

“We Watch Everything”

A Methodology for Boots on the Ground Caribou Monitoring



Tłıchọ Traditional Knowledge and Land Use Study



Dedats'eetsaa:
Tłıchọ Research & Training Institute
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Tłjchq Yatì

Placenames

Kokètì	Contwoyto Lake
Deèzàatì	Point Lake
Ek'ati	Lac de Gras
Ek'adii	Island on Lac de Gras
Ewaànit'ı̀tì	Courageous Lake
Nq̀diikahtì	Mackay Lake
Ets'àiłì	Rawalpindi Lake
łiwets'ą̀òats'ahtì	Lac de Sauvage

Geography

Nq̀okè	Water crossing
Tataa	Land between water bodies
Whatàa	Esker
Hozì shìa	Low hill/ mountain on barrenland
Daka	Elevation points
Tì	Lake/water
Dı	Island
Tabàa	Lake shore
Tı k'abàa	Shoreline (walking by the shoreline)
Nàłeèzheà	Caribou calving grounds
Dechłaa	Treeline

Animals

Ekwò	Caribou
Dìga	Wolf
Sah dek'oo	Grizzly bear
Hozì edzie	Muskox
Didi	Ground Squirrel

1. Introduction

Faced with challenges from the decline of the Bathurst caribou herd and a self-imposed ban on caribou hunting in 2015, the Tłıchq Government initiated Boots on the Ground (the program) to collect critical field knowledge of the Bathurst caribou herd and its habitat. The objectives for the pilot year included setting up a long term traditional knowledge monitoring program for the Bathurst caribou and monitor the conditions of Bathurst herd’s summer range by focusing on indicators: (1) caribou habitat and environment, (2) caribou, (3) predators, and (4) industrial disturbance. This program’s approach to caribou monitoring is based on the principle that local people who live on the land and rely on caribou for their daily subsistence are the people in the best position to know the current conditions of caribou and of the land. The program is based on the traditional knowledge (TK) of harvesters, and while utilizing interdisciplinary research techniques, it relies on the traditional ways of traveling, interacting with, and assessing the conditions of the land.

This document provides the context and background of the program, and specifically:

- The TK framework of “We Watch Everything”, a holistic monitoring approach combining the biological and the cultural;
- The field-based methodology named “Do as Hunters Do;” based on a Participatory Action Research (PAR) approach; and,
- The details involved in recording knowledge in the field, including details of the participatory approach.

The project presented here is a work in progress based upon the observations and the learnings gathered from the pilot year of the program, conducted in 2016. As new knowledge and experiences accumulate, further development of the program and of this document are expected. The program is a collaboration between the Tłıchq Government, Government of Northwest Territories - Environment and Natural Resources (GNWT-ENR), the Wek’èezhii Renewable Resource Board (WRRB) and Dominion Diamond Ekati Corporation (DDEC). Funding was provided by the GNWT-Cumulative Impact Monitoring Program¹ (CIMP) and DDEC.

1.2 Program Development

Over the past six years the Tłıchq Government has conducted the CIMP-funded Traditional Knowledge (TK) research project, Tłıchq Ekwo Nàowo (Tłıchq Knowledge of Caribou). The research enlisted the traditional knowledge of Tłıchq harvesters (men, women and elders) in Wekweètì; as they followed the herd during their seasonal harvest, they observed and recorded cumulative impacts of natural and

¹ This article is Project CIMP94 of the Government of the Northwest Territories Department of Environment and Natural Resources, Northwest Territories Cumulative Impact Monitoring Program. CIMP coordinates, conducts and funds the collection, analysis and reporting of information related to environmental conditions in the NWT. More info can be found at: <http://www.enr.gov.nt.ca/en/services/cumulative-impact-monitoring-program-nwt-cimp>

anthropogenic factors on the Bathurst caribou. However, in 2015, the Tłı̄ch̄q Government chose to discontinue the Bathurst caribou harvest due to low population numbers. Tłı̄ch̄q caribou research projects cannot, therefore, continue to focus on the first-hand knowledge of hunters. However, the Tłı̄ch̄q do not want to discontinue interaction between their people and the herd. Therefore, we (the Tłı̄ch̄q Research and Training Institute) evolved the Tłı̄ch̄q Ekwo Nàowo project to establish a new caribou monitoring program.

