cows (95% Confidence Interval Upper 46.7, Lower 40.0), based on 1,628 ekwò in 20 groups. For context, a ekwò herd with an average adult female survival rate of 85% would need to have approximately 35 calves per 100 cows in late winter to have a stable population growth rate. Because some calves will die through fall and winter, calf to cow ratios in late winter would most certainly be lower than calf counts in summer.

The small sample sizes and low precision of the estimated calf to cow ratio (coefficient of variation ranged from ~21-31%; Table 6) indicate that sampling intensity was likely insufficient. However, it is likely that there were limited opportunities to observe larger groups of ekwò and compile representative calf-cow composition samples of the herd because most ekwò were too far away for the monitoring teams to access by boat trips and day-hikes.

In contrast to previous field seasons at Kokètì, in summer 2020 fewer ekwò were seen and group sizes were smaller; only two larger groups of 150 and 328 ekwò were observed, while remaining groups comprised fewer than 100 animals. We think there were two plausible reasons for fewer ekwò observed: 1) many of the Bathurst ekwò were further northwest of Kokètì, away from the lake shore and fewer large herds occurred within the area searched and observed by the monitors (see Map 4; showing overlays of ekwò distributions in August and September and GPS track files of field teams); 2) poor visibility and weather days resulted in reduced effort and effective observation time by field teams on the whole. A third explanation is also possible – a numerical decline in the Bathurst population; but this will require further assessment based on an updated population estimate. In addition to a possible decline in the herd, a shift in summer range use patterns and reduced aggregation of ekwò due to lower activity levels of biting insects may also have contributed the observations of smaller group sizes.



Ekwò Health

Monitors observed ekwò health by noting a) body condition of bulls and cows within a group, and b) any occurrences of physical injuries to individual ekwò within a group. Body condition was ranked as fat, average (“good”), or thin, and was based on visual assessment of fatness at three general areas of the body including the neck and shoulders, ribs, and base of tail and hips. Fat ekwò had rounded rumps with no noticeable protrusions of bones on the hips or along the top of the spine. For example, fat ekwò bulls were described as having “no tail” when viewed from the side because the rump fat extends beyond the base of the tail, partially obscuring it; in other words, the ekwò had “no tail” because of “big fat” (R. Drybones, pers. comm. 22 Aug 2019). Ekwò in average condition were considered normal and healthy. Ekwò that were thin appeared “boney” and were in poor body condition.



Photo 8: Healthy bull and cow, mid- August, Koketi (J. Nitsiza).

Of the ekwò groups that were observed ≤ 1 km away, most of the bulls observed (60%) were in average condition, with 39% considered to be fat. One bull (~1%) was considered thin, and was described as a lethargic, single “boney old bull” observed on the 12 September; this animal was bedded and thought to be dead initially and then it jumped up and walked away as monitors approached it within 300 m. Compared to bulls, a higher proportion of cows (84%) were considered to be in average condition, and 16% were considered fat (Table 8). Body condition of animals was noted in 21 (24%) of the 89 groups observed through the summer season. Within the 21 groups, body condition was ranked for 72 bulls and 62 cows (Table 8).

Table 8. Summary of body condition for ekwò observed ≤ 1 km away among 21 groups at Kokèti between 6 August – 21 September.

| | Bulls | | | | Cows | | | |
|-------------|-------|---------|------|-----|-------|---------|------|-----|
| | Fat | Average | Thin | Sum | Fat | Average | Thin | Sum |
| Individuals | 28 | 43 | 1 | 72 | 10 | 52 | 0 | 62 |
| | 38.9% | 59.7% | 1.4% | | 16.1% | 83.9% | 0.0% | |

Observations of ekwò that walked or ran with a limp were likely due to injury in a leg or hoof. Although there are many potential causes of leg or hoof pain ranging from soft tissue injury (sprain or strain), injury to a joint, bone fracture, dislocation, or localized infection, the focus was on detecting an abnormal gait or behavior of individual ekwò. Injured ekwò were observed on 13 separate occasions during the summer. Twelve of the 13 observations were of a single injured ekwò, and one observation was of 2 injured ekwò trailing behind a group of ~150 ekwò (10 Aug 2020). Of the 12 times a single injured ekwò was observed,

it was either by itself (4 out of 12 / 33%) or with another ekwò (3 out of 12 / 25%); on the other 5 occasions (42%), a single injured ekwò was observed with groups ranging in size from 19 to 300 animals.

When aggregated across all ekwò groups observed over summer 2020, the total of 14 injured ekwò represented approximately 1.1% of all the ekwò observed (Table 9). When only ekwò groups that were seen within 1 km were considered, the relative occurrence of injury was similar with 7 of 761 (0.9%) ekwò that walked with a limp. It appeared that there were relatively more injured ekwò observed earlier in the summer by Team A compared to fewer injured ekwò observed later by Team C (Table 8), although small sample size limits our confidence in explaining this apparent trend. Nevertheless, this pattern – if real – may be explained by multiple reasons including a) a lower rate of injury later in summer, b) injured ekwò have healed or resolved their lameness through the summer, and/or c) animals injured earlier in the summer may have been killed by predators resulting in fewer lame animals seen in late summer. However, with respect to large predators, it is worth noting that no wolves were seen in summer 2020 compared to 31 wolf sightings in 2019; with respect to grizzly bears, 7 were observed in summer 2020 compared to 10 bears in summer 2019.

Despite the relatively few lame ekwò observed, it appeared that cows made up just under half (~43%) of the injured animals seen (10). Bulls represented 21-29% of the injured animals, with the proportion varying based on distance class i.e., less than or greater than 1 km away from observers. Yearlings, calves and unknown sex/age classes represented 29-35% of the injured animals with proportions varying with distance class from observer (Table 10).

Table 9. Summary of injured ekwò (i.e., walking with a limp) observed at Kokèti (6 Aug – 21 Sep).

| Distance Class | Team | Ekwò Groups | Injured Ekwò | Total Ekwò (Counted & Estimated) | % Injured |
|-----------------|--------------|-------------|--------------|----------------------------------|-------------|
| up to 6 km away | A | 34 | 9 | 398 | 2.3% |
| | B | 38 | 2 | 697 | 0.3% |
| | C | 17 | 3 | 190 | 1.6% |
| | Total | 89 | 14 | 1285 | 1.1% |
| ≤ 1 km away | A | 8 | 5 | 280 | 1.8% |
| | B | 15 | 2 | 418 | 0.5% |
| | C | 6 | 0 | 63 | 0% |
| | Total | 29 | 7 | 761 | 0.9% |

Table 10. Composition of injured ekwò (i.e., walking with a limp) observed at Kokèti (6 Aug – 21 Sep)

| Distance Class | Bull | Cow | Yearling | Calf | Unknown | Total |
|-----------------|----------|----------|----------|---------|----------|------------|
| up to 6 km away | 3 21% | 6 43% | 2 14% | 1 7% | 2 14% | 14 100% |
| ≤ 1 km away | 2 29% | 3 43% | - 0% | - 0% | 2 29% | 7 100% |



Photo 9: Two healthy young bulls, Sept 5, 2020 (J. Nitsiza).



Photo 10: Four bulls swimming across no'oke. Notice one bull's hardened antler. Sept 11, 2020 (A. Guile).

Indicator 3: Predators







During August and September, there was no *diga* (wolf/*Canis lupus*) observed. This was in sharp contrast to the higher number of wolf observations in summer 2019, when monitors observed 31 wolves. Reasons for a lack of observed wolf activity in fall 2020 may have been tied to fewer ekwò (their main prey) in the area. During summer 2020 fewer ekwò were seen and group sizes were smaller. It was likely that during the shortened field season many of the larger herds were northwest of Kokèti, and fewer ekwò occurred within the area searched and observed by the monitors. Additionally, the teams were not on the ground during July when wolf pups were younger and more closely associated with dens.

There were seven groups of *sahcho* (grizzly bears/*Ursus arctos*/ “big guy”) for a total of eight animals observed through August and September at Kokèti. Except for a sow accompanied by a yearling, seen by Team B on the 23 August, all other grizzly bear observations through August and September were of a single animal. During summer 2019, three more animals were observed with a total of ten *sahcho*.

