Traditional Knowledge Study for Diavik Soil and Lichen Sampling Program

Tłı̨chǫ Government

Tłı̨chǫ Research and Training Institute

2013

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Tłı̨chǫ Government, 2013

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EXECUTIVE SUMMARY

The project was collaboration between Diavik and Tlicho Research and Training Institute. The objective of the project was to document and apply traditional knowledge (TK) in Diavik Soil and Sampling Program. The program examines if dust from the mining activities are absorbed into the lichen and ingested by caribou, by taking samples of soil and lichen at specific distances from the mine site. The purpose of the traditional knowledge study was to assess the type of landscapes caribou prefer for forage, use and migration, and to assess the lichen conditions at the sample sites to investigate how dust from the mine potentially affect caribou use of the area.

The study applied a qualitative research approach based on workshops and personal interviews with elders while conducting the assessment in the field. Mapping exercises with the elders was conducted to documented caribou migration routes and important water crossings around the mine site.

The study assessed locations near the mine and at locations 30-40 kilometers from the mine site. The research showed that lichen around the mine site was in poor conditions. Caribou will avoid using the area in close proximity to the mine as their migration route, as the caribou recognize a difference in the lichen quality (by smell and taste). The area around the mine was an important location for the fall migration route, but caribou has decreased the use of this migration route, due to the poor forage conditions, and will travel to other areas with preferable forage

The lichen at sample locations 30-40 kilometers away from the mine site was in normal conditions. Caribou use and forage at these locations. The migration to these areas has been altered due to the reduced use of migration routes through the areas around the mine site. The study has documented specific Tlicho concepts which describe caribou in relation to use of specific land formations and caribou behavior in relation to changing condition of vegetation and development.

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TŁĮCHǪ PLACENAMES

Ek’atì	Lac De Gras
	Ek’atì is named after the white color on the rocks (quartzite) found frequently at numerous locations around the lake. Ek’atì is also the word for fat, due to the resemblance to the white rocks. The old name for the lake is Kwʔek’atì.
Ek’adì	Island on ʔek’atì. Location of Diavik diamond mine.
Nǫdìikahtì	Mackay Lake
Ewaànıt’ııtì	Courageous Lake
Be?aitì	Winter Lake
ʔezǫtì	Jolly Lake
Kǫ̀k’èetì	Contwoyto lake
Dezahtì	Point Lake
Tł'ok'edaatì	Starfish Lake
Whaticho / Whatika	Seahorse Lake

1.0 INTRODUCTION

This report describes the traditional knowledge (TK) study which has been conducted for the Diavik Soil and Lichen Sampling Program. The purpose of the study, directed by the Tłı̨chǫ Research and Training Institute (TRTI), was to document and apply the traditional knowledge of Dene elders in the lichen and soil sampling program conducted during summer 2013. The objective of the program was to determine if metals in dust from mining operations had the ability to be absorbed in the lichen and therefore ingested by the caribou in the area surrounding the mine. The study documented Dene elders' traditional knowledge of the Bathurst caribou herd in the area adjacent to Diavik mine site. The purpose of the study was to (1) assess the types of landscape caribou prefer for forage, use and migration, and (2) to assess the conditions at the sites where lichen and soil was sampled to investigate how dust from the mine potentially affects caribou use of the study area.

The project was collaboration between Diavik and TRTI. The intent of the project was to use knowledge and methods from both traditional knowledge and science to assess the current conditions of vegetation around the mine site. This required the cooperation of Dene elders and Diavik's biologists while conducting the fieldwork. The Dene traditional knowledge holders assessed and determined the sampling sites where biologists collected lichen and soil samples for metal and dust analysis. The project was also collaboration between Lutsel K'e First Nation and Tłı̨chǫ, and involved elders from both First Nations.

The study was conducted in the area surrounding ʔek'atì (Lac de Gras). This area has been a central hunting and trapping area for the Dene since time immemorial. The ʔek'atì area has been recognized for numerous valuable hunting locations due to the important caribou migration routes that go through the area. The area is also known to be a reliable trapping area, especially for wolves and white fox. The Dene has always travelled extensive distances to hunt. Their travel routes, over land and water, with traditional camp sites, connect through the project study area into the adjacent regions.

A part of successfully maintaining a harvesting economy in the sub-arctic environment requires accurate knowledge of the minute detail of animal's activities, their habitat and feeding preferences. An economy based on hunting requires intimate knowledge of the changes in the animals' seasonal movement, their appearance, breeding cycles and especially their sensory capacity for human approach. Such knowledge is based on an intimate relationship between the hunter and the animals. The caribou is of central importance to the Dene economy and knowledge of the seasonal movement and habitat preference for caribou is vital for successfully securing meat. To understand the movement of caribou, the Dene has developed concepts which describe particular caribou manners and the herds' movement in relation to use of their land. These Dene concepts have been applied during this study to understand caribou behavior in relation to their habitat and development. The following report describes the traditional knowledge of caribou and the current conditions of forage and use areas surrounding Diavik diamond mine.

2.0 TŁĮCHǪ RESEARCH AND TRAINING INSTITUTE

The project was conducted by the Tłı̨chǫ Research and Training Institute. The newly established Institute has the intention to bring together academic, government, non-governmental organizations (NGO), corporate and local Tłı̨chǫ resources to collaborate on research in social, cultural,

environmental, health and wellness concerns for the Tłı̨chǫ. The mandate of the Tłı̨chǫ Research and Training Institute is to advance the study of Tłı̨chǫ lands, language, culture and way of life through the promotion of research, and its use for education, training, planning and monitoring purposes.

The Tłı̨chǫ Agreement was signed on August 4th, 2005 and established the Tłı̨chǫ Government with full powers and jurisdiction over 39,000 square kilometers of Tłı̨chǫ Lands, wildlife and resources in the Northwest Territories (NWT), Canada. The Agreement, the first comprehensive land claim and self-government agreement in the NWT, is between the Tłı̨chǫ, the Government of Canada and the Northwest Territories. The Tłı̨chǫ Agreement created the Tłı̨chǫ Government to preserve, protect and promote Aboriginal and Treaty rights, and way of life – including culture, language, heritage, lands, economy and resources – for all Tłı̨chǫ today and for future generations to come.

The TRTI will advance the study of Tłı̨chǫ lands, language, culture and way of life by the promotion of research projects and activities involving elders and youth; the development and training of Tłı̨chǫ researchers; the development and use of indigenous research design and appropriate community methodologies; publishing our work in a variety of media including online at www.Tłı̨chǫ.ca; developing the Tłı̨chǫ 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 while promoting collaboration with academic and corporate partners.

3.0 Research Methods and Procedure

Following the standard research methodology of the Tłı̨chǫ Research and Training Institute this study applied a qualitative approach based on workshops and personal in-depth interviews. The style of interviews that were conducted involved a combination of semi-directive and open-ended interview technique. The use of these two techniques allows for flexible interviews, which is vital when it comes to gathering research from an oral perspective. Flexible interviews, in this case, created a safe space for elders to freely share their knowledge and tell their stories while continue to follow the objectives of the research. The interviews were conducted in Dene and in English. The interviews were recorded with digital recorders and qualified local translators transcribed the interviews. The map was digitized and entered into ArcGIS (Geographical Information System).

3.1 Part One: Pre-Assessment

The study was designed as a three-part study. The initial part of the study involved the establishment of the elders committee. The elders from the Tłı̨chǫ and Lutsel K'e communities were selected based on their extensive knowledge of caribou migration and their personal experience with hunting and travelling on the barrenlands.

The study consisted of:

- Two Lutsel K'e elders (one male/ one female).
- Two Tłı̨chǫ elders (two males).

The field work was conducted by three male elders, as the lady from Lutsel K'e left the study after the first workshop. Part One consisted of the preparation workshop held in July 2013. The workshop was characterized as a round table discussion, where each elder took turns to share their knowledge. The research topics that were covered are displayed in Table 1. A central aspect of the research was

documentation of Bathurst caribou migration routes through the study area. A mapping exercise was held with the elders to document important migration routes and water crossings and any changes to the migration routes in recent years (Map 3).

3.2 Part Two: Assessment of Sample Sites

The elders assessed the near-site and far-site sample location with the biologists. The sample locations were determined from the previous year's research. Two helicopters were used for four days to visit the near-site and far-site sample locations. Two days were spent assessing the near-site sample locations and two days for the far-site sample locations. When approaching a kilometer radius from the sample sites, the elders discussed and determined a specific location to conduct a soil and lichen sample. The location selected by the elders was based on the most preferred use and forage area for caribou. While assessing the sample site the elders were interviewed regarding caribou use of the area and conditions of vegetation and caribou forage at the location. The on-site interviews were documented with a digital recorder and notes.