Prior to beginning our first year of field work we attempted to develop a structured research plan by engaging with GNWT-ENR biologists, DDEC and WRRB. During successive meetings, many good ideas were presented. As planning continued it became apparent that a less structured approach would be more suitable for the first pilot season due to the extensive timelines and preparations required to incorporate suggestions from multiple stakeholders with different perspectives, as well as uncertainties in regards to the program’s feasibility and limitations. A simple, flexible approach allowed us to get the program started within timelines and budgets and refine the methodology, while on the land, and using the lessons accumulated during the first year of fieldwork. Important motivations behind the decision to make the pilot year less structured were to examine the mobility of field research teams, and the practical limitations and possibilities of following and monitoring herds of caribou by boat and on foot. Using the lessons learned, we adapted our research framework to best elicit, collect and analyze the knowledge gathered from elders and harvesters.

The program’s fieldwork was conducted from July 5th to August 2nd 2016. Timeline and study area were determined using Bathurst caribou GPS-collar data collected every four days by ENR biologists, as well as Tłı̄ch̄q and Inuit knowledge of the local area. For the pilot season, we did not have funding for the daily use of a helicopter or floatplanes. We therefore decided to establish base camps on K̄qketi (Contwoyto Lake) for the entire period (map 1), and with our available funding, we bought hiking boots for the 8-person team and rented a boat and outboard engine from the local Inuit family who lives on Kokèti. The first camp was established in an inlet on the northeast shore of Kokèti, in Nunavut territory. After a week, the camp was moved near the water crossing between Kokèti (Contwoyto Lake) and Fry Inlet, in the Northwest Territories, where it stayed for the remaining three weeks (map 2). Two teams, each composed of four persons, spent 14 days at a camp, travelling the landscape and following caribou movements.

Using the elder’s knowledge of the land as well as the latest available ENR radio-collar data, a collective decision was made on a daily monitoring plan for specific areas. Such method allowed the elders and the team to make collective decisions based upon indigenous cultural approaches of travel on the land, as well as the latest scientific data and observations.

The elders and local harvesters provided guidance to the decision-making process using their knowledge of caribou behavior and of the area throughout the day. After following their lead, it was apparent that the elders’ way of travelling was based upon detailed knowledge of caribou movement and behavior, as well as factors such as topography and diverse weather. Since radio-collar data was not available for each day and is limited to a small number of individual cow and bull caribou, the daily selection of a place to travel within a vast landscape involved a considerable amount of guesswork and knowledge of local conditions and terrain—well beyond the information that a map can provide. We found a strong

correlation between the harvesters’ predictions of caribou movement on the land and caribou movement maps provided by ENR.