One group of three *nògha* (wolverine/ *Gulo gulo*) was observed by Team B on 3 September (Table 3 and Table 4). The group of *nògha* was most likely a mother with two kits. The other field teams did not see wolverine. In 2019, the same amount of *nògha* was observed.

Sixteen individual *det'qcho* (eagle) were observed throughout the field season by the three teams; 12 were bald eagles, three were golden eagles, and one unknown was not classified. This was fewer observations than the 23 *det'qcho* observed in 2019. The absent of the field teams during July, likely explains the fewer *det'qcho* observed.

No predator activity was seen in the vicinity of ekwo and no attempted chases on ekwò were observed. All predators appeared healthy with no injuries or health issues noted.

| | |
|--|--|
|  |  |
| <p>Ahri Ekendia, Russell Drybones, and Joe Zoe watching the land, Kokèti (P. Kane).</p> | <p>Therese Zoe, Louis Zoe, Ahri Ekendia and Karin Clark by campfire at Kokèti camp (P. Kane)</p> |
|  |  |
| <p>Stephanie Behrens, Grand Chief George Mackenzie and Chief Charlie Football watching caribou, Kokèti (P. Kane)</p> | <p>Elder Louis Zoe playing cards with Ahri Ekendia and Bobby Nitsiza (P. Kane).</p> |
|  |  |
| <p>Feeding the fire ceremony during first snowfall, Sept 9, Kokèti (P. Kane).</p> | <p>Abundance of berries; end of August, Kokèti (P. Kane).</p> |

Indicator Trends 2016-2020

Kokètì *ekwò* monitoring has been based on the periodic assessment of indicators, developed using the holistic Tłıchq concept of “*We Watch Everything*,”. The elders included several interconnected indicators for monitoring *ekwò* and its habitat. Table 11 summarized results for each monitoring indicator per year; laying out trends and correlations for the indicators.

Indicators Over Time

| | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|----------------------|--------------|--------------------------|--------------------------|----------------------|
|  Weather,vegetation | Warm, dry | Mix dry/wet | Wet, windy | Wet, windy | Wet, windy |
|  Caribou health | Normal, many injured | Normal | Early fat, bulls healthy | Early fat, bulls healthy | Healthy, fat animals |
|  Calf abundance | Normal, high | Normal, high | Normal, low | Low | Low |
|  Wolves observed | One | Eighteen | Sixteen | Thirty-one | Zero |

Table 11: Trends of monitoring indicators 2016-2020

Combining Weather/Vegetation Conditions, Ekwò Health and Calf Abundance for 2016-2020

Summer weather conditions, including trends in temperature, wind speed and precipitation, have direct and indirect influences on *ekwò* health and fitness for the coming months of the rut and the long winter migrations. Summer weather influences plant growth and forage quality, which, in turn, influences *ekwò* nutrition and growth. Similarly, summer weather conditions influence insect abundance, which influences *ekwò* foraging behavior.

On warm days with low wind, biting insects will cause *ekwò* to aggregate in large groups of several hundreds or thousands. The *ekwò* aggregate to reduce insect harassment and will be constantly walking and running along the higher ground or by shoreline where there is slightly more wind to avoid being bitten. But while continuous running solves the problem of insect bites, it detracts from valuable feeding time, and individuals are unable to start building up fat reserves by foraging. These relationships, between weather, vegetation, insects and *ekwò*, are, however, often non-linear and with short and long-term consequences. For example, the adverse effects of a “bad year” or a “good year” of weather could possibly have effects on *ekwò* calf abundance and population changes the following year, or even longer. Monitors observed changes in calf abundance for summer months, from 2016 to 2020 (table 11). The two first years (2016-2017), calf abundance was recorded qualitatively, and were characterised as positive years, in which herds carried a normal and high amount of calves. While in 2018 and 2019, a declining trend was observed with a *low* amount of calves in the monitored herds.

Weather/Vegetation Over Time



Table 12: Summer Weather/Vegetation Over Time: 2016-2020

In 2016; warm, dry conditions were prevalent; long periods of little rainfall and high temperatures resulted in dry, “crusty” vegetation. *Ekwò* were observed to be in “normal” body condition, but were unable to build up fat reserves in July, which was understandable due to the high amount of biting insect harassment. During summer of 2016, monitors saw *ekwò* groups with normal and at times high calf abundance.

The 2017 summer; was similarly warm and dry except for periods of rain and cold temperatures. During a few of that season’s heat waves (especially in August, where temperatures at *Kokèti* reached 30 degrees Celsius) *ekwò* 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 (Photo 11). Overall, monitors said the forage was of “good and normal” quality throughout July and August, and had been made “moist and fluffy” from the few rain showers and the wind. During 2016-17; the *ekwò* were considered to be in “normal” health and we saw that a few bulls had started to accumulate fat reserves in early July, which was earlier than in the previous year, but not as early as we would see in the 2018 and 2019 seasons. Although 2016 and 2017 brought warm conditions and periods of dry vegetation, we did observe a normal and high amount of calves in the herds. In 2017, most cows observed were accompanied by calves, resulting in nearly a one-to-one calf-cow ratio in observed *ekwò* groups.

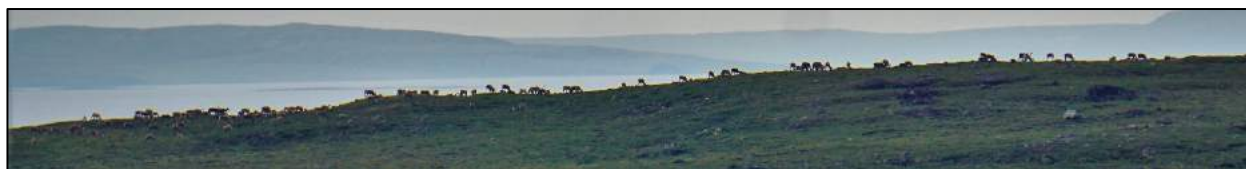


Photo 11: Herd standing on ridgeline facing into wind to avoid the high biting insect harassment. July 11th, 2017 (P. Jacobsen).

In 2018; hot and dry weather trends reversed, and turned cold, wet, and windy—which was optimal for *ekwò*. Throughout the 2018 monitoring season, the weather was rainy, very windy and continuously cold (below 10 Celsius) except for five days with warm, calm weather in July (photo 12). Throughout the summer, monitors described the *ekwò* forage as consistently “good” with no dry periods of “crusty” vegetation as seen in 2016 and 2017. Overall, these conditions generated less insect harassment. The herds had more time to feed uninterrupted and thus build up fat reserves without the need to

continuously run from biting insects. With the continuously cold temperatures of 2018, then, the bulls started to accumulate fat reserves on their rumps and lower back and grew large and dark-coloured 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. Although weather and forage conditions were favourable for *ekwò* fitness, however, in summer 2018 the positive trend had changed and we observed a declining trend in calves.

Caribou Health Over Time



Table 13: Caribou Health over Time: 2016-2020

By the summer of 2018, monitors saw fewer herds with calf “normal” abundance and several herds with low or no calves low were seen. Yearlings were noted to be abundant in many *ekwò* groups, suggesting normal-to-high survival rates of calves born in 2016 and 2017. While these observed demographic patterns may be influenced by a number of factors (including predation), the high calf abundance in 2016 and 2017 may result in an increase in the number of young breeding-aged (3-years old) females in 2019-2020, which may in turn, contribute to more calves in the upcoming seasons. However, this trend is countered by low calf abundance in 2018 and 2019, when the declining trend continued, resulting in most *ekwò* groups with few or no calves at all.