3.3 Part Three: Verification

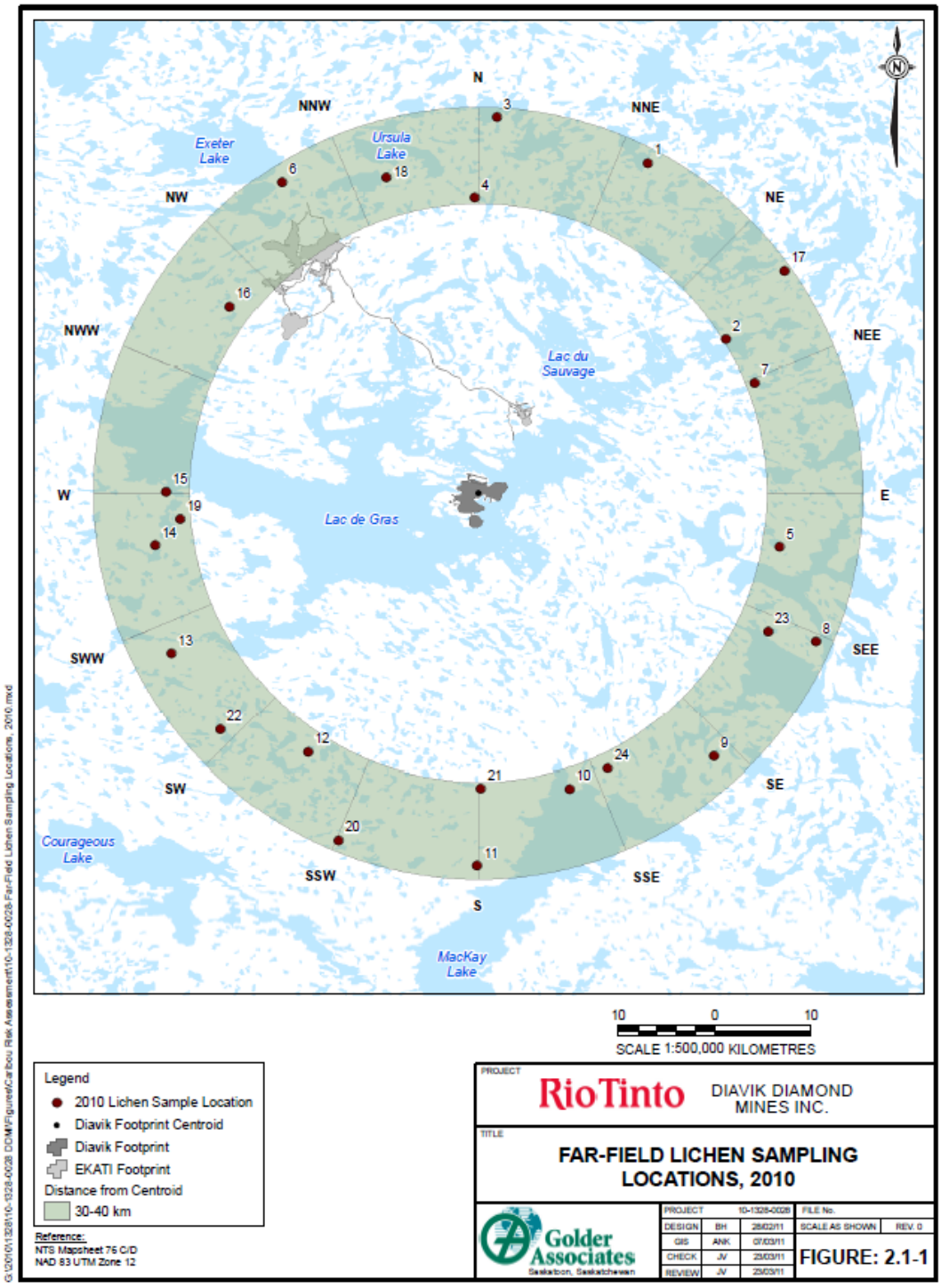
Once the documented knowledge had been transcribed and analyzed, a verification workshop was held in October 2013. The last workshop was designed to both validate and verify the knowledge documented on both the maps and the text. Additional traditional knowledge was also documented during this workshop. Once the elders was satisfied that the correct knowledge had been documented, the knowledge was included in the research report. The documented knowledge, audio files, text and maps, are stored in secure locations in the Tłı̨chǫ Government office in Yellowknife.

Table 1: Research Focus

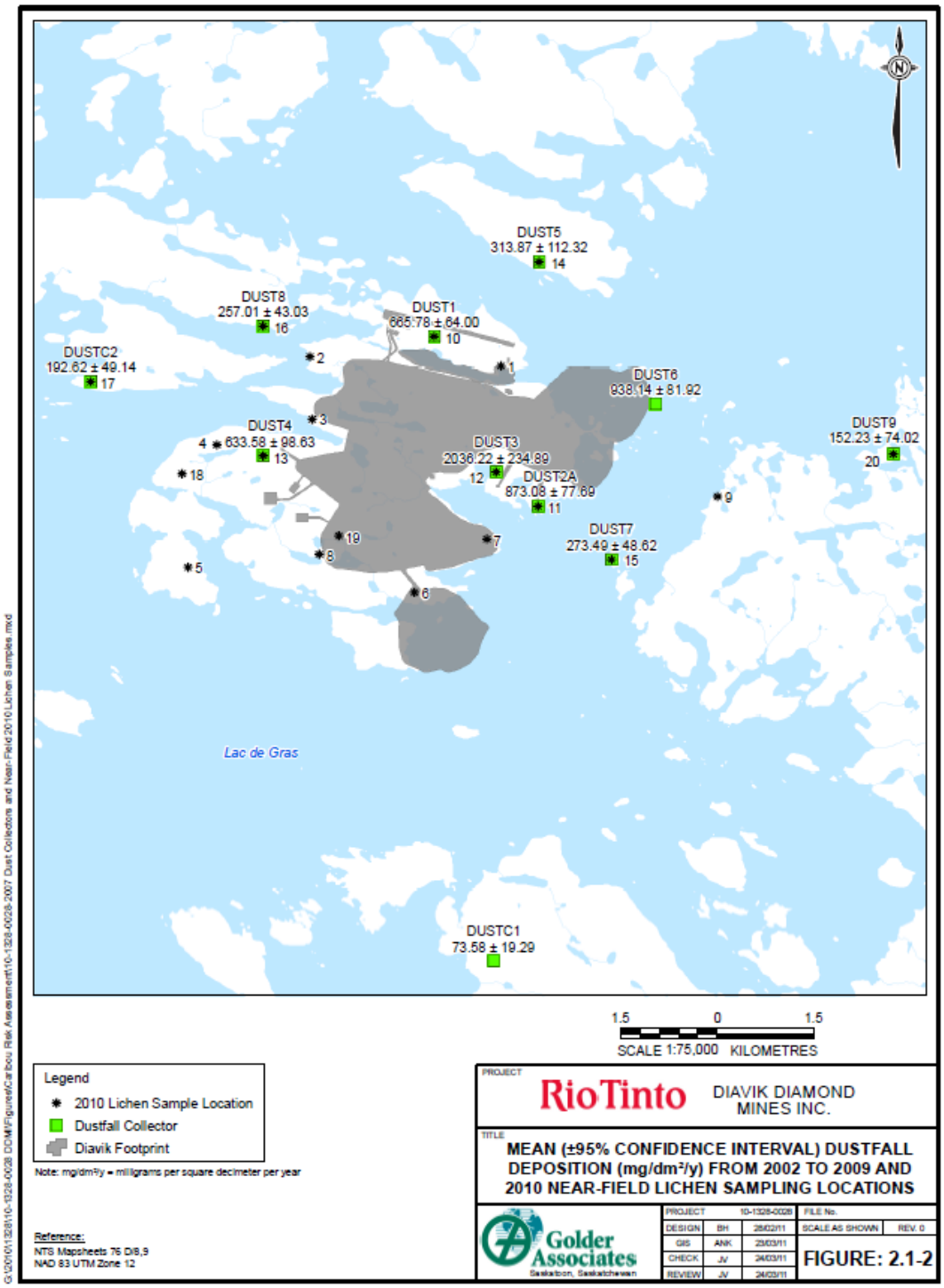
PART ONE: PRE-ASSESSMENT	PART TWO: FIELD WORK	PART THREE: VERIFICATION
- Assessment of pre-determined sampling locations. - Identify indicators of preferred forage areas. - Identify indicators of preferred use/ travel areas. - Document why / why not caribou chose areas for forage and use. - Documentation of caribou migration routes. - Documentation of caribou water crossings in study area.	- Continue assessment of pre-determined sampling locations in the field. - Identify other possible sample locations. - Identify preferred forage areas within study area. - Identify preferred use/travel area within study area - Identify preferred types of lichen. - Document harvesters' criteria for assessment of caribou habitat.	- Verification of documented traditional knowledge from part one and two. - Record additional traditional knowledge. - Evaluate research process for future TK studies.

4.0 STUDY AREA:

Map 1: Far-Site Sample Locations



Map 2: Near-Site Sample Locations



5.0 KEY LEARNINGS

During the research process, several key concepts were pointed out repeatedly by the elders. By learning traditional knowledge from Dene elders, the land and animals become easier to understand. Traditional knowledge as a knowledge system does this because the land itself and all beings are sentient persons with the ability to act and chose based on personal agency. Inanimate and animate beings are individuals with a personality, similar to humans. This understanding makes the land more comprehensive because all beings act towards each other, and to humans, in similar ways as humans relate to other humans. The land then becomes a social landscape. Animals are person with personality and knowledge, and not solely biological objects acting on instinct. The Dene elders live in active relationships with the land, and thus, acts towards the land and animals in similar ways as one would towards another human and learns from the land in similar ways. The key ways indigenous peoples acquire knowledge about the land is to be actively involved in intimate relationships with animals and the land itself, and to spend time with the animals on the land to observe and learn from them. This section summarizes key concepts and learnings to understand caribou, their movement on the land, how caribou react to a changing environment, and the intimate relationship between Dene and caribou.

5.1 TŁĮCHǪ CONCEPTS

5.2 TATAÀ

The concept refers to caribou movement in relation to lakes and land formations. The word means a channel of land between lakes which forms a land bridge that caribou are compelled to walk across, as the caribou herds migrate through the land. The concept refers both a large channel of land as between Ek'atì and Nǫdìikahtì and a small channel of land as between Ek'atì and Lac de Sauvage. The numerous lakes on the caribou migration route create boundaries which forces caribou to migrate on specific tataà between the lakes.

5.3 NAAʔÒO K'È

The concept is similar to the concept Tataà. The word means a narrow water crossing that caribou can use to migrate between the large lakes. An example of Naaʔòo k'è is near-site sample location NS 23. The peninsula on Lac de Sauvage extends almost to the other side of the lake, but leaves a gap where caribou are forced to swim to reach the peninsula. Such water crossing is a Naaʔòo k'è.

5.4 DÈ ʔǪGOÈHSHÌ

The concept refers to caribou and forage areas.
The word means: caribou has thrown this land/area away, and, caribou do not use the area anymore. The elders use this term to describe the area close to the mine site. The concepts means that caribou has thrown this land away because their food source is in poor condition.

5.5 EKWǪ YEKA AT'Į-LE ADZÀ

The concept refers to caribou use of land. The word means: caribou do not walk on this land anymore. The elders use this term in reference to the near-site sample locations.

5.6 WHEK'ÒO WEKW'ǪǪ̀ WHEɔǪ

The concept refers to Tłı̨chǫ's harvesting relationship to animals and the animals' availability to the hunters. The word literally means: the freezer is empty. The concept refers to the availability of animals, and particularly caribou, for the people. For the Tłı̨chǫ, a healthy environment on the barrenlands is comparable to own a freezer full of meat for ones availability. When the freezer is empty means that the environment on the barrenlands is deteriorating and that caribou are not healthy and available to the Tłı̨chǫ hunters as they used to be. The land is thus a freezer that the Tłı̨chǫ can go and acquire their food. When the freezer is empty, means that the land is not healthy and country food is not as easily accessible to Tłı̨chǫ as it was.