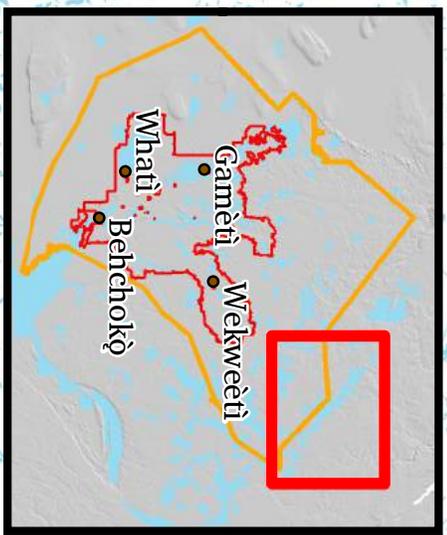
This correlation—as well as other observations provided by the elders—reinforced our research method based upon the elders’ knowledge and culture. “We watch everything” is an expression of the elders’ ways of travelling and observing the natural interaction of different ecosystem components at play, drawing conclusions about where groups of caribou are and what they will do based upon their intimate understanding of caribou behavior. The holistic nature of the elders’ knowledge, correlated with science, provides a framework for an environmental monitoring methodology that aim to be inclusive and interdisciplinary. Over the next years, we plan to run the monitoring program for four to six weeks in the Bathurst herd’s summer and fall ranges. Using a boat, the teams will be able to travel along Contwoyto Lake to access areas closest to predicted caribou locations. On land, the monitors will follow the caribou on foot, hiking an estimated 5-15 km a day, and return to camp in the evening. When the herds move, the teams will use the vast expanse of Contwoyto Lake as a ‘road’, and move camp to a new location where they can access caribou. By using a boat on the large lake, the research team are able to access areas further north into Nunavut, or the southern parts of the lake in Northwest Territories. The large lake consists of numerous Nᓱᓱᓱᓱ (water crossings) and tataa (land bridges) across which caribou are known to migrate. Using local Inuit and Tłı̨chǫ knowledge, as well as collar data from ENR, we are able to know where and when to intercept the moving herds.

1.3 Dedats’eetsaa: Tłı̨chǫ Research and Training Institute

This project was conducted by the Dedats’eetsaa: Tłı̨chǫ Research and Training Institute (TRTI). The Institute intends to bring together academic, government, non-governmental organizations (NGOs), and corporate and local Tłı̨chǫ organizations to collaborate on research in social, cultural, environmental, health, and wellness concerns for the Tłı̨chǫ. The mandate of TRTI is to advance the study of Tłı̨chǫ 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 Tłı̨chǫ researchers; developing and using indigenous research design and appropriate community methodologies; publishing work in a variety of media including online at www.tlicho.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 projects while promoting collaboration with academic and corporate partners.

Caribou Monitoring Area



Kokèti (Contwoyto Lake)

Fiy Inlet

Nunavut

Northwest Territories

- Study Area
- Mek'èezhii Boundary
- Tìchq Boundary



1.4 Tłıchq

The traditional territory of the Tłıchq is vast, and the network of hunting trails extends far into every corner of their lands. The four Tłıchq communities of Behchokò, Whatì, Gametì and Wekweètì are located in the boreal forest, and our land stretches far north of the tree line into the tundra where many of their hunting grounds for caribou are located. The traditional land use areas of the Tłıchq lie within the boundary known as “*Mqwhì Gogha Dè Njıttèè*” of which was outlined by Chief Mqwhì during the negotiations of Treaty 11 in 1921 (Helm 1994). The traditional land consists of the area between Great Slave Lake and Great Bear Lake, from the Horn Plateau in the southwest, and as far north as the Coppermine River and Contwoyto Lake.

On August 4, 2005, the Tłıchq Agreement—the first land, resource, and self-government agreement in the N.W.T.—came into effect. This Agreement was signed by the Tłıchq, the Government of Canada, and the 39,000 km² of Tłıchq lands, wildlife, and resources. The Tłıchq Agreement not only created the Tłıchq Government, but also set its mandate to preserve, protect and promote Aboriginal and Treaty rights and way of life—including culture, language, heritage, lands, economy and resources—for all Tłıchq today and for future generations to come.

The significance of the Agreement is that the Tłıchq people have ownership of 39,000 km² of land surrounding the four Tłıchq communities, including surface and subsurface rights. The Agreement guarantees participation in the Wek’èezhìi Renewable Resource Board and the Wek’èezhìi Land and Water Board, the co-management boards governing the resources within Tłıchq traditional lands. The Tłıchq have their own lawmaking power over all Tłıchq citizens, including aspects of education, child and family services, income support, social housing, and other services.