Photo 12: Large herd grouped together during a hot day with high insect harassment. July 2018. (P. Jacobsen)

Calf Abundance Over Time

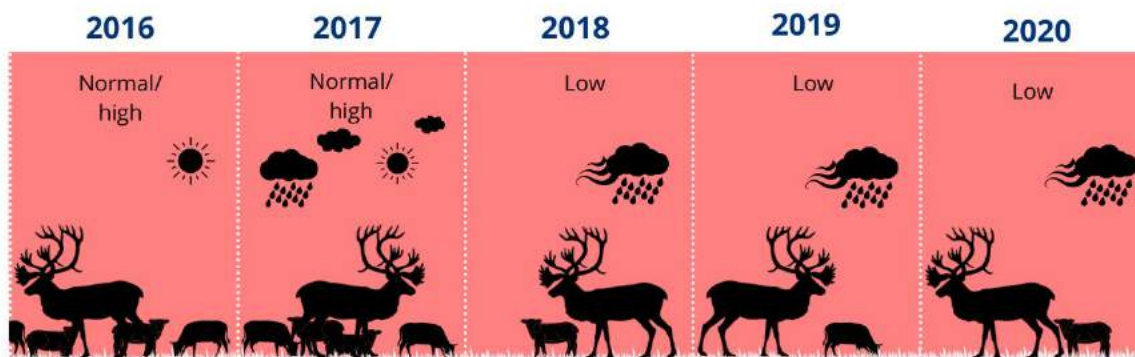


Table 14: Calf Abundance over Time: 2016-2020.

2019 summer; brought similar weather conditions—continuously cold, strong winds and frequent rain showers. The vegetation quality was good and tundra flowers and mushrooms were visibly abundant, as compared to previous years. Once again, these were favourable weather conditions for *ekwò*; insect activity was suppressed and *ekwò* had more time to feed uninterrupted for longer time periods in the lush vegetation (photo 13). The monitors reported healthy *ekwò* throughout the summer. Bulls were building fat reserves in mid-July and grew large and wide, dark-coloured, palmate antlers. While forage conditions were favourable in the summer of 2019, and the herds went into the fall in good physical condition, the majority of herds carried 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 *ekwò* health—those two years also saw declines in calf abundance.

In 2019, we 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 (figure 8). 89 *ekwò* 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 (*ekwò* 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.



Photo 13: Optimal forage conditions for caribou. July 2019 (P. Jacobsen)

Summer/fall2020; comprised of favourable weather conditions for *ekwò*; 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 summer. In summer 2020 fewer *ekwò* and smaller group sizes were observed; only two larger groups of 150 and 328 *ekwò* were observed, while remaining groups comprised fewer than 100 animals. While forage conditions were considered 'good' and *ekwò* 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 summer and fall 2020.

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 *ekwò* groups observed (Figure 6). The group sizes ranged from a single animal to an estimated group of 328 (observed on 30 August). The observed calf to cow ratio was considered low and would likely indicate a declining population trend, if it truly represents the whole Bathurst herd. However, during summer 2020 fewer *ekwò* were seen and group sizes were smaller than previous years.



Photo 14: Elder Louis Zoe watching two bulls feeding in lush vegetation, August 2020. (P. Kane)

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| <p>Joseph Judas holding fire feeding ceremony at Deèzàatì (P. Jacobsen)</p> | <p>Drummers at feeding the fire ceremony, at Kokètì (P. Kane).</p> |
|  |  |
| <p>Therese Zoe praying with rosary, at Kokètì camp (P. Kane)</p> | <p>Chief Charlie Football and Grand Chief George Mackenzie walking the land at Kokètì (P. Kane)</p> |
|  |  |
| <p>Albina Nitsiza and Eva Mantla cooking food for the teams at Kokètì (P. Kane).</p> | <p>Joe Lazare Zoe teaching JJ Simpson how to skin moose, at Deèzàatì (P. Jacobsen)</p> |

Deèzàatì - Ekwò Harvesting and Cultural Places

Tłıchq̓ have an extensive trail network throughout the traditional territory (Andrews, T. D., J. B. Zoe, and A. Herter 1998, Zoe, J. B., editor 2007, Legat 2012). Located on the northern barrenland, the large lake Deèzàatì was accessed by the canoe trails from the treeline, as people traveled here for *ekwò* harvesting and trapping since time immemorial. As Tłıchq̓ have traveled here each *ekwò* hunting season, the lake Deèzàatì (Point Lake) 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 trees, growing in sheltered bays and along creeks. This combination provides two integrated ecosystems that could sustain 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”. Over time, this unique location has created a rich cultural landscape; once one knows what to look for.

In summer 2021, teams of Tłıchq̓ monitors returned to the lake. During the last week of July, we brought two boats to the lake and set up camp on Dı Cho (Big Island). We left the boats, then returned in September, and stayed at the camp for 28 days, from September 2nd to 28. The teams traveled the entire lake from east to west and covered 1782 kilometres by boat. The teams identified and documented numerous cultural sites and *ekwò* no’oke (watercrossings) throughout the entire lake (see map 5). The elders Joe Lazare Zoe from Gametì, Michel Louis Rabesca from Behchokq̓ and Joseph Judas from Wekweètì led the teams during the daily excursions to identify cultural places.



Photo 15: Elders sharing stories of their travels on the esker; on portage trail between Deèzàatì and the small lake Whatì (P. Jacobsen).



Photo 16: A pouncing rock: Joe Lazare Zoe, Joseph Whane, Russell Drybones investigating marks in a pouncing rock, used for pouncing meat to make pemmican (P. Jacobsen).

On July 30th, we sat on top of an esker (photo 15) on the portage between Deèzàatì and the small lake Whatì, while elders shared stories of travel through this place. The elders, Joe Lazare Zoe and Michel Louis Rabesca, travelled to Deèzàatì by canoe to hunt *ekwò* when they were younger, but had not returned to the lake for approximately 40-50 years. Joe Zoe travelled several times with his family to Deèzàatì by canoe when he was a teenager, often with his father and brothers to hunt *ekwò* at Deèzàatì. During late summer and fall, many people travelled the canoe trail from the communities in the treeline to the barrenland for the *ekwò* hunt. At times, when the men departed to the barrenland to hunt and trap, the

women and smaller children remained in a basecamp made further south in the forest. The harvesters came to Deèzàatì at a certain time of the year to hunt *ekwò tsia* (calf). The soft hide from *tsia* was needed to make clothes for one's young children in the family. The elder Joe Zoe explained that, "if you have a large family, how will you clothe all your kids? You need fur from calves and yearlings to dress your small ones – the young kids".

The elders explained how the men would carry the canoe across the portage, and their dogs would carry a small sled packed full with hides and dry meat. Joe Lazare Zoe explained that the placename Deèzàatì, comes from the word *wozàa*, which describes an *ekwò* cow with a *tsia* during summer. Thus, the meaning of the placename, speaks to a location to travel to at a certain time of the year where you can meet *ekwò* cows and their calves. Additionally, it speaks about a place when the animals are at a certain age and subsequently the hide is in correct conditions to prepare clothes for the small kids in one's family.

Deèzàatì can almost be considered a river lake, meaning that the Coppermine River runs through the lake, on its long route from Ekati (Lac de Gras) to the Arctic Ocean. The water level fluctuates greatly depending on the flow of water in the river. During the month of September, the water level by our camp dropped by approximately four feet, which was visible on a day-to-day basis. The lake appears to be very deep with clear water throughout making it prime fish habitat for lake trout. The only shallow area we located was south of Di cho (Big Island) while all other inlets and bay were deep and clear. Three other large rivers also enter Deèzàatì: in the northeast is the outflow of a wide and shallow river from the north. No known name is recorded for this river. In the central northern arm of Deèzàatì, called *Kwikedah t'à*, is the outflow of the large river that enters from Itchen Lake, and on the west side is the outflow of Parent River into Redrock lake. Several other smaller streams and creeks enter the lake in nearly each bay and inlet of Deèzàatì. Most of the inlets and bay that we explored had remnants of cultural history (map 5). The following is the description of these locations.

Deèzàatì; East shore

N1 - "Place with Rocks-on-Rocks"

Location: Northeast side of Deèzàatì; into channel/river leading north (N#1)

Content: rock placed on top of another rock (photo 17).