5.7 EKWǪ̀ WINĮ̀ ŁÈ ZǪ LANÌ

The concept refers to the wisdom of caribou. The concepts means: all caribou has one mind. The elders always emphasize that caribou are smart animals and that caribou know every detail of their land and their environment. The caribou can predict weather changes and know what will approach them on their migration route. The caribou have good memory of their land and of all their migration routes. The caribou has one mind, because they know what happens on their land. Sometimes when a herd of caribou is travelling 50 km in front of another herd, the herd in the back will know when the first herd has changed direction to their migration route, although the herds are 50 km apart. The concept also refers to the sensory capacity of caribou. The animals know how the weather will be and when the weather will change. The caribou know when the weather will become colder and warmer, and based on this they know if they will travel south into the forest or stay on the barrenlands. The elder Albert Boucher explained,

> *I heard that caribou is one mind. I don't know how many thousands of caribou, still one mind, just one mind. That's what the elders were telling me.*
>
> Albert Boucher, August 14th 2013.

The Tłı̨chǫ has developed these concepts from maintaining an intimate relationship with the land. Maintaining a successful and healthy economy based solely on knowledge of the land requires the hunters to be deeply aware of any changes in animal behavior and habitat conditions. While the concepts Tataà and Naaɔòo k'è refers to movement over static land formations, the concepts Ekwǫ̀ yeka at'ı̨-le adzà and Whek'òo wekw'ǫǫ̀ wheɔǫ imply changing conditions to caribou habitat and how caribou react to such changing conditions.

The concept Whek'òo wekw'ǫǫ̀ wheɔǫ refers to animals' availability to Tłı̨chǫ. As the changing conditions to caribou habitat have implication to the Dene hunting economy, the concept refers to the notion that caribou do not use the same migration routes as prior to the construction of the mine. Thus, caribou are not available at the same hunting locations as earlier. The last concept Ekwǫ̀ wınį̀ ıłè zǫ lanì, refers to how all the caribou know that changes has occurred to their land and how the animals know they have to travel in different directions to avoid the changes. The elders emphasized the connection between Ekwǫ̀ wınį̀ ıłè zǫ lanì and the change of migration routes, leading to reduced availability of caribou to Dene at normally secure hunting location.

5.8 CARIBOU BEHAVIOR

This section describes specific knowledge of the types of landscape caribou prefer for forage, use and migration.

5.9 PREFERRED FORAGE AREAS

- The caribou prefer to forage in open and flat terrain as predators can easily be spotted.
- Caribou prefer flat areas because it is easy to spot predators. At locations where vegetation is too high, caribou's visibility of predators is limited (for example FS 21). Hunters and wolves use such bushes as cover while hunting caribou, and the caribou know that potential dangers could hide among high vegetation. The caribou do not prefer to forage in those areas because of the lack of visibility. On the barrenlands, the caribou herds travel through such areas with high vegetation to better forage areas with increase visibility.
- Forage areas by the shoreline are preferable, during summer, because the breeze from the lake keeps flies away. At open and flat locations, the caribou can rest and sleep
- During summer and fall, caribou prefer to stay in the wind to avoid mosquitoes and flies.
- On warm days and during periods with lots of flies, the caribou prefer to stay on top of hills to be in the wind.
- Caribou forage on lichen when it is dry, but prefer their forage to be moist.
- Caribou prefer to lie down to rest in muskeg areas, while foraging on lichen and sedges.
- The elders explained that caribou forage everywhere all the time. While walking through any kind of terrain, the animal will always look for forage at the same time. They combine their diet by eating lichen, sedges, bog birch and other plants at the same time.

> *The [caribou] eat lots, they eat anywhere. They eat as soon as they see food they eat. They are always hungry. For them there's pie, strawberries, green tea. All kinds of food everywhere, there's mushroom soup...(laughter).*
>
> Joseph Judas, August 14th 2013.

5.10 ESKERS

- The caribou prefer to walk on the high-ground on the esker and prefer to walk in the sand on top of the esker.
- Caribou follow the eskers on their migration route.

- The herds use the eskers as their trails and are used as landmarks for orientation.
- Caribou prefer to stay in the wind on top of the esker as relief from flies.
- Caribou walk down from high-ground on the eskers to forage in the low-lying areas, preferably muskeg, around the esker.

5.11 ROCKY AREAS

- When caribou travel in large herds, they will walk over rocky areas. When they travel in small herds or individually, rocky areas are avoided. The caribou always look after their hoofs and legs. The rocky areas area avoided, to minimize the risk of damaging their legs and hoofs. As they travel across the Naaɔòo k'è at NS 23, the animals avoid the western tip of the peninsula because of the rocky area. Instead, caribou prefer to walk on the western side, covered with lichen and sedges. This is evident by the multiple caribou trails leading into the water on the western side of the peninsula.

> *The caribou have really strong legs, some of them have really strong legs, you know. But if they see rocky area like that they will not go. But instead they go right here where there are no rocks, see there's a place right there? That's where they go.*
>
> *Some go there on the grass and go right here. They don't go on the rocks. Well, you know the caribou. Even me, I wouldn't go there. The caribou are just the same.*
>
> Albert Boucher, August 14th 2013.

5.12 MIGRATION AND USE OF EK'ADÌ

- Ek'adì used to be an important feeding area. The caribou know that their forage is currently in poor condition at this location and choose not to use and forage on the island. The elders said that caribou avoid using this area anymore and will most likely not forage in this area for 20-30 years after the mine is closed.
- One of the main migration routes of the Bathurst caribou used to go through Ek'adì. The herds used to travel through and forage on the island. Since construction of the mine, caribou hardly travel through Ek'adì and the surrounding area. On the occasions when caribou travel across Ek'adì, the herds will only pass through because they recognize the low quality of the lichen and other plants they forage on. An elder describe the conditions on the island, "the whole island is dead for [caribou] now" (21.10.2013, Yellowknife).
- The elders did not see fresh or old caribou tracks on Ek'adì. Old caribou scat was found on the gravel road by NS 1, most likely from herds passing through this location during winter. Caribou probably travels through during winter when the herds can travel on the

ice, but the large herds will most likely not travel through this location in summer or fall due to the close proximity to the mine.

5.13 USE OF ELEVATION

- The preference for use of elevation depends on (1) temperature and (2) flies. On days with high temperatures, caribou will go on top of hills where the wind has a cooling effect. On colder days, caribou prefer to stay in areas will low elevation or in a valley to avoid the cold wind. Similarly, in the morning and evening when it is colder the caribou prefer to stay in a valley to forage, whereas during midday and the warmest parts of the day caribou prefer higher grounds and hills. The activity of flies is related to temperature and wind. When flies are most active caribou go to windy places, usually on high ground, as hills and eskers, to avoid the flies.

5.14 DENE CARIBOU HUNTING

- The hunters know the movement of caribou and their preference for use of elevation. The best time for hunting in the low-lying areas and valleys is in the morning and evening when the animals are resting. When hunting during mid-day or on warm days, the best location to look for animals is higher ground where caribou are trying to get away from flies and the heat. While if it is colder and not too much flies, the hunters will look for caribou in low-lying areas and valleys.

- The caribou prefer to walk through valleys and lie down to rest and forage in the muskeg in the bottom of the valley. The best location for a successful hunt is to go on the higher areas around the valley, where one can look down on the animals. From this location one can securely shoot the caribou resting in the muskeg.

6.0 Research Results

The research results outline the details of caribou use of the area around each sample site and the condition of lichen and vegetation, as caribou forage. The research results are divided in two sections. The first section outlines results from the near-site sample location and the second section outlines results from the far-site sample locations.

6.1 Near-Site Sample Locations (NS)

NS 12

August 12th 2013

1:40 PM

Description of Sample Location

The sample site is located on Ek'adì. The location is on flat muskeg by small body of water. The location is surrounded by infrastructure at Diavik mine site.

Details of Caribou Use of Location

Migration and Use of Are

No fresh tracks or caribou activity were observed around the sample location. Old trails were observed. These trails are from before the construction of the mine.

The large caribou herds do not travel through and forage at this location. The location is too close to the infrastructure at mine. The noise and activity disturbs caribou, thus the herds choose not to use and forage at this location. Instead, caribou will travel to locations with better forage conditions. Caribou has good memory of their travel routes and of their land, especially of landforms and lakes used to navigate throughout their land.

Conditions of vegetation:

The elders observed dust on the lichen and other vegetation at this location. The lichen at this location is not preferable forage for caribou. The conditions at the locations were dry. Caribou eat lichen when it is dry, but prefer their forage to be moist.

NS 1

August 12th 2013

3:30 PM

Description of Sample Location

The sample site is on Ek'adì, located on the south side of gravel road. The ground at the site is sloping from a hill towards artificial lake (old bay). Vegetation is mainly lichen and bog birch.

Details of Caribou Use of Location

- **Migration and Use of Site**

The elders did not see fresh or old caribou tracks at this location. Old caribou scat was found on the road, from herds passing through this location during winter. Caribou probably travels through here in winter time when the herds can travel on the ice. The large herds will presumably not travel through this location in summer or fall due to the close proximity to the mine and the poor forage conditions.

The sample location is on the main migration route of the Bathurst caribou and the herds used to travel through and forage on this island. Since construction of the mine, caribou hardly travel through Ek'adì and the surrounding area. On the occasions when caribou walk to this side of Ek'adì, the herds will only pass through because they recognize the low quality of the lichen and other plants they forage on. An elder describe the conditions on the island, "the whole island is dead for the [caribou] now" (Joseph Judas, 21.10.2013, Yellowknife).

During summer and fall, caribou prefer to stay in the wind to avoid mosquitoes and flies. On warm days and during periods with lots of flies, the caribou prefer to stay on top of hill above the sample site to be in the wind.

- **Forage**

This site used to be good feeding area but the location is too close to the activities and infrastructure at the mine. The caribou know that their forage is of poor quality at this location and choose not to use and forage around this location. The elders emphasized the concept Dè ɔǫ̀goèhshì, that caribou avoid using this area and will most likely not eat in this area for 20-30 years after the mine is closed.

Conditions of vegetation

Elders observed noticeable amount of dust on lichen and other vegetation. The vegetation is not preferable caribou forage. A lot of mushrooms grow at this location.

Other observations

One dead red fox found close to sample site. Two fox dens by the shoreline. One of them is in use.