2. Traditional Knowledge Framework

The program is an applied interdisciplinary research project that bridges the biological and the cultural, as such we need to identify the context within which we work and engage with the realities within that context. We adopt a biocultural approach to emphasize the Tłıchq as well as Inuit knowledge of the ecosystem they live in. Biocultural approaches are based upon the emerging recognition that biodiversity comprises both biological and cultural diversity. Conventional research on biodiversity has often overlooked the link between the loss of species and the loss of traditional societal structures adapted to life on the land, in favor of targeted conservation approaches. Nowadays, a growing body of evidence correlates that global decreases in biodiversity are expressed in both biological and cultural terms. Furthermore, that indigenous knowledge of ecological systems plays a key role in understanding reductions in animal abundance and distribution (Pretty et al, 2009; Rapport and Maffi, 2010).

In the context of this research program, indigenous knowledge is employed to monitor the status of Bathurst caribou and the environment. Since monitoring of the environment is inherently based on the process of information classification and documentation, key approaches of the program are to let indigenous language and cultural practices preside in the monitoring. When classifications are based on environmental taxonomy and the English vocabulary, outcomes are inevitably expressed in Euro-Canadian

models and viewpoints. Originating from centuries of life on the land, Tł̨ch̨q and Inuit words and practices offer a broader understanding and classification of local ecological connections, based on the depth of time living within the local ecosystems.

Words and concepts within one’s language set the mental maps which enable meaning and understanding to take place within the human brain. The cultural interpretation of the word “nature” therefore means that it is one’s culture that gives meaning and form to one’s surroundings. The underlying notion is that “nature is culturally constructed” (Ingold 2000:41). Thus, as knowledge of nature is culturally situated, humans experience the world indirectly through one’s cultural interpretation. Using this notion, the idea that universal truths of nature exists are avoided in favour of viewpoints based on specific cultures. Within different cultures and languages, a process in a physical environment may have quite different meanings. Furthermore, their response towards these processes might also be quite different depending on the pre-existing ideas and values within one’s culture. Thus, the ideas and beliefs one holds of the environment, then, direct one’s possible actions towards it (Ingold 2000; Sharp and Sharp 2015).

Developing a traditional knowledge environmental monitoring framework, depends on recognizing and adapting the values and ideas within the indigenous ontology as foundation for the processes of classification and documentation. Using key concepts within Tł̨ch̨q language, we strive to avoid using a conventional scientific classification of nature and rely instead on Tł̨ch̨q interpretation of local ecological connections. We use the word ‘strive’ because as proven during the pilot year’s field study, interpreting Tł̨ch̨q and bringing its wealth of equivalents into English is often challenging as words and cultural connotations related to nature often do not have direct parallels in English. Linguists and field anthropologist widely recognize that words related to specific historical and cultural experiences and concepts do not directly translate from one culture to the other.

An example of diverse interpretation is an entry from a field journal recorded on July 19th, 2016. After observing three muskoxen for over an hour, both the Tł̨ch̨q elder and Inuit harvester came to the agreement that they were “friends”. When the researcher enquired as to the curious use of the word, the elder Moise Rabesca explained that their behaviour, posture, and the way they related to each other indicated a long-term association. The muskoxen “grew together,” and now they were inseparable. From an ecologist’s point of view, it would be easy to discount such a description as imaginary, because not based on observable facts. Yet, such a notion would fail to understand the depth of the hunter’s empirical knowledge about muskoxen. The elder understood the association between muskoxen intimately because “if you kill one, the others will not let you go near the body. So, if you only need one you’ll need to take the other two” (Moise Rabesca). The knowledge of muskoxen behavior was not born out of curiosity or the lack of communication skills in English, but out of a survival need accumulated during numerous hunts, and passed over from generation to generation across centuries of life on the land. This form of knowledge allowed the hunters to thrive in the arctic landscape. The statement also evokes times before the advent of firearms, and the ease in which hunters can now take the life of animals, when in the past each caribou or muskox had to be killed at close range, and often at great personal risk.

The example above exemplifies our approach following the elders’ teachings and way of interpreting the land to understand concepts, as opposed to classifying knowledge using Euro-Canadian standards. Paul Nadasdy, working with the Kluane First Nation in Yukon, exemplifies the concept of differences between Euro-Canadian and indigenous empirical knowledge:

Certainly, Kluane people do not switch between their empirical knowledge of moose population and their non-empirical understandings of moose as other-than-human persons. The two are inseparable for them, each informing the other and imbuing it with meaning (2003: 112).