Description: Over twenty rock-on-rock are spread out over the hills inland from the water. The rock-on-rocks are located only on the west side of the channel and there doesn't appear to be a pattern to the location of each rock. They are likely used as part of a "ekwò fence" designed to funnel *ekwò* so the herds will cross in one particular area where hunters would be positioned for the most efficient and successful hunt. The rock formations are likely been placed by Inuit hunters (not verified). The rock formations are positioned similarly as the 'ekwò fences' and 'hunting blinds' at Kokètì.

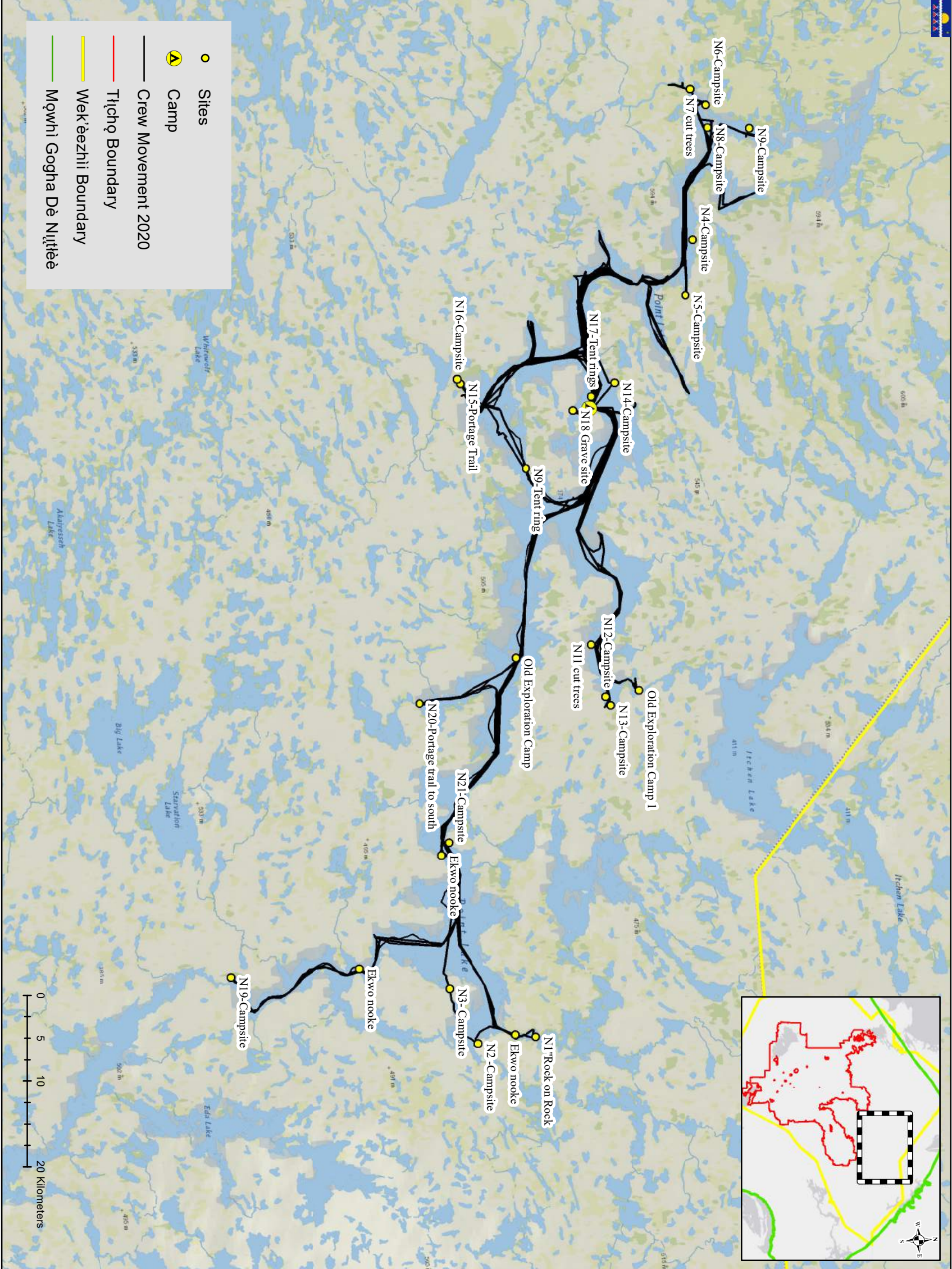
Placename: Kwe dè kwa la (spelling to be verified during upcoming fieldwork).



Photo 17: "Rock-on-Rock" placed on the bed rock



"Rock-on-Rock" placed alongside the valley



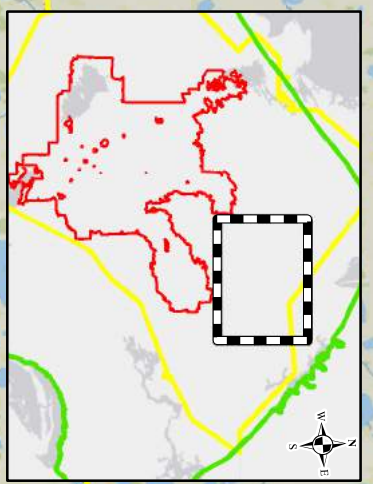
- Sites
- ▲ Camp

— Crew Movement 2020

— Tłı̄ch̄ų Boundary

— Wek'èezhìi Boundary

— Mǫ̀wìhì Gogha Dè Nìt'èè



#N2 – Camp site with Rock Tipi Rings

Where: esker and open sandy area; eastern shore of Deèzàatì (N#2)

Content: six rock tipi rings in the sand; one possibly boat shelter (a narrow-shaped rock ring) (photo 18).

Descriptions: The rock tipi rings are located in the flat part of the esker/open sandy area leading to the shoreline. The tipi rings are likely from Tlicho or Dene hunters. On flat ground by the shore, a narrow circle of rocks was possibly a boat shelter. Possibly hunters traveled here by boat and walked inland along the long esker to hunt ekwò. The location is possibly start of portage trail to lakes to the east. The esker extends further east and provides easy walking to other lakes, where migrating ekwò could be found. Several tin cans are scattered on the beach; possibly from hunting or canoeing tourists.



Photo 18: Joe tsia Zoe shows a rock tipi ring.

Narrow rock circle; possibly boat shelter.

Old ekwò skull with antler; remnants from Oldtimers.

#N3 – Camp site with Rock Tipi Rings

Location: In channel on south side of large island; eastern shore of Deèzàatì (N3)

Content: One rock tipi ring, possibly more tipi rings.

Description: Camp location on sandy flat esker in narrow channel between island and mainland. We did not stop at site, but viewed site from the boat.

#N19 – Camp site

Location: Southern shore, east side of Deèzàatì; by outflow of Deèzàatideè (Coppermine River) from Lake Providence further south (N19)

Elders' explanation: Camp site for ekwò hunting. Joseph Judas told the story of how he travelled and camped here with six hunters from Wekweètì. The hunting party travelled by canoe along the Coppermine River searching for ekwò. They shot ekwò in the hills by the outflow of Deèzàatideè. Then they had camp on this location. The group departed by floatplane back to Wekweètì.

Placename: Deèzàatideè (Coppermine River).

N20 – Elà tjlì (Portage trail) to the south

Location: South end of Keskarrah Bay; south shore of Deèzàatì (N16)

Description: Elà tjlì (portage trail) from Deèzàatì to a lake located approximately 1 km south. The lakes connect to canoe trail towards Beati (Winter Lake) and towards Wekweètì.

Elders' explanation: Joseph Judas heard stories from his brother that they went by canoe from Wekweètì to Deèzàatì by this trail. The men travelled from Winter lake, to Little Marten Lake, Big Lake and further

north along chain of smaller lakes to Deèzàati. The large Keskarrah bay has large stands of spruce forests on the east side, providing shelter and supply of firewood.

Saat'ootì - Redrock Lake

N4 - Rock Circles/tent rings

Location: Saat'ootì (Redrock lake); northern shoreline (N3)

Content: three rock tipi rings; one fireplace

Description: the site is along the northern shoreline of Saat'ootì. Flat open terrain with sparse vegetation and few spruce trees.