NS 9

AUGUST 15TH 2013

8:30 AM

Description of Sample Location

The location is on east side of Ek'atì, across the lake from the mine site. The site is by the shoreline and contains mainly lichen and rocks. The terrain is flat with higher elevation to the east.

Details of Caribou Use of Location

- **Migration and Use of Site**

No fresh tracks or signs of caribou were seen at the site. The site used to be on the fall migration, but the herds do not migrate through this area as was common before the construction of the mine. The

herds used to swim across the lake from Ek'adì to the eastern shoreline of Ek'atì, by this sample location. As the caribou recognize the poor quality of forage in the area and the noise and activity at the mine site, the herds choose not to migrate through Ek'adì and by this location.

- **Forage**

The site used to be a good forage area for caribou. The caribou prefer to forage in open and flat terrain as this sample location because they can easily spot predators. The location by the shoreline is preferable, during summer, because the breeze from the lake keeps away the flies.

The herds do not forage at this location anymore as they recognize the poor quality of lichen. At this location, the elders noticed dust on the lichen and other vegetation that caribou forage on. The caribou will taste and smell a difference in lichen quality, and thus avoid locations where the lichen is of poor quality. Also, at this location the elder emphasized the concept Dè ɔǫ̀goèhshì, because caribou will avoid this area. Caribou know that their food source is of poor quality at this location and prefer to travel to other areas where they know their food source is of better quality.

Conditions of Vegetation

Elders observed dust on lichen and vegetation at sample location.

> *Wind blowing this way a lot. That northwest wind. It looks like a little bit of dust flying from these mines, stuff like that. No…I cannot say it is good. I don't agree with that.*
>
> Joseph Judas, August 15th 2013.

Other Observations

Elders found berries at the location but would not eat the berries because of possibility of pollution due to the close proximity to the mine site.

Photo 1: Harry Apples and Joseph Judas examining lichen by sample site NS 12. Diavik diamond mine in the background. August 12th 2003.

NS 15

AUGUST 15TH 2013

09:30 AM

Description of Sample Location

The site is on a small island southeast of Ek'adì. The site is directly across from the mine site. Rocks and boulders are scattered across the location.

Details of Caribou Use of Location

- **Migration and Use of Site**

The elders found no tracks or fresh signs of caribou at this location. Old migration trails went from north to southeast side of island. The fall migration used to go across the chain of islands from the north to the southeast side of Ek'atì, prior to the construction of the mine. The caribou do not use this island or migrate through this location, during summer and fall. The mine has created a 'wall' that the caribou cannot and do not want to pass. Caribou herds might travel by the location during the winter, and during spring migration, when the herds use the ice for travel and not the trails on land.

- **Forage**

The island used to be good forage area before construction of mine but the island is not used by caribou anymore. The elders noticed that caribou has not eaten at this location for many years. The elders said that caribou would eat the lichen if they had to, because they have to eat, but the animals would most likely avoid eating lichen at this location.

"If [lichen] doesn't taste good, they are not going to eat it".

Joseph Judas, Ek'adì, August 15th 2013.

Conditions of Vegetation:

Dust was observed on lichen and other vegetation. The lichen is not considered good caribou forage because of the accumulated dust.

Other:

A particular rock was found on large boulder. The symbolic meaning of this rock was unknown to the present elders, but could potentially indicate:

- A secure hunting location.
- A burial site (other rocks found in alignment could indicate the possibility of a grave).
- The rock could be placed by either Dene or Inuit.

NS 20

AUGUST 15TH 2013

10:00 AM

Description of Sample Location

The site is on a hill above the TK camp on the east side of Ek'atì. The site is across the lake from the mine site. The site contains mainly bog birch and bushes. Limited amount of lichen grows at this location.

Details of Caribou Use of Location

- **Migration and Use of Site**

No fresh caribou tracks or fresh signs of caribou were found. No migration trails go through this location. The caribou do not usually come to this site due to the bay that separates the location from the mainland. Caribou follow the mainland east of the site and do not need to walk out to this area. Occasional animals might walk to this site.

During periods of warm temperatures, caribou prefer to stay on top of hills to cool off in the wind. Caribou are adapted to cold temperatures and prefer cold winds on the hilltops on warm days. Also, caribou seek to the wind on higher grounds and hills to escape from flies and mosquitoes during the summer.

- **Forage**

The site contains limited amount of lichen that caribou prefer to forage. The caribou do not frequently walk by this location; consequently the site is not a preferable forage area. The elders noticed dust on the vegetation at this site and stated that caribou most likely would avoid forage in areas where a different smell or taste can be noticed.

Conditions of Vegetation:

The elders noticed dust on lichen and vegetation.

NS 14

AUGUST 15TH 2013

11:30 AM

Description of Sample Location

The site is on an island (Bear island) north of the mine site. The sample location is on higher ground sloping southward to Ek'atì.

Details of Caribou Use of Location

- **Migration and Use of Site**

No tracks or fresh signs of caribou were found on the location. Old migration trails used prior to construction of mine extend from east to west along the island. The island used to be on the fall migration route. Currently, the herds avoid using this island as their migration route due to poor forage and disturbance from the mining activities.

- **Forage**

The forage is in poor conditions at this location. The elders state that caribou would most likely get sick from eating the vegetation at this location.

Conditions of Vegetation

The elders observed dust on the lichen and vegetation. Not much lichen grows at this site.

Photo 2: The research team: Petter Jacobsen, Joseph Judas, Dianne Dul, Albert Boucher, Karen Stefanyk, and Harry Apples. August 14th 2013.

6.2 FAR-SITE SAMPLE LOCATIONS (FS)

FS 25

AUGUST 13TH 2013

09:30 AM

Description of Sample Location

The site is located on southeast end of Nǫdìikahtì. The site is on the south side of large bay. The location is on an esker extending in an east- west direction. The terrain is mainly flat, sloping to the lake from a hill to the east. The sample site is on a low esker with muskeg on the north side.

Reasons for new sample location

The elders inquired an examination of potential dust and pollutants brought with the northwest wind from mine site to this important forage and migration area. The sample site is a high-use area for caribou because:

- During fall migration, the eastern side of Nǫdìikahtì is an important Naaɔòo k'è. The herds migrate both east and west across the water crossing. On the westward crossing, the caribou follow the shoreline of Nǫdìikahtì or use the chain of islands to cross Nǫdìikahtì.
- High-quality forage area.
- The site is on an esker that caribou follow on their east and westward migration through this area.

Details of Caribou Use of Location

- **Migration and Use of Area**

The location is by an important water crossing, during fall migration. Several caribou trails cross through the site in an east-west direction. The caribou prefer to walk on the high-ground on the esker and enjoy walking in the sand. Caribou follow the esker on their migration route and walk down from the high-ground to forage on lichen and sedges on the low-lying muskeg around the esker. Caribou prefer a peaceful and quiet area. Joseph Judas described the importance of this location during fall migration:

> *We are standing right now on the esker on the bay on the east side of Nǫdìikahtì. The caribou start moving from the north this way. They hit Nǫdìikahtì on the northeast side of it, and then they go further east. Then they come back again the same way but they don't go to the north. They go straight to the northwest all the way to Mesa Lake, around Rawalpindi Lake, and that area.*
>
> *The caribou go that far and then they come back southeast again [to* Nǫdìikahtì]*. Then caribou go the same way again to the northwest but sometimes they go half way and then they hang around for awhile. Then they go straight to the southeast again, and they continue to go this way*

about three to four times. Then sometime around October or November they start moving into the tree line.

Joseph Judas, Nǫdìikahtì, August 13th 2013

- **Forage**

The site is important forage area for caribou and the site contains high-quality forage. The lichen and other vegetation are in good quality at this site. Caribou walk down from esker to forage of lichen and sedges in the muskeg around the esker.

Conditions of Vegetation

No dust was noticed on lichen and vegetation. Elders stated that dust is probably carried with the wind and accumulate on the vegetation but they cannot notice a difference. The lichen and vegetation looks healthy at this site, but caribou will avoid eating the lichen if it smells or tastes different.

FS 11

AUGUST 13TH 2013

12:00 AM

Description of Sample Location

The site is located inland from the northwest side of Nǫdìikahtì, on the south side of an esker extending in east-west direction. The site is on flat ground by small pond, with several pockets of sand beneath the high esker.

Details of Caribou Use of Location

- **Migration and Use of Area**

Fresh caribou tracks were seen in the sand beneath the esker. The tracks went towards the west. The site is on the tataà between Ek'atì and Nǫdìikahtì. The entire land between these two large lakes is an important tataà and an important part of the fall migration route. The herds travel past this location mainly from two directions: (1) from the north and northeast after passing Ek'atì, and (2) from the east after travelling across the islands on Nǫdìikahtì.

The caribou follow the esker on their migration route. The herds use the eskers as their trails and are used as landmarks for orientation. Caribou enjoy walking in the sand on top of eskers. Caribou prefer to stay in the wind on top of the esker as relief from flies.

When caribou travel in large herds they will walk across rocky areas. When they travel in small herds or individually, they avoid rocky areas. The caribou always look after their hoofs and legs. Therefore, they avoid the rocky areas to minimize the risk of damaging their legs and hoofs.

- **Forage**

The site is a high-quality forage area. The lichen and vegetation are in good conditions and the area is an important forage area for caribou. The location is an important migration route and the caribou

forage extensively while walking through this area. Caribou walk along the esker and come down to forage on the low-lying areas besides the esker.

Conditions of Vegetation:
No dust was observed on lichen and other vegetation. Vegetation is in intact conditions.

Other
The esker is high-use area for several different animals, especially for digging dens.
Fresh track were observed in the sand by the small lake of caribou, wolf, mink and wolverine.

FS 21

AUGUST 13TH 2013

12:50 PM

Description of Sample Location
The sample site is on the tataà between Ek'atì and Nǫdìikahtì. The terrain is flat, covered in meter high vegetation. Caribou antlers found at sample site.

Details of Caribou Use of Location

- **Migration and Use of Area**

The site is on the tataà between Ek'atì and Nǫdìikahtì. Caribou prefer flat areas as predators are easily discovered. At this site the vegetation is too high and caribou's visibility of predators is limited. Hunters and wolves use such vegetation as cover while hunting and the caribou know that potential dangers could hide among the high vegetation. The caribou do not prefer to use and forage in this area due to the lack of visibility. On the barrenlands, the caribou herds travel relatively fast through such areas with high vegetation to better forage areas with increase visibility. The caribou do not prefer to use this location because of the lack of lichen and the high vegetation. No fresh tracks or sign of caribou were observed, except for old antlers probably from a wolf kill.