To achieve an indigenous perspective, the program employs key Tłıchq̓ words and concepts to guide our thinking. As an example, we rely on the concept of *dè* to demonstrate our approach and the struggles required to translate Tlicho perspective into English. *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 of. As Allice Legat explained “*dè* includes everything because all entities are in the state of existing and have spirit” (2012: 79). By using Tłıchq̓ words to guide our way of thinking, then, the program utilizes the concept of *dè* as a biocultural, interdependent landscape. The land is a social landscape where people, animals and natural elements (biotic and abiotic) engage in social relationships based on respect, in a similar manner to two people interacting with each other using established codes of mutual respect (TRTI 2016).

Our methodology therefore attempts to mirror what hunters have always done. Their awareness, interpretation and way of thinking about the environment is the framework for field research, while their actions dictate the way of travelling and being on the land. Using the lessons learned in the pilot season and through the hunters’ viewpoints, the caribou monitoring program is akin to a traditional hunt because it adapts the hunters’ thinking—what we look for—and the hunters’ actions—what we do—on the land.

Key elements of the hunter’s way of thinking are further defined in the following sections.

2.2 **Sentience:** We recognize animals as sentient beings with personal autonomy and the ability to communicate, hold memory, and accrue knowledge. We recognize that all animate beings, such as caribou, fish and birds, are intelligent beings capable of making conscious choices based on personal agency. Furthermore, inanimate beings, such as the wind or a lake, are also sentient beings with the ability to act on individual choices and influence other beings. Consequently, we recognize that we engage in a social relationship with animals and natural elements (biotic and abiotic) when we travel and stay on the land. By respecting the land and water when we camp or travel, through small acts such as paying the water, we follow the elders’ teachings, and engage with *dè* as hunters have always done.

Being part of the interdependent landscape, we adopt the elders’ way of thinking, and recognize that communication between people and animals is not only possible and necessary, but that spiritual communication between the species maintains the process of natural balance.

2.3 **Using different forms of communications:** We recognize that due to the different nature of beings in *dè* communication occurs using diverse channels unfamiliar or unknown to Euro-Canadian perspectives. Amongst these there is spiritual communication intended as a form of knowledge production. Spiritual communication is not defined as a hierarchical religion practiced only by certain skilled individuals, but rather it is a legitimate form of knowledge that

informs of the presence and abilities of animals and of natural elements. Furthermore, “spirituality is simply a way of behaving [and] a way of communicating with the surrounding world in the same way one does to other humans in one’s society” (TRTI 2016: 45). We accept that knowledge revealed through such a method is valid and can be utilized in a similar manner as hunters have always used it.

- 2.4 **Interdependence:** Humans, caribou and biotic and abiotic elements of the land live in a dynamic interdependent relationship. For the Tł̨ch̨q, *dè* is not separated into the biological, social or supernatural spheres. There is no dualism, no separation, or as anthropologist David M. Smith elucidated about the Dene ontology “there are no sacred-profane, natural-supernatural or material-spiritual dualisms” (1998:423). We recognize that the thought of dualism is not an indigenous concept, but it is a construct of western culture, one that is widely used in the environmental management discourse.

In summary, relying on the hunter’s way of thinking and the indigenous knowledge of the ecosystem, “We watch everything” is a framework that documents the environment as indigenous people always have. “We Watch Everything” is a holistic approach to caribou monitoring. By “holistic” we mean that all things on the land are interdependent and that all the parts and connections between them form a wider whole. The success of this method relies in following the lead of the elders and local harvesters both when describing the physical observation on the land and the biocultural reasoning behind it.



Photo 1: Sean Richardson, Jorgen Bolt, Archie Black and Moise Rabesca positioned on esker watching land surrounding Nq̨okè between Fry Inlet and K̨q̨ketì.