Placename: Saat'ootì

N5 - Camp site with Rock Circles/tent rings

Location: East side of small inlet; east shoreline Red rock lake (N3)

Content: fireplace and two fuel drums (old drums)

Description: The campsite is likely frequented and possibly made by canoe tourists

Wek'ehaeljti deh – Parent river

N6 – Possible Campsite

Location: Outflow of Wek'ehaeljti deh (Parent River) into Redrock lake (N6)

Content: Cut marks in trees; possible camp location (Photo 19)

Description: Several tree stumps cut by axe, and trees with axe cut marks; all through the forest. The location is on the northwestern shore of the outflow of Parent River into Redrock. The area is likely a campsite during fall and winter. We could not locate an actual campsite, likely as it was made in winter. According to elders, the winter campsites are usually located further into the forest to shelter from winter storms.



Photo 19: Elder Joe Lazare Zoe by a cut tree, along Wek'ehaeljti deh - Parent river.



Joe Lazare Zoe teaching the youth JJ Simpson how to look for Oldtimers traps, along Wek'ehaeljti deh - Parent river

Elders' explanation: Families from Gametì lived in the area from Parent lake to Redrock lake. They travelled here by canoe trail from Gametì area via Mesa Lake. Joe Lazare Zoe explained how families stayed in this area all year; winter and summer. In winter, they would have camp in land from shore, to be protected from snowstorms. They would have meat storage on platforms in the trees by camp. This area has all the resources needed to live all year; ekwò, fish, moose, ducks for feeding their families, and to white fox for trapping. This unique location provided both access to the forest and the barrenland ecosystems.

Joe Lazare Zoe's sister, Margaret, was born in this area. After her birth, her parents paddled all the way south to Behchokò to get her baptized. Once completed, the family paddled all the way back to this area in fall time.

Placename: Wek'ehaeljiti – Parent lake. Wek'ehaeljiti deh - Parent river.

#N7 – Culturally modified trees

Location: Outflow of Parent river into Redrock lake (N7)

Content: Several stumps of cut trees; cut marks by axe in trees

Description: Open spruce forest and thick willow bushes by shoreline of river.

Placename: Wek'ehaeljiti deh – Parent river.

N8 – Possible Campsite

Location: Outflow of Parent river into Redrock lake (N5)

Content: Cut marks in trees and cut stumps visible; possible camp location.

Possible location of a gravesite consisting of rock pile laid out in east-west direction; on west side of sand beach.

Description: The location is on the northwestern shore of the outflow of Parent river, further downstream from waypoint #6. The possible gravesite is located on west side of sand beach.

Numerous trees have axe cut marks. Whole trees have been cut down; through out the forest, to the east of the large sand beach. Possibly a campsite location during fall and winter.

Placename: Wek'ehaeljiti deh – Parent river.

#N9 – Culturally modified trees

Location: Western shore of Deèzàatideè (Coppermine river); between Redrock lake and Rocknest lake (N9)

Content: Several stumps of cut trees; cut marks by axe in trees

Description: Open spruce forest and thick willow bushes by shoreline of river.

Placename: Deèzàatideè (Coppermine river).

Deèzàatì – western side

N10 - Campsite

Location: Southeast side of Dì Cho - Big Island; on large sand beach/esker (N10).

Content: One rock tipi ring, large size (Photo 20); and 2 or 3 rock circles for drying ekwò hides.

Description: The main rock circle is of large size, approximately 18x18ft, located 100 metres from shoreline. Camp positioned on whagweè; flat esker consisting of sand and rocks.

Elders' explanation: The rock tipi ring consists of numerous smaller rocks piled up in a large circle. Joe Lazare Zoe explained that “small kids would get small rocks from the shoreline and pile up all around

tent". Likely, a large family was living here, possibly in spring time, when ekwò walk on the ice along shore between island and mainland, as it would be an effective place to harvest ekwò.

Two or possibly three smaller rock circles on sandy esker. The rock circles were used to weight down and dry ekwò hides. Additionally, the person drying hides would use small willow sticks were put into the ground to hold down the hide. No sticks were found, likely moved by wind.

The camp location is also located on an ekwò *no'oke* (water crossing) between the island Dì Cho and mainland.

Placename: Dì Cho - Big Island

N11 - Campsite

Location: Southeast side of Dì Cho - Big Island; on large sand beach/esker. Further east than #10; possibly part of same camp (**N11**)

Content: One rock tipi ring (Photo 21); pile of old dried willow bushes for firewood gathered and left on ground.

Description: Tent circle is located on flat ground, approximately 50 metres above shoreline, on the large sand beach southeast side of Dì Cho. The camp was used for ekwò harvesting when ekwò migrate on the lake ice or when swim across the narrow channel, as the location is on an ekwo *no'oke* (water crossing) between the island and mainland.

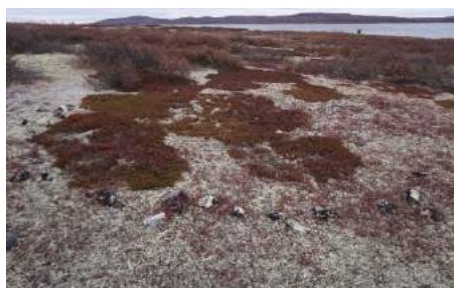


Photo 20: One rock tipi ring made by small rocks; southeast side of Dì Cho.



Photo 21: Rock tipi ring; Southeast side of Dì Cho - Big Island



Photo 22: Joe Lazare Zoe and Albert Nitsiza looking at a tipi ring; northern bay of Deèzàati,

N12 - Campsite

Location: Northern Bay of Deèzàati; southeast shoreline; on sand beach (**N12**)

Content: One rock tipi ring (Photo 22)

Description: The one rock tipi ring is on flat ground on top of whagweè; flat esker consisting of sand and rocks. The tipi size is approximately 16x16 ft. The tipi that was erected used one pole in the centre, and numerous smaller rocks were placed around the outside of the tent, placed by the young boys in the family. "Small boys help the mother and ladies set up the tent, while the father and men are out hunting" explained Joe Lazare Zoe.

Old fuel drums, and pieces of lumber and garbage left by exploration team; most likely from recent activity during summer 2020.

N13 – Harvesting location for Joe Lazare Zoe's family

Location: Northern Bay of Deèzàati; eastern shore of bay (N13)

Content: Hunting site; bones of ekwò and dedii scattered around flat ground by shore (Photo 23).

Description: Joe Lazare Zoe's family hunted ekwò at this location in 1950s. Joe was here with his father and brothers when Joe was around 10 years old. They travelled to this bay: *Kwi ke dah t'à* (large bay by river from Itchen Lake), where they shoot three dedii (moose). The bones of the dedii and ekwò they hunted are scattered around the area. The campsite is located close to a small creek that runs into the bay from the eastern hill, where the two hunters had been making dry meat. The creek is surrounded by tall willows that grows thick around the water source, and provides fire wood for this camp site.

Explanation: The place was their camp site for the time they spent hunting here during September; remnants of old ekwò bones, camp fire and tent site was found on the flat ground (Photo 24). Joe explained how his father would dry hides on the flat ground here. He cut sticks from the tall willows to prepare dry meat. Long sticks were cut to make a rack and smaller thin sticks were prepared to pierce through the meat and hang onto rack. Two other men, Romie Wetrade and Johnny Arrowmaker, hunted ekwò further northeast in the hills. There they made dry meat from the ekwò they harvested. The family had travelled by canoe from Behchokq area. They used canvas canoe (a V-shaped frame) and a 6 hp Johnson outboard engine. Joe still has the old engine at his house in Gametì. Once they harvested sufficient ekwò and prepared dry meat, the family travelled by canoe back to the treeline to meet the rest of their family. The women and small children would stay in a basecamp made in the forest/treeline, and the men travel out to the barrenland to hunt and trap. In the treeline, the men cut 6ft long tree logs that they would tie up in a bundle and carry with them for firewood.

This location, on northern bay of Deèzàati, was as far as Joe's father would travel to hunt ekwò. If they did not meet ekwò here, he would decide to travel back south to treeline where the rest of their family was located. The harvesters would not carry any cans or other heavy items.

Placename: *Kwike dah t'à* – large bay by river from Itchen Lake.