- **Forage**

The forage is in good condition at this site, but the area is not preferable for forage. Caribou migrate through this location by walking, eating, walking, eating and continue on to other locations.

Dene Caribou Hunting
The Dene hunt caribou at this site and in other locations with similar terrain. Harry Apples explained his experience of hunting in similar terrain,

> *Caribou like flat land because the caribou can see us from far when we go caribou hunting. We go and sit somewhere like in a ditch, like in [the bushes] and hide from the caribou. That's how we hunt them.*
>
> *At this time of year [August] when we used to go to the barrenlands by boat in the summer, we would hunt only by hiding. If it's flat like this, caribou would see us from a long distant as we walk toward him. The only way is to*

> *hide from him, and he would come to us while we sit and wait among the willows until he comes close to us. That's how we hunted in the barrenlands*.
>
> Harry Apples, August 13th 2013

Conditions of Vegetation
No dust was observed on lichen and vegetation. The vegetation is in good condition.

FS 10

AUGUST 13TH 2013

2:00 PM

Description of Sample Location
By the shoreline at north end of Nǫdìikahtì. The terrain is open and flat with increasing elevation to the north. The vegetation is mainly lichen and moss. Numerous rocks cover the landscape.

Details of Caribou Use of Location

- **Migration and Use of Area**

Important migration routes follow the shoreline on both sides of Nǫdìikahtì. The caribou travel by this location along the shoreline of Nǫdìikahtì. During fall migration, the herds travel southeast from Ek'atì towards Nǫdìikahtì and to this location. The herds follow the shoreline of Nǫdìikahtì and travel further southeast or across the Naaɔòo k'è, by sample location FN 25, in southwest direction. Joseph Judas explained how caribou use this area,

> *We are at the north end of Nǫdìikahtì. The caribou usually go east side of Nǫdìikahtì and then all the way around the lake. Then [caribou] goes in direction of Lutselke, not to Lutselke, but somewhere southeast towards that area and then caribou comes back this way, a couple of times, goes back and forth on the barren land and then they head to the tree line. So this is the spot, it's a good spot, nice view. It is good for animals. So there are a lot of foods here, all kinds of food here.*
>
> Joseph Judas, Nǫdìikahtì, August 13th 2013

The caribou have a preference for the terrain at this site. They prefer open and flat area where predators and dangers can easily be spotted. Caribou like the breeze and wind from the lake that keeps flies away. Thus, caribou prefer locations similar to this site, where they can lie down, rest and sleep. No fresh tracks or signs of caribou were seen. Several migration trails extend across this site.

- **Forage**

The ground is covered with lichen and other vegetation caribou feed on. The lichen and vegetation at this location are in good condition and the location is a preferred forage area for caribou.

Conditions of Vegetation
The elders observed no dust on lichen and vegetation. The vegetation is in good condition.

FS 24

AUGUST 13TH 2013

2:45 PM

Description of Sample Location

The site is located inland on the northeast side of Nǫdìikahtì. The terrain consists of rolling hills gradually sloping towards Nǫdìikahtì. The ground is covered with lichen and bog birch and some rocky areas.

Details of Caribou Use of Location

Migration and Use of Area

The site is located on migration route along the northeast side of Nǫdìikahtì. Several caribou trails cross the sample site in northwest-southeast direction. No fresh tracks at the site but old caribou scat was found.

Forage

The site is a high-quality forage area and the lichen and vegetation are in good condition.

Conditions of Vegetation:

The elders observed no dust on lichen and vegetation.

FS 9

AUGUST 13TH 2013

3:50 PM

Description of Sample Site

The site is on the north side of a tataà between two small lakes. The terrain at the site is flat. The ground is muskeg with abundance of sedges and lichen. To the north, the flat ground turns into two small hills forming a valley with flat muskeg in the low-lying area between the hills.

Details of Caribou Use of Location

- **Migration and Use of Area**

The area is on the caribou migration route in a southeast direction from Ek'atì. Several caribou trails go through the valley on north side of the sample site. The caribou travel through the valley, pass the sample site and walk across the tataà between the two small lakes. Caribou have a preference to lie down and rest while foraging on lichen and sedges in the flat muskeg. No tracks or fresh sign of caribou were seen at the site.

At this site, the caribou prefer to stay in the muskeg during morning and evening while during midday the animals prefer to stay at the hills. The preference for use of elevation depends on (1) temperature and (2) flies. On days with high temperatures, caribou will go on top of hills where the wind has a cooling effect. On colder days, caribou will stay in the valley to avoid the cold wind. Similarly in the morning and evening when it is colder the caribou prefer to stay in the valley to forage. While during the warmest part of the day, caribou will go to higher grounds where it is colder.

The activity of flies is related to temperature and wind. During periods of high insect activity, caribou seek to cooler air and wind at high ground, as hills and eskers, to escape from the flies during the warmest part of the day.

- **Forage**

The muskeg at this site is a high-quality forage area. Caribou like to lie down to rest while forage on lichen and sedges in the muskeg.

Dene Caribou Hunting

The Dene hunters know that the caribou prefer to walk through the valley and lie down to rest and forage in the muskeg in the valley. The best method for a successful hunt is to locate oneself at top of the hill, where one can look down on the animals. From this location one can securely shoot the caribou resting in the muskeg.

The hunters know the movement of caribou and their preference for use of elevation. The best time for hunting in the low-lying areas and valleys is in the morning and evening, when the animals are resting. When hunting during mid-day on warm days, the best location to look for animals is higher ground where caribou are trying to get away from flies and the heat. While, on colder days with less flies, the hunters will look for caribou in low-lying areas and valleys.

Conditions of Vegetation

No dust was observed on lichen and vegetation. The vegetation at this site is intact.

NS 21

AUGUST 13TH 2013

4:30 PM

Description of Sample Location

The sample location is on a long stretch of land with numerous lakes on each side. The terrain is flat and open, covered with muskeg and few rocky areas on east side. The site is located in front of a tataà between two lakes to the southwest.

Reason for new sample location

The elders picked this sample location due to its significance for caribou migration and forage area. The sample site is located on a long stretch of land, in north-south direction, between numerous lakes on both east and west side. The caribou follow this stretch of land after they travel by Ek'atì.

The site is located in front of a tataà between two large lakes, on the southwest side of the sample site. The site contains mainly muskeg, with lichen and sedges, where caribou like to lie down, rest and forage. The elders Albert Boucher and Joseph Judas described their reasons for choosing this sample location.

> *I wanted to stop here, because it is a big stretch of land opening this way [north], no lakes, nothing. So the caribou...I see a lot of tracks, lots. So the caribou pass right here and goes right through to the southeast. Every time you see that big stretch of land like this, it's for caribou.*
>
> Albert Boucher, August 13th 2013

> *If the caribou around here are going toward Ek'atì and around there, they swim across to the edge of Ek'adì. If they cross along the edge of Ek'adì and walk on this tataà which goes straight to Nǫdìikahtì; then now we are right on the path of the caribou.*
>
> Joseph Judas, August 13th 2013

Details of Caribou Use of Location

- **Migration and Use of Area**

The location works as a channel of land, from north to south, between numerous smaller lakes on both east and west side. Several old migration trails go through the location. No new tracks or trails were observed. The area was an important location for caribou migration but the herds have reduced their use of this area due to avoidance of the migration route at Ek'adì. The elders emphasized that although one cannot see the mine from this location, the site is still too close to the activities at the mine. The noise and possibly deteriorated forage areas are the reasons that caribou prefer to travel to other areas with better forage. The elder Joseph Judas explained caribou migration at this location.

> *We chose this area because my great ancestors went through here; it is the main tataà for this area. The mine is over there and it is not that far. The caribou are coming through here and most of the caribou use this path because they are going across. Then they are going towards Nǫdìikahtì then northeast of Nǫdìikahtì. That's how the caribou are traveling. So anything that's coming from the north, that's where the animals used to travel before, but now that the mines are operating I don't know what is happening with the animals.*
>
> Joseph Judas, August 13th 2013

- **Forage**

The ground is mainly covered with muskeg. This terrain is good forage area for caribou because it is open and flat and with abundance of lichen and sedges. The animals like to lie down, rest and sleep while foraging on lichen and sedges in the muskeg. The elders are concerned that dust will be brought with the wind to this forage area, and that caribou possibly will avoid foraging at this location if the lichen is in poor condition.

Conditions of Vegetation

The elders observed no dust on lichen and vegetation. The vegetation is intact.

NS 22

AUGUST 14TH 2013

09:30 AM

Description of Sample Location

The new sample site is located at the northeast end of Ek'atì. The location is on the southeast side of the tataà between Ek'atì and Lac de Sauvage.

Reason for New Sample Location

This new sample site was located by the elders, because of its significance during fall caribou migration. The location is on an important tataà, the main migration route, between Ek'atì and Lac de Sauvage. During fall migration, caribou migrate through the Ek'atì area at mainly at two locations: (1) through Ek'adì and the islands in the centre of Ek'atì, and (2) the tataà between Ek'atì and Lac de Sauvage. Additional to these crossings, the caribou also migrate on the west side of Ek'atì, the east side of Lac de Sauvage and some swim across Ek'atì. Joseph Judas explained the importance of this location.

> *The tataà, the caribou are using this. From the north, caribou come this way. Going through where the land connects with each other. Huge caribou herds come through right here. If [caribou] are coming from the north going south, this is where they go. Some [caribou] cross the lake, some doesn't cross the lake, they go through this tataà. Here they go across the creek, in the river there. There is a shallow place where they can cross. This is a good spot that the animals used a lot because of good food. But now there is a mine close by so I guess the dust flies everywhere.*
>
> Joseph Judas, August 14th 2013

Further, Joseph Judas explained why it is important to sample at this site.

> *Because my forefather used it and the people are using it. And also I need the caribou to be healthy. That's why I need this to be done. Right here is a good place because the caribou go by here. They're using it a lot, because this is where the tataà is.*
>
> Joseph Judas, August 14th 2013

Details of Caribou Use of Location

- **Migration and Use of Area**

The site is located on the main tataà that caribou use to cross the large lakes (Ek'atì and Lac de Sauvage) in the area. The tataà is very important for the migration of caribou to areas south of Ek'atì. The elders described how the caribou trails at this location were all covered in mud from the large amount of caribou that travelled across this tataà. After construction of the mines, caribou have decreased their use of this tataà. Instead of using this tataà and the surrounding forage areas, the caribou need to travel to other locations with better forage.

The elders emphasized Ekwǫ̀ wını̨ ıłè zǫ lanì, and that caribou are smart animals. The herds always know what lies in front of them on their migration route. The main reason for caribou migration is forage. The caribou will choose to travel to areas where they know their forage is in better condition. Thus, caribou will avoid areas where they know the vegetation is not intact.

- **Forage**

The location used to be an important forage area for caribou, especially during fall migration when the herds would travel across the tataà between Ek'atì and Lac de Sauvage. When caribou travel across this tataà they travel in the common way by walking, eating, walking, and eating.

Dene use of this location

This important tataà was an important caribou hunting location for Dene hunters during the fall caribou migration. Hunters and their families would come to this location and other important tataà in the area to secure caribou meat for the winter. After freeze-up, trappers would set their traplines throughout the Ek'atì and south to Nǫdìikahtì and Ewaànit'iiti. The river between Lac de Sauvage and Ek'atì is an important fishing location for Dene while hunting caribou and trapping in the area during winter. The river and the outlet do not freeze complete over in the winter. Dene hunters and trappers relied on this tataà to supplement to their food supply with fish. Joseph Judas elaborated on Tłı̨chǫ use of this area.

> *Not only my Dad, but a lot of Dene people. They travelled on the land here. It is a good trapping area for arctic fox and stuff like that. Not only for the fox but if they see caribou, especially that one they like that, they are going to be killing that. So they like the barrenlands.*
>
> *This place is not for using fish nets but for using fishing hooks in the creek, because they are using only axe not chisel. That's what they were using, the fish hooks. They don't catch lots, just a couple of fish, just enough to feed themselves. That happened when they are feeding their dogs but they probably had something else for their dogs too so.*
>
> *They made camp somewhere, and then they come here with dogteam and check their fishing hooks. They don't worry about camp. They worry about what they are going to get, about the fur. In those days there's no pension, no family allowance, nothing. So this [tataà] is just like 'money in the bank'. Right here is a good place because the caribou go by here. The caribou are using it a lot because this is where the tataà is.*
>
> Joseph Judas, August 14th 2013.

Conditions of Vegetation

The elders observed some dust on the lichen and vegetation at this location. The caribou forage at this location is not the same quality as it used to be.

Other

A white wolf was spotted on the north side of the tataà.

NS 23

AUGUST 14TH 2013

10:00 AM

Description of Sample Location

The sample site is on a narrow peninsula extending from the south side into Lac de Sauvage. The peninsula almost extends to the north side of the lake, leaving a Naaɔòo k'è that caribou have to swim across. The area is flat, covered with lichen and moss and some rocky areas. The western tip of the peninsula is covered with large rocks.

Explanation for Choosing New Sample Location

The location is an important caribou migration route. During fall migration, caribou use this peninsula to cross Lac de Sauvage. The elders requested to examine this location because its importance as a migration route and forage area. Joseph Judas explained the use of this new sample location.

> *We stopped at that other tataà (sample site NS22) because we know that is the tataà that caribou are crossing all the time. Same thing over here too. [Caribou] cross here, always coming from the north, or else coming from the south going to the north.*
>
> Joseph Judas, August 14th 2013.

Details of Caribou Use of Location

- **Migration and Use of Area**

The Tłı̨chǫ term for a caribou water crossing, Naaɔòo k'è, describe caribou use at this location. The caribou swim the short distance from the northern shoreline of Lac de Sauvage to the peninsula. The location is an important Naaɔòo k'è during fall migration Several caribou trails were observed on the peninsula. No fresh tracks or other signs of caribou were observed.

The caribou always protect their feet and legs. As they travel across this Naaɔòo k'è, the animals avoid the southern tip of the peninsula because of the rocky area. Instead, they prefer to walk on the northern side, which is covered with vegetation. This is evident by the multiple caribou trails leading into the water on the northern side of the peninsula.

> *The caribou have really strong legs, some of them have really strong legs, you know. But if they see rocky area like that they will not go. But instead they go right here where there are no rocks, see there's a place right there? That's where they go.*
>
> *Some go there on the grass and go right here. They don't go on the rocks. Well, you know the caribou. Even me, I wouldn't go there. The caribou are just the same.*
>
> Albert Boucher, August 14th 2013.

The elders explain that this Naaɔòo k'è was an important crossing before the establishment of the mines. The activities at the mine and the possible accumulation of dust on caribou forage, the herds choose to use this area less.

- **Forage**

The caribou forage at this location at the same time they use the Naaɔòo k'è. As caribou travel across this Naaɔòo k'è they move in the common way by walking, eating, walking, and eating. The elders explained that caribou eat everywhere all the time. They combine their diet by eating lichen, sedges, bog birch and other plants at the same time.

> *The [caribou] eat lots, they eat anywhere. They eat as soon as they see food they eat. They are always hungry. For them there's pie, strawberries, green tea. All kinds of food everywhere, there's mushroom soup...(laughter).*
>
> Joseph Judas, August 14th 2013.

Conditions of Vegetation

No dust was observed on the lichen and vegetation. The elders said that the wind most likely brings dust from all the mines in the area (Diavik, Misery pit and Ekati) to this location.

FS 5

AUGUST 14TH 2013

11:00 AM

Description of Sample Location

The terrain is flat ground with small hills around. The site is situated by a small lake on the east side of a long esker. Large boulders are scattered around the site

Details of Caribou Use of Location

Migration and Use of Area

The location is close to an esker extending in an east-west direction. The caribou follows this esker as they migrate through the area. The location contains several large boulders. The caribou do not mind the large boulder and walk through the area while foraging.

Forage

The location is a high-quality forage area for caribou. The ground is covered with lichen and sedges that caribou prefer. The caribou forage is in good condition at this location.

> *At this time of the year the caribou like this kind of food. They like it and walk among it. Their food looks good, that is why the caribou love it at this time of the year. When we used to go to the barrenlands by boat, we used to kill caribou only among this kind of caribou food.*
>
> Harry Apples, August 13th 2013.

Conditions of Vegetation

The elders observed no dust on lichen and vegetation. The vegetation is in good condition.

Other
Several rabbit bones were found at this location. Jack rabbits live in the rocky area by the lake.

FS 8

AUGUST 14TH 2013

11:45 AM

Description of Sample Location
The location is on a tataà between two large lakes on north and south side. The vegetation consists mainly of lichen and bog birch. The terrain is flat and sloping gradually from a hill to the south and a lake to the north.

Details of Caribou Use of Location

- **Migration and Use of Area**

The location is on a caribou migration route. Caribou migrate to this area in a southeastern direction from Ek'atì. The migration route follows the tataà between the large lake on both the north and south side. Several caribou trails, in a northwest to southeast direction, were observed throughout the area around the sample location. The caribou like the flat terrain at this location as they can see predators from a distance. The herds have used this area extensively as most of the lichen and sedges have been eaten. On warm days the caribou prefer go to the hill in the centre of the tataà, to cool off in the wind and to avoid flies. The elders observed caribou tracks and scat, about a month old (July).

Forage
The location contains a variety of caribou forage: lichen, sedges and bog birch. The forage is in good condition. This tataà is a good forage area and the elders observed that the herds have used this area extensively as most of the caribou forage has been eaten. The caribou prefer the flat terrain on this tata. At this location, predators can be noticed from a distance and there is no disturbance from the mine. The caribou prefer this terrain to rest and forage.

Conditions of Vegetation
No dust was observed on the lichen and vegetation. The caribou forage is in good condition at this location.

FS 23

AUGUST 14TH 2013

1:30 PM

Description of Sample Location
The sample location is on the south side of the tataà, between two large lakes. The site is on the caribou migration route in a southeast direction from Ek'atì. Sample sites FS 8 and FS 23 are on the

same tataà. The location is on the south side of a hill facing the lake to the south. The ground is sandy with some lichen cover.

Details of Caribou Use of Location

- **Forage and Use of Area**

Fresh tracks (from same day) of one bull were observed in the sand. The bull had been resting in the sand on the high-ground by the sample site. Caribou like to stay at this location because the elevation gives them overview of the surrounding area. Caribou will lie down on the high ground at this location to forage and rest while they can easily spot predators. Additionally, the wind from the lake keeps flies away. On warm days, caribou prefer the top of the hill of the tataà where the wind reduces the temperature and reduces the flies.

The caribou travel across this tataà, by the sample location, in a southeast direction from Ek'atì. As the herds migrate through, the location is mainly used for eating and resting.

> *[Caribou] sleep on top of the hill, that's what they are doing. Sometimes when it's really warm and windy they sleep on top of the hill. That's what he is doing all this way, eating, traveling, eating, traveling.*
>
> Albert Boucher, August 13th 2013.

Conditions of Vegetation

No dust was observed on the lichen and vegetation. The vegetation is in a good condition.

FS 13

AUGUST 14TH 2013

3:00 PM

Description of Sample Location

The terrain is flat, overlooking the river between Ek'atì and Whaticho towards Ewaànit'iitì. The location is on high ground sloping down to the river to the west. The ground is covered with lichen and bog birch.

Details of Caribou Use of Location

Forage and Use of Area

The location is valuable forage area for caribou. The area is on the fall migration route from Ek'atì to Ewaànit'iiti. Caribou prefer the open and flat terrain at this site, however the herds do not travel through this location as prior to the construction of the mine. The elders noticed that the caribou forage is in good condition, but the herds do not travel through the location to the same extent as they used to. Occasionally, caribou will travel through the area. No caribou trails were found and no fresh tracks were seen.

Conditions of Vegetation

The elders observed no dust on the lichen and vegetation. The caribou forage is in intact and healthy.

Other
Wolf tracks were seen in the mud.

FS 14

AUGUST 14TH 2013

3:30 PM

Description of Sample Location
The sample site is on the southwest side of Ek'atì. The location is by a small lake. The flat ground is covered with lichen and bog birch.

Details of Caribou Use of Location

- **Migration and Use of Area**

The location is on the caribou migration route. Caribou trails go through the location. However, the caribou herds do not use this location for migration and forage to the same extent as prior to the construction of the mine. No fresh tracks were seen and the elders noticed that caribou has not foraged or travelled through this area for a long time. The location is on the fall migration route in a southwest direction from Ek'atì towards Ewaànit'iitì, Ezoti and towards Be?aitì. Joseph Judas explained the migration pattern passed this location.