Photo 23: Joe Lazare Zoe holding the bones of the ekwò his father hunted about 60 years ago (P. Jacobsen).



Photo 24: Joe Lazare Zoe pointing out the camp site where he stayed with his family when he was around 10 years old (P. Jacobsen).

N14 - Campsite

Location: Northern shore Deèzàatì; on sand beach (N14)

Content: Four tent rings / rock circle, possibly a fifth tent ring (needs further investigation).

Description: The tent rings are located on a small open sandy esker, in close proximity, approximately 30 metres, from the shoreline of Deèzàatì and to a small creek that enters the lake. In the past, people stayed close to the shoreline and close to small creeks. The four tent circles are approximately 30 metres apart; and each ring consist of 7-8 rocks. One of the rocks at a tent circles looks as a 'pounding rock'; for pounding meat. There is possibly a fifth tent circles located about 10ft for the shoreline.

The tent circles appear to be set up by Tłıchq people, on ekwò hunting trip. The site was possibly only used for a short stay, as the tent used were smaller type that are used for hunting and trapping.

N15 – Elà tlı (canoe trail) to the south: from Deèzàatì to Whatì

Location: South end of channel; south shore Deèzàatì (N5)

Content: Elà tlı (canoe trail); rock-on-rocks placed halfway on trail; culturally modified trees along trail (Photo 25)

Description: The Elà tlı is approximately 2 kilometres between Deèzàatì and the small lake named Whatì. Numerous ekwò trails run parallel to the Deèzàatì shoreline. The *hoteh* (portage trail) lead from south end of Deèzàatì over sloping ground leading up to a large esker system that bisect the terrain in east-west direction. From the esker, one can see numerous small lakes with tree clusters alongside the esker; which provide excellent moose habitat. Rock-on-rock are placed on a boulder halfway through the portage. Few clusters of spruce trees in the area have cut marks from axe. One stick was found with axe cuts shaped into a spear.

One tree stump is of interest; new growth of branches seems to have been continuously cut, creating a small, wide and dried-up stump. Likely there are stories or explanations to the appearance of this tree stump. On the south side of esker is a gradual sloping plain, providing good camp location where a tent ring was located (photo 23), and the entry to the *hoteh* (portage trail) to the small lake Whatì.

Placename: Whatì – small lake south of Deèzàatì.

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|  |  |
| <p>Photo 25: Culturally modified tree stump (P. Jacobsen).</p> | <p>Photo: Leon Ekendia pointing out cut marks in tree along portage trail (P. Jacobsen).</p> |

N16 - Campsite

Location: South end of portage between Deèzàatì and Whatì; on side of esker (N16)

Content: One tent ring / rock circle (photo 26); *hoteh* (portage trail).

Description: the tent ring is on a gradually sloping plain 50 metres from the shoreline of the small lake Whatì. The location is on the south end of the *hoteh* (portage trail) between Deèzàatì and Whatì. There are likely more tent rings, but rocks are overgrown with vegetation, making it challenging to identify circle patterns.

Explanations: The team sat on top of esker while elders shared stories of the place. Both elders Joe Lazare Zoe and Michel Louis Rabesca travelled through here by canoe when they were teenagers. The explained how the men would carry the canoe across the portage, and their dogs would carry a small sled packed full with dry meat. They would carry with them one long stick that they could cook their meat on and to hold their teapot over the fire. At times, when the men departed to the barrenland to hunt and trap, the women and smaller children remained in a basecamp made further south in the treeline. The harvesters came to Deèzàatì at a certain time of the year to hunt *tsia* (calf) ekwò. The soft hide from *tsia* was needed to make clothes for one's young children in the family.

Placename: Whatì – small lake south of Deèzàatì.



Photo 26: Joe Lazare Zoe showing the tent circle location by Whatì (P. Jacobsen).



Photo 27: View from esker of portage trail towards Deèzàatì, in the background (P. Jacobsen).

Dì Cho – Big Island

N17 - Campsite

Location: By large sand beach; northwest side of Dì Cho - Big Island (N17)

Content: Two tent rings / rock circles (photo 28); pounding rock (Photo 29), axe marks on trees; ekwò bones and antlers; small rocks used to stretch/dry hides

Description: Two large tent circles are located on flat ground above the long and wide beach that covers the entire bay. The two circles are large and consists of approximately 68 rocks are close by each other and have likely been tied together. The two tent circles are large size, and its “a camp for lots of people”. The nearby cluster of trees has numerous axe marks and cut logs; which was likely used to tie down the dogs. An oval shaped brown pounding rock lay on the ground. The elder found traces of pounding marks

on it; as it was used to pound dried meat up which was mixed with fat. A nutritious meal for hunters traveling far from camp to hunt ekwò. The campsite was likely for several families that stayed on the island. The island has all the resources needed for survival and the beach is a beautiful place to live throughout summer. The beach is open to wind and waves from the northwest, which could challenge boat travel but the wind would keep biting insect away during summer months.

| | | |
|---|--|---|
|  |  |  |
| <p>Photo 28: Two rock circles (P. Jacobsen).</p> | <p>Photo 29: Pounding rock; Joe Lazare Zoe pointing out marks in the rock.</p> | <p>Photo 30: Russell Drybones and Joe Lazare Zoe investigating the gravesite</p> |

N18 - Gravesite

Location: By large sand beach; northwest side of Dì Cho / Big Island (**N18**)

Content: Grave site (photo 30); fireplace

Description: the grave site is directly west of the tent circles; approximately 10 metres away. The grave consists of a pile of approximately 23 rocks piled together in east-west direction. A fireplace was located next to the grave site, and could have been used to burn the belongings of the deceased. No artifacts were found around the site; vegetation has likely overgrown any item.



Louis Zoe leads the team during a feed the fire ceremony, during the first snowfall at Kokèti (P. Kane)



Russell Drybones plotting ekwò collar info at the map at basecamp Kokèti (P. Kane)



Team D finished building the cabin at Deèzàati, on September 28th



The three amigos: Joseph Judas, Leon Ekendia and Joe Lazare Zoe at Deèzàati (P. Jacobsen)



Joseph Whane watching sun set at the Deèzàati camp (JJ. Simpson)



Drymeat snack time in the boat at Kokèti (C. Zoe-Chocolate)

Methodology

“We Watch Everything” - Traditional Knowledge Framework

Ekwò 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 Tł̨chq̨ 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

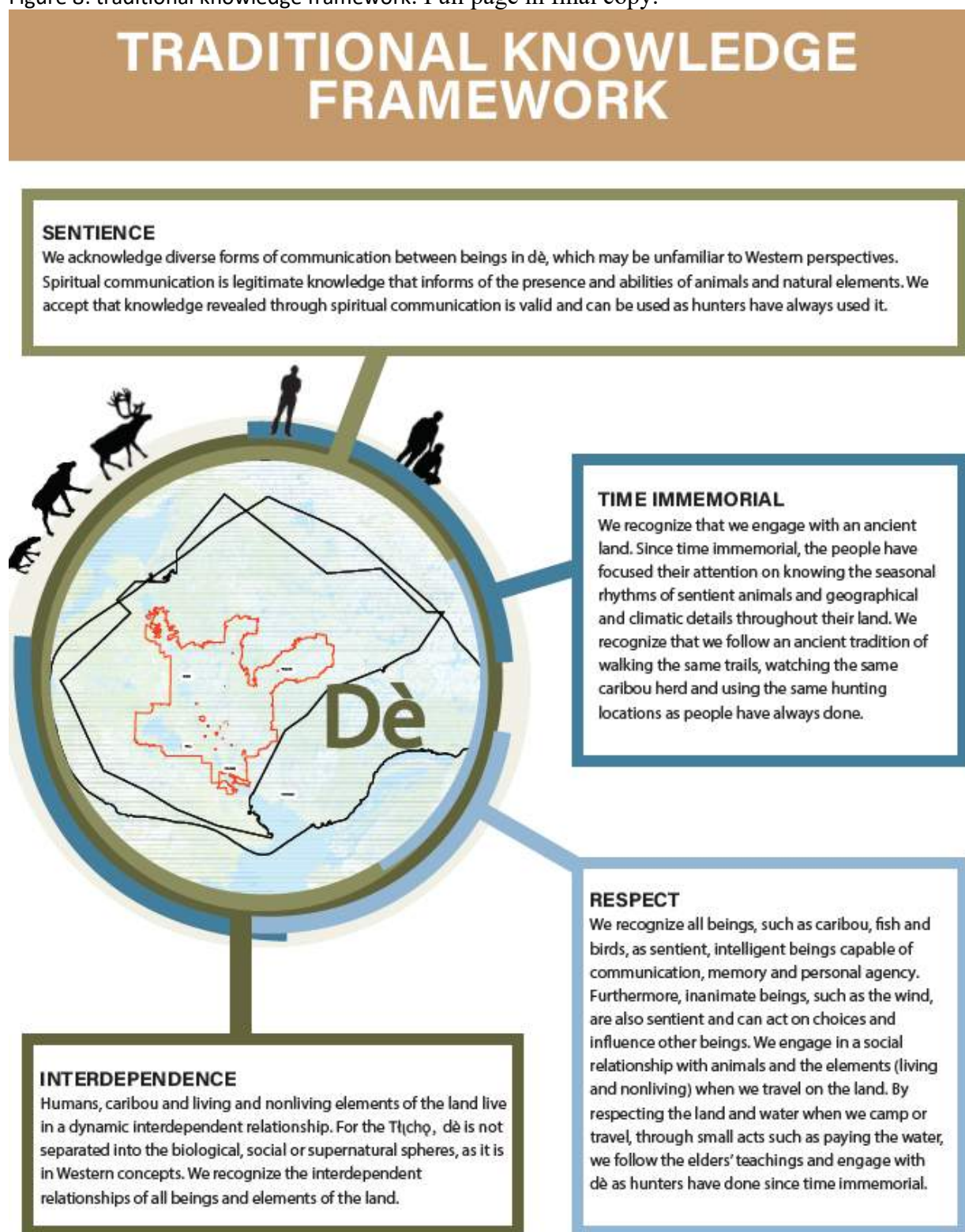
Knowledge of nature is culturally situated and derives from the environmental adaptations of the culture that gave it meaning. Our human experiences of nature are thus tied to their cultural interpretations. Seen through different cultural lenses, a single process in a physical environment may have two (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 *ekwò* 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 *ekwò* in the landscape of Kokèti.

Land-based Theoretical Concepts

To achieve an indigenous perspective, the program employs Tł̨chq̨ words and cultural perspectives deeply ingrained in Tł̨chq̨ ontology. While such theoretical concepts are abstract, they have a very concrete physical practice in the day-to-day thinking of Tł̨chq̨ 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 Alice 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).

Figure 8: traditional knowledge framework. Full page in final copy.



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. Tł̨chq̓ use the word *Dè Gogha Nàeɔ̓* (“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 ekwò 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 ekwò 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 Tł̨chq̓ 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, Tł̨chq̓ 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 31: Team positioned on What’aa (esker); next to a well used animal trail (P. 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 *Nq̄okè*

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

Nq̄okè refers to the interface between water, land, and *ekwò* 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 *hozì shìa* (hills on barrenland) and *what'aa* (eskers) are extensively used by the team to monitor *ekwò*, 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 *ekwò* migration. It refers to movement patterns of *ekwò* over land formations relative to water bodies, and literally means “in the midst of waters” (Whaèhdōō Nàowoò Kō 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 *ekwò* to move between lakes along their migration routes. The concept of *tataa* is also used by the elders to refer to a migration route (Whaèhdōō Nàowoò Kō 2002:21).

Hunting Techniques as Methods of Observation

The location of our main camp, close to the *nāokè* (water crossing) between *Kokètì* and *Kwiidliachjì* in Northwest Territories, was located at the northernmost range of Tłıchq̄ 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 *ekwò* hunting. They followed shorelines by boat, then beached at known *ekwò* water crossings. Families set their camps short distances from the crossings, so as not to disturb the potential movement of *ekwò*. From camp, hunters walked to hill tops or eskers, where they waited and watched for any movement on the land surrounding the crossing.

The Ekwò 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 *hozì shìa* (hills on barrenland) and *what'aa* (eskers) are the main tools applied by the team to locate *ekwò*. Advised by local hunters, our

main camp was established approximately two kilometres north of the main *naʔokè*. This location has been used for centuries by Tłıchq 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 *naʔokè*.

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 *nəʔokè*; places where *ekwò* are expected to migrate. As *ekwò* 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 *ekwò*.

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 *ekwò* 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 52 days of field work at Kokèti, we had covered 2393 kilometres by foot and boat (table 2). 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 *ekwò* 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 Tł̓chq̓ concept of “We Watch Everything,” the elders highlighted several related indicators to be included for an analysis of ekwò and habitat assessment. The resulting list of monitoring indicators include: (1) habitat; (2) *ekwò*; (3) predators, and (4) industrial development.

Indicator 1: Habitat

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

Indicator 2: *Ekwò*

Ekwò 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 *ekwò* 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 *ekwò* predators
- Relationship between *ekwò* and predators

Indicator 4: Industrial Development

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

Finding Ekwò

The main challenge for monitoring *ekwò* is finding *ekwò*. In general, *ekwò* migrate southwest, from their calving grounds west of Bathurst Inlet, in late June/early July, toward the general area of *Kokètì* and *Kwiidliachijj*, 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 *ekwò*. 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 *ekwò* 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 32: Stephanie Behrens and team B plotting caribou collar locations on the map (P. Kane)



Photo 33: Russell Drybones and Karin Clark plotting caribou collar locations on grid map (P. Kane)

Local Knowledge

Since herds can move long distances each day, local knowledge was necessary to identify where to best position ourselves to intercept *ekwò* before they moved to areas inaccessible by our transportation methods; boating and walking. Building camp near frequently used *nq̄okè* and waiting is the traditional and most efficient way to ensure meeting *ekwò*. 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 *ekwò* will move through. In *Tłjchq̄*, *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 15 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 observations and adjusting to the elders' descriptions. The field books are printed in Rite-in-the-Rain™ waterproof paper.

Table 15: Template for wildlife observations

| Number and Classification | Date (DD/MM/YYYY): _____ Obs #: _____ | Movement (coming from / going to): _____ _____ | | | | |
|---|--|---|-------------|------------------------|-------------|---|
| | Species: Caribou Wolf Muskox Other: _____ | Behaviour (circle): Feeding Bedded – Ruminating Swimming Walking Running — due to Insects or Predators or _____ | | | | |
| | Obs start time: ____ : ____ (24:00) Obs end time: ____ : ____ (24:00) | Are weather / insects affecting behaviour and ability to feed? No Yes | | | | |
| | Total obs time (hours mins): _____ Dist. from observer (m): _____ | Can you see what they are eating? No – too far Yes | | | | |
| | Placename (Descr.): _____ | Description: _____ | | | | |
| | Waypoint #: _____ ; N _____ ° _____ " W _____ ° _____ " | Condition of food: | | | | |
| Temp: ____ °C Wind: speed: ____ km/h; direction: ____ (e.g. N, SW) | Grasses / sedges | None | Poor growth | Avg growth | Good growth | |
| Precip (circle): No Fog/Drizzle Rain - Lt Med Hvy Other: _____ | Shrubs | | | | | |
| Insect Activity (circle): None Low Medium High | Lichens | | | | | |
| Total group size: _____ (circle): Count Estimate | Mushrooms | | | | | |
| No. animals classified: | Other: | | | | | |
| Bulls | Cows | Calves | Yearlings | Unknown | Total | Ask elders / monitors why? _____ |
| | | | | | | _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ |
| Calf:cow ratio: _____ (0-10 score) _____ | | | | | | |
| 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: _____ | | | | | | |
| Effect on Behaviour | | | | | | |
| Tłtchq 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

In 2020, three monitoring teams spent 48 days on the *Kokètì ekwò* summer range in July, August and September. We expanded our program and established a camp on Deèzàati, with two teams there for the month of September. On Koketi, the teams observed a total of 89 *ekwò* groups (estimated total number of *ekwò* observed was 1313) of which 37 of the observed groups were used to estimate an overall calf: cow ratio. Based on the sample of 37 *ekwò* observations, we estimated an overall calf: cow ratio of 29.1 (± 6.2 SE) calves per 100 cows; this would be considered low, because it suggests that by summer less than 1/3 of breeding-aged females had a calf. The low number is a continuation of a negative trend observed since 2018 and 2019.