> *The caribou go along the west side of Ek'atì and down towards Ewaànit'iiti. Sometimes caribou goes south to the tree line then go back up a little bit and then to ɔezǫtì [Jolly Lake] pass Be?aitì [Winter Lake], Little Marten Lake, all the way to Gots'ǫkàtì (Mesa Lake) and around Parent Lake. Then they go back the same way until it starts to get cold and until they hit the tree line. That's how they travel.*
>
> Joseph Judas, August 14th 2013.

- **Forage**

The location is good caribou forage area because of the high-quality forage and the open and flat terrain, as caribou prefer. However, the caribou do not use and forage in this area as prior to the construction of the mine.

> *The ground is better here than closer to the mine, because they are always blasting there. They work 24 hours there, so there's always dust around from the blasting they do. It is steady and the dust flies around especially when it is windy.*
>
> *But over in here is no dust. The problem is how come the caribou is not using this area as much as before? They must know that there is a mine there so they go around somewhere else.*
>
> Joseph Judas, August 14th 2013.

Conditions of Vegetation
The elders observed not dust on the lichen and vegetation. The vegetation is in intact.

FS 19

AUGUST 14TH 2013

4:00 PM

Description of Sample Location

The location is on the southwest side of Ek'atì. The sample site is on an esker in northwest direction towards small lake on northwest side.

Details of Caribou Use of Location

- **Migration and Use of Area**

Caribou prefer to stay on top of esker, as the wind keeps the flies away. The caribou use the esker as travel route and walk down from the esker to forage on lichen and other vegetation in the low-lying areas. Fresh tracks (two days old) were seen in the sand on the esker. The area used to be on the fall migration route and several caribou trails cross through the location. The abandoned exploration camp, located north of the sample site across a small lake, disturbs the caribou and they choose not to use this area as before. Also, the herds do not migrate and forage at this location as before the construction of the mine. A few smaller herds might travel through the area, but not to the same extent as earlier.

The site is on the fall migration route in a southwest direction from Ek'atì towards Ewaànit'iitì, Ezoti and towards Be?aitì. The caribou do not use and travel through this area, to the same extent as prior to the construction of the mine.

- **Forage**

The location is used for eating, resting and sleeping while caribou travel through the area. The forage is in good condition.

Conditions of Vegetation

No observable dust on the lichen and vegetation. The vegetation is intact.

FS 15

AUGUST 14TH 2013

4:45 PM

Description of Sample Location

The sample site is on the southern shoreline of Ek'atì. The terrain around the site is flat and covered with lichen and rocks. The site is located on the west side of a tataà between southern shoreline of Ek'atì and a small lake.

Details of Caribou Use of Location

- **Migration and Use of Area**

The location is on the west side of a tataà between Ek'atì and a small lake on the south side. The exploration camp on the east side of the tataà disturbs the caribou and prevents them from foraging and using the tataà as they normally do. The exploration camp is currently abandoned and a few animals will most likely travel by.

The location is on the fall migration route in a southwest direction from Ek'atì towards Ewaànit'iitì, Ezoti and towards Be?aitì. The caribou used to travel through and forage at this site. However, after the construction of the mine the caribou do not use this area to the same extent.

- **Forage**

The area is preferable feeding grounds for caribou. Caribou like to feed in flat areas where they can easily spot predators. The area consists of high-quality lichen.

Conditions of Vegetation

No dust was observed on the lichen and vegetation at this location. The vegetation is in good condition.

Photo 3: Albert Boucher examining vegetation by sample site FS 25. Nǫdìikahtì in the background, August 14th 2013.

7.0 COMPARISON OF NEAR-SITE AND FAR-SITE SAMPLE LOCATION

7.1 NEAR-SITE SAMPLE LOCATION

The near-site sample locations (NS 1 - NS 12 - NS 9 - NS 15 - NS 14) are on the migration routes of the caribou, crossing from the northwest side of Ek'atì to the mainland on southwest side of Ek'atì. Sample site NS 20 is not high-use area. The near-site sample locations were considered high-quality forage areas for caribou before construction of the mine. Currently, the conditions of lichen and caribou forage at the near-site sample locations are poor. The elders repeatedly emphasized the concepts Dè ɔǫ̀goèhshì, 'caribou has thrown this land away', and Ekwǫ̀ yeka at'ı̨-le adzà, 'caribou do not walk on this land anymore', during the discussion of the near-site sample locations.

The areas around the sample sites are no longer preferable use and forage are for caribou during summer and fall because (1) the lichen shows visible sign of dust which impacts its quality, and (2) the close proximity to noise, activities and infrastructure at the mine site. The lack of signs of caribou usage demonstrates that these locations are no longer used by caribou. The caribou might travel by the mine site and across Ek'atì during winter and spring when the herds can travel on the ice and are not compelled to follow their trails on land.

Before the construction of the mine, the chain of islands from the north side to the southeast side of Ek'atì used to be one of the main migration routes for the Bathurst caribou herd during fall migration. Today, the herds have decreased their use of this migration route because of poor lichen quality. Caribou will avoid lichen that taste or smell different. From the elders' perspective, the caribou cannot use the chain of islands as their migration route due to the 'wall' the mine site has created at Ek'adì. The caribou do not want to be close to the mine site because of the disturbance from noise and infrastructure. Thus, the herds will avoid areas where they know the forage is in poor condition. The caribou herds prefer to travel to other areas, both east and west of Ek'atì, which has more suitable forage areas and less or no development.

> *Lots of caribou trails here [north side of Nǫdìikahtì] compared to around mine site, were there are no trails around the mine, only old trails.*
>
> Albert Boucher, August 13th 2013.

7.2 FAR-SITE SAMPLE LOCATIONS

The conditions of lichen and vegetation at the far-site sample locations are overall intact. The sites located in proximity to Nodiakti (FS 25 - FS11 - FS 10 - FS 24 - FS9) are on caribou migration routes and are considered important forage areas. These sites, except FS 21, are all preferable areas for forage. FS 21 is not preferable due to the high vegetation. The lichen and vegetation are considered to be good caribou forage.

The lichen and vegetation at the far-site sample location (FS 5 - FS 8 - FS 23) are intact. The sites FS 8 and FS 23 are frequently used by caribou. These sites are preferable forage areas because of the flat and open terrain where predators can easily be seen and the abundance of high-quality forage. The sites are on a tataà, thus caribou will regularly use these locations.

The lichen and vegetation at the far-site sample locations on the southwest side of Ek'atì (FS 13 - FS 14 - FS 19 – FS 15) are in good conditions. However, these sites showed few signs of caribou usage. The elders emphasized that the conditions of caribou forage are fine but that caribou chose to alter their migration routes due to the mining activities. Thus, caribou do not migrate and forage at these sites to the same extent as was common prior to the construction of the mine. Joseph Judas explained his assessment of sample site FS 14:

> *The ground is better here (FS 14) than closer to the mine, because they are always blasting there. They work 24 hours there, so there's always dust around from the blasting they do. It is steady and the dust flies around especially when it is windy.*
>
> *But over here (FS 14) there is no dust. The problem is how come the caribou is not using this area as much as before? They must know that there is a mine there so they go around somewhere else.*
>
> Joseph Judas, August 14th 2013.

The elders used the concept Ekwǫ̀ wını̨ łłè zǫ lanì, and stated that caribou has 'one mind'. The caribou are smart and know the conditions on the land. Thus, the herds chose to go to the more preferred areas and avoid others. Since caribou know that their forage is in poor conditions around the mine, their migration routes has changed which in turn has altered their use of the areas around sample sites, FS 13 - FS 14 - FS 19 and FS 15.

7.3 Summary of Comparison

A common concern among the elders involves the potential consequences of the deteriorated forage areas around near-site sample locations. One of the consequences is altered migration routes. The caribou know their feeding grounds are of poor quality close to the mine and as such the herds choose to travel to other areas with increased forage quality. Consequently, as caribou decrease their use of the migration route through Ek'atì, the use of the far-site sample location and the migration to these locations have been altered.

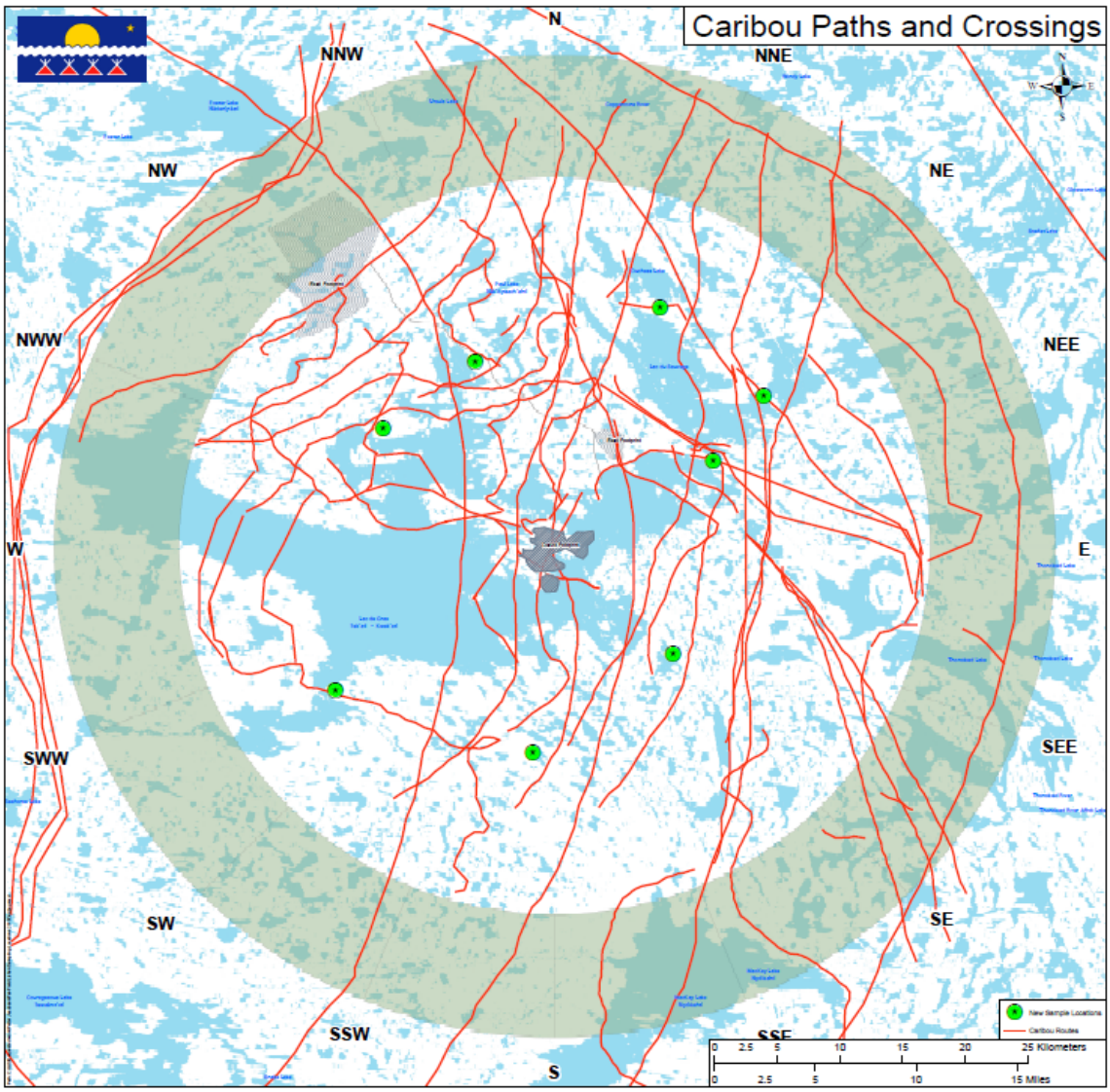
> *You see, around the mine site, I went there yesterday, walked around and I didn't see, not really any trails around there, not since a long time ago. That's why now [caribou] are way out from the mine, about thirty kilometers away from the mine. Then we see lots of trails, lots of trails. I think the mines make too much noise, so [caribou] go out a little ways. [Caribou] make a new trail a little ways out from the mine. Looks like he made a new trail*.
>
> Albert Boucher, Nǫdìikahtì, August 13th 2013.