The overall conditions of *ekwò* forage were characterized as very good to excellent during the summer months, because the vegetation was lush and productive due to consistent rain and soil moisture. An abundance of berries and mushrooms; indicators of good summer growing conditions—were observed throughout August and into September. With high winds and abundant, high-quality forage, herds fed well, undisturbed by biting insects, and consequently they were observed gaining fat reserves, because *ekwò* had time to graze peacefully on the lush vegetation.

In contrast to previous years, we observed no *diga* or *didi*. *Sahcho* were seen seven times during the late August and early September. No *sahcho* activity was seen in vicinity of *ekwò* and no attempted chases on *ekwò* were observed. 16 *det'qcho* were observed on 18 occasions. Of the 23 individuals seen, eight were bald eagles and four were golden eagles. In 2019, we observed more *det'qcho* than in 2020. No nests or juveniles were observed this field season, in contrast to previous seasons, in which juveniles were sighted. The bald eagle summer range is typically limited to the forest landscape and does not reach into the barrenland. First observed in 2005 by local residents on *Kokètì*, bald eagles are now a permanent presence on the Bathurst summer range.

Based on five years of watching the Bathurst summer range, the *Ekwò Nàxoèhdee K'è* caribou monitoring program makes four recommendations:

Recommendations

- 1) continue zero harvest of the *Kokètì ekwò* to promote recovery of the declining herd, and respect the rules of the Mobile Core Bathurst Caribou Mobile Zone;
- 2) support wolf hunting by indigenous harvesters on the barren-ground caribou core use area;
- 3) advance actions on climate change—urge territorial and Canadian governments to commit to climate change action, and
- 4) protect *ekwò* by establishing a *Kokètì Ekwò* Conservation Area.

Continued Monitoring Topics

In upcoming field seasons, the program will continue to monitor:

- Health and calf abundance trends of the *Kokètì ekwò* herd.
- Habitat and forage quality, and the effects of climate change on habitat and *ekwò* behaviour.
- The relationship between *ekwò*, *diga* and indigenous harvesters.
- Impacts of industrial development on *ekwò* habitat.

Further Research Topics

We suggest that further research related to ekwò decline should include:

- How does the loss of cultural practices associated with less *ekwò* harvesting, meat processing and hide preparation affect social and cultural identity in northern communities?
- How does 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 *ekwò* affect food security concerns in Tłıchq and other indigenous communities?

Ekwò Nàxoèhdee K'è has given participants, old and young, the opportunity to live in close contact with *ekwò* 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 *ekwò*, all felt the visual impact of lower population numbers than ever; others felt nostalgia and sadness at the lost opportunity for their kin and youth to learn their traditional practices. Elder Joe Lazare Zoe summed up the feelings of all on the real implications to his community from the *ekwò* decline: *“how can I be happy [to see ekwò], when my wife and kids back home are hungry”*.



Photo 34: Tłıchq flag at Kokètì camp during first snowfall. Sept 9th, 2020 (P. Kane).

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|---|--|
|  |  |
| <p>Elder Michel Louis preparing a birch bundle as firewood, Deèzàatì (P. Jacobsen).</p> | <p>Boat arriving at Deèzàatì by helicopter (P. Jacobsen).</p> |
|  |  |
| <p>Old Tłıchq woodstove, southeast shore of Kokètì</p> | <p>Russell Drybones and Archie Zoe, Kokètì (P. Kane).</p> |
|  |  |
| <p>Team walking up from Deèzàatì camp in September (JJ. Simpson).</p> | <p>Elder Michel Louis Rabesca leading the team in morning prayer (P. Jacobsen).</p> |

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Data Appendix 1:

Sample of 37 caribou groups used to estimate calf:cow ratio in the 2020 Ekwò Nàxoèhdee K'è field season at Kokèti.

| No. | Team | Date (dd/mm/yy) | Obs # | Total Caribou in Group (count or estimate) | Cows Classified | Calves Classified | Other Caribou |
|-----|--------|--------------------|-------|--|--------------------|----------------------|------------------|
| 1 | Team A | 6-Aug-20 | A-08 | 4 | 2 | 0 | 2 |
| 2 | Team A | 8-Aug-20 | A-21 | 1 | 1 | 0 | 0 |
| 3 | Team A | 9-Aug-20 | A-22 | 10 | 2 | 3 | 5 |
| 4 | Team A | 10-Aug-20 | A-28 | 81 | 4 | 0 | 77 |
| 5 | Team A | 11-Aug-20 | A-33 | 2 | 1 | 0 | 1 |
| 6 | Team A | 11-Aug-20 | A-35 | 4 | 3 | 1 | 0 |
| 7 | Team A | 11-Aug-20 | A-38 | 4 | 2 | 2 | 0 |
| 8 | Team A | 11-Aug-20 | A-39 | 5 | 4 | 1 | 0 |
| 9 | Team A | 11-Aug-20 | A-40 | 19 | 12 | 7 | 0 |
| 10 | Team A | 15-Aug-20 | A-49 | 4 | 3 | 0 | 1 |
| 11 | Team A | 15-Aug-20 | A-50 | 1 | 1 | 0 | 0 |
| 12 | Team A | 16-Aug-20 | A-53 | 9 | 1 | 0 | 8 |
| 13 | Team A | 16-Aug-20 | A-56 | 8 | 6 | 2 | 0 |
| 14 | Team A | 16-Aug-20 | A-57 | 1 | 1 | 0 | 0 |
| 15 | Team A | 17-Aug-20 | A-60 | 5 | 5 | 0 | 0 |
| 16 | Team B | 21-Aug-20 | B-02 | 2 | 1 | 0 | 1 |
| 17 | Team B | 22-Aug-20 | B-04 | 13 | 1 | 0 | 12 |
| 18 | Team B | 24-Aug-20 | B-14 | 2 | 1 | 0 | 1 |
| 19 | Team B | 24-Aug-20 | B-16 | 3 | 1 | 0 | 2 |
| 20 | Team B | 24-Aug-20 | B-17 | 25 | 7 | 3 | 15 |
| 21 | Team B | 25-Aug-20 | B-19 | 3 | 1 | 0 | 2 |
| 22 | Team B | 25-Aug-20 | B-19a | 11 | 3 | 2 | 6 |
| 23 | Team B | 28-Aug-20 | B-24 | 1 | 1 | 0 | 0 |
| 24 | Team B | 28-Aug-20 | B-25 | 9 | 1 | 0 | 8 |
| 25 | Team B | 28-Aug-20 | B-25a | 10 | 1 | 1 | 8 |
| 26 | Team B | 28-Aug-20 | B-26 | 44 | 31 | 13 | 0 |
| 27 | Team B | 28-Aug-20 | B-27 | 10 | 6 | 4 | 0 |
| 28 | Team B | 28-Aug-20 | B-28 | 2 | 1 | 1 | 0 |
| 29 | Team B | 5-Sep-20 | B-36 | 2 | 1 | 0 | 1 |
| 30 | Team C | 10-Sep-20 | C-02 | 29 | 1 | 0 | 28 |
| 31 | Team C | 10-Sep-20 | C-04 | 21 | 2 | 0 | 19 |
| 32 | Team C | 13-Sep-20 | C-12 | 7 | 1 | 0 | 6 |
| 33 | Team C | 18-Sep-20 | C-14 | 6 | 1 | 0 | 5 |
| 34 | Team C | 20-Sep-20 | C-17 | 1 | 1 | 0 | 0 |
| 35 | Team C | 20-Sep-20 | C-18 | 3 | 1 | 0 | 2 |
| 36 | Team C | 21-Sep-20 | C-19 | 9 | 1 | 0 | 8 |



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