One of the main reasons for caribou migration is forage. Elder Joseph Judas said, "it's simple. The caribou don't have jobs or houses to take care of, all they worry about is finding food" (October 21st 2013, Yellowknife). The caribou are always searching for areas with high-quality forage. But their movement is constrained by the large lakes on their migration route. The Tłı̨chǫ concepts of tataà and Naaɔòo k'è are useful to understand caribou migration. By understanding the specific movement between the numerous lakes, Dene elders know how the caribou move across the landscape.

The main caribou migration routes through the study area (Map 3) show that the migration routes through Ek'adì and the tataà, between Ek'atì and Lac de Sauvage, are central routes to reach the forage areas south, southeast and southwest of Ek'atì. When these crossings are avoided, the caribou need to use other migration routes and use different tata to travel to areas with better forage. The far-site sample locations, 30-40 kilometers away from the mine, contain intact vegetation and are preferred forage areas. But the use of the far-site sample locations, located southeast, south and southwest of Ek'atì, is dependent on the use of the areas around Ek'adì. Since migration through Ek'adì is avoided, caribou will migrate either east of Lac de Sauvage or west of Ek'atì, towards Desteffany Lake and thus alter the use of the far-site sample locations. Furthermore, the avoidance of these crossings ultimately affects the caribou migration to areas further away from Ek'atì towards the tree line.

Photo 4: Rita Wetrade interviewing Harry Apples by sample site FS 5. August 14th 2013.

Map 3: Bathurst Caribou Migration Routes and Proposed Sample Locations



8.0 ASSESSMENT OF SAMPLE LOCATIONS

A central item of discussion among the elders during the research project was the reasoning behind the pre-determined near-field and far-field sample locations. At the start of the field work, the elders did not agree with collecting lichen and soil samples directly around the mine site as the caribou will not use or forage at those locations anymore. Instead, it was recommended that research should be conducted at high-use caribou locations because of the value of studying the amount of metals and dust at import forage areas. Efforts of cross-cultural communication between the traditional knowledge research team and the scientist research team were made to learn each other's knowledge systems, but with limited success during the short time of the field work.

The elders categorized the current sample locations (Table 1) into two categories; Not High Use Area, and High Use Area. The Category 1 identifies the sites not located on migration routes or on valuable forage areas. The Category 2 identifies the sample sites located on migration routes and forage areas. A detailed assessment of each sample site, and its location on migration routes and forage areas is described in section 6.0 Research Results.

Table 2: SAMPLE SITES IN RELATION TO CARIBOU USE AREAS

Category 1: Not High Use Area	Category 2: High Use Area	New Sites on High Use Area
FS5	FS 25	FS 25
FS 21	FS 11	NS 21
FS 13	FS 10	NS 22
FS 14	FS 24	NS 23
FS 19	FS 9	
FS 15	FS 23	
	FS 8	

8.1 REASONS FOR LOCATION OF NEW SAMPLE SITES

To improve the lichen and soil sampling study, the elders recommended conducting samples at high-use areas for caribou. The new sites sampled during the fieldwork (NS 25 – NS 21 – NS 22 – NS 23) were chosen due to its location on high-use areas, specifically on caribou migration routes and forage areas. This section outlines the specific details for conducting samples at the selected sites.

FS 25

Reasons for choosing this sample site:

- During fall migration, the easternmost point of Nǫdìikahtì is an important water crossing. The herds migrate both east and west across the water crossing.
- High-quality forage area.
- The site is on an esker the caribou follow on their east and westward migration through this area.

- The elders were interested in examining if dust potentially was brought with the northwest wind from Diavik to this migration and forage area for caribou.

NS 21

Reasons for choosing this sample site:

- Important location on the fall migration route.
  - The site is located on a long stretch of land, in a north-south direction, between numerous lakes on both east and west side that the herds follow. The caribou follow this stretch of land after migrating by Ek'atì.
  - The site is located in front of a tataà between two large lakes, on the southwest side of the sample location.
- Significant forage area.
  - The site contains mainly muskeg, with lichen and sedges. Caribou have a preference to lie down and rest while foraging in the muskeg.

NS 22

Reasons for choosing this sample site:

- Significant location during fall caribou migration.
- The location is on the main tataà between Ek'atì and Lac de Sauvage. During fall migration, caribou migrate through the Ek'atì area at two main locations: (1) through Ek'adì and the islands in the centre of Ek'atì, and (2) the tataà between Ek'atì and Lac de Sauvage. Joseph Judas explained the importance of this location.

> *The tataà, the caribou are using this. From the north, caribou come this way. Going through where the land connects with each other. Huge caribou herds come through right here. If [caribou] are coming from the north going south, this is where they go. Some [caribou] cross the lake, some doesn't cross the lake, they go through this tataà. Here they go across the creek, in the river there. There is a shallow place where they can cross. This is a good spot that the animals used a lot because of good food. But now there is a mine close by so I guess the dust flies everywhere..*
>
> Joseph Judas, August 14th 2013

NS 23

Reasons for choosing this sample site:

- Location is on an important caribou migration route.
- During fall migration, this Naaɔòo k'è, water crossing, is one of the main caribou crossing at Lac de Sauvage.
- The locations is an important forage area.

8.2 Recommendations for Additional Sample Sites

The elders emphasized inclusion of additional sample sites on specific high-use caribou locations. The elders located additional new sites (map 2) on tataà and migration routes that caribou are compelled to use as they travel through the study area. The sites are important forage areas. After completing the assessment of near-site and the far-site sample locations the elders recommended sampling at important high-use areas in between the near and far-sites as a means to examine the conditions of caribou forage at this distance from the mine.

Sample site NS 21 is an interesting case because of its location in between the near-site and far-site. The location is a high use area for caribou, in terms of migration and forage. The elders are not sure that caribou still use this area as much, because the possibility of deteriorated forage conditions and also because the caribou have reduced the use of their migration route passed Ek'adì leading to this site. Similarly, sample site NS 23 is located in between the near-site and far-site sample locations. The location is a high-use area for caribou because of migration and forage, but the elders do not assume caribou will use this location to the same extent as before due to the possibility of deteriorated forage condition. An examination of lichen at this location, and other selected locations at similar distance from the mine, will determine if the conditions of lichen are affected at this distance from the mine.

9.0 CONCLUSION

The condition of lichen at the near-field sample locations were in poor condition compared to the condition of lichen at the far-site sample locations. Caribou will avoid foraging around the near-site sample locations. The lichen at the far-site sample locations was in normal condition and caribou prefer to forage at these locations. The area around Ek'atì and especially Ek'adì was important caribou migration routes. As the conditions of lichen in close proximity to the mine has started to deteriorate, caribou notice a difference in the quality of lichen (by taste and smell) and prefer to travel away from the mine to better forage areas.

The lichen and vegetation at the far-site sample locations are in normal and intact conditions. At most of the far-site sample locations, caribou use and forage as normal, but the migration routes to these areas has become altered as caribou avoid the area around Ek'atì. The elders are concerned about the consequences this will have for caribou migration to and use of the areas around the far-site sample location. Furthermore, the elders are concerned of the implications for caribou migrations to areas further away from Ek'atì towards the treeline.

The elders have emphasized the need to improve the sampling program by conducting tests at high-use caribou locations, especially at important tataà and forage areas. Their request for improvement of the program stems from the elders' desire to understand why they observe increasing amounts of caribou that are no longer healthy and why caribou do not follow their normal migration routes.

The Traditional Knowledge study was collaboration between Diavik and the Tłįchǫ Research and Training Institute. The collaboration during the fieldwork was an exercise between the strengths and limitations of western science and traditional knowledge. A successful collaborative project needs to realize one limitation and combine the strengths of one's knowledge. For this project, the value of traditional spoke to caribou behavior, habitat preferences, the details of caribou migration and caribou's relation to development. While the value of western science involved the detailed knowledge of vegetation and ability to distinguish the combination of metal in the dust accumulated on lichen. Both types of knowledge has its own specializations. During the fieldwork, each specialized type of knowledge came to its particular use. Elders selected the best caribou use area and assessed the site for caribou usage, while the biologists conducted the soil and lichen samples at the location the elders pointed out. The elders were satisfied with their involvement in all aspects of the research process, from sharing their detailed traditional knowledge of caribou and the land, to conducting assessment of the conditions at the sample sites, and actually picking the lichen which will be analyzed for dust and metals.

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