3. Indicators of Healthy Environment: “We Watch Everything”

Monitoring is based on the periodic assessment of key indicators. These indicators have been developed using an interdisciplinary approach. In the first place, indicators were refined using the elders’ knowledge of the Bathurst herd through *dè*. Second, we considered scientific wildlife monitoring indicators, and integrated or adapted some of these into our research. Based on the holistic Tłjchq concept of “we watch everything”, the elders highlighted several related elements to be included for an analysis of caribou and habitat assessment. The resulting list of criteria guiding our research include: (1) caribou habitat and environmental conditions, (2) caribou, (3) predators, and (4) industrial disturbance.

3.1 Caribou Habitat and Environmental Conditions

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

3.2 Caribou

Caribou health

- Unhealthy: skinny; bony; fatigued
- Healthy: normal conditions. No bones visible on rump and back
- Healthy: 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 color

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

Walking posture

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

Injured animals

- Number of caribou injured in the herd
- Types of injuries
- Signs of disease

Calves

- Cow-to-calf ratio
- Number of cows without calves
 - i. When no calves: sign of unhealthy herd, and cows under stress
- 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

3.3 Predators

- Number and location of caribou predators
 - a. Signs: tracks, kill sites

- Relationship between caribou and predators

3.4 Industrial Disturbance

- Caribou behavior and movement affected by visible presence, noise, scent from industrial infrastructure and activities

These indicators are assessed through detailed observations of caribou over the course of the research program, and are described in qualitative and quantitative terms. We believe that a qualitative analysis of individual animals, and of the herd behavior can provide a wider understanding in the context of our research. Meanwhile, we use quantitative indicators to quantify numbers and perform specific forms of data analysis. Further details pertaining the recording of information are presented in section 8. *Recording Knowledge*.



Photo 2: Lone caribou swarmed in masses of mosquito.

4. Field Methods: “Do as Hunters Do”

Do as Hunters Do is the practical implementation of the methodology framework “We Watch Everything”. The name was chosen as our research emulates traditional indigenous caribou hunting in the barren lands (no real hunting occurred). Using a participatory action research approach, members of the ‘hunting party’ travel to specific locations on the barrenlands to find caribou together, collectively participating, experiencing, and sharing knowledge. Using a PAR approach, the researchers became part of the ‘hunting team’ under the direction of the elders and the local harvesters, as always done in Tłıchq̓ culture. This form of PAR research can be defined as a process of self-investigation shaped by collective decision-making power among the team members.

The field methods for the pilot year were designed to leave researchers with the flexibility to modify or tailor the program using guidance from elders, harvesters and the team as a whole prior to and during the field season. Organizational sessions were held in the summer of 2016, before the field program, in Yellowknife and Behchokq̓. These sessions consisted of collaboration involving all team members to discuss strategies for monitoring caribou, travel and safety on the land, and to plan field logistics.

The essence of Do as Hunter Do is the recognition how a TK monitoring program does not need to develop new methods. Rather, learn from and adapt to the cultural practices developed by experienced indigenous harvesters to sustain their communities in the arctic environment. In order to comfortably live in the arctic environment, Tłıchq̓ and Inuit hunters developed sophisticated ways of looking at the landscapes surrounding them and locate animals as well as other sustenance sources, including plants. Such ways, and the observations used to assess the conditions of animals before a kill was made, were incorporated as effective tools within our research framework.

4.2 Use of Traditional Hunting Locations

The location of our main camp, close to the *Nq̓okè* (water crossing) between Kokèti (Contwoyto lake) and Fry Inlet, in Northwest Territories, was located at the northernmost range of the Tłıchq̓ land use (see map 2). 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 caribou hunting. People followed the shorelines by boat, then beached at water crossings, where caribou are known to cross. Families set their camps short distances from the crossings, so as not to disturb the potential movement of caribou. From camp, hunters walked to high points or eskers, where they waited and watched for any movement on the land surrounding the crossing. The waiting could take days or weeks. Once animals were seen, the hunters would wait close by in their canoes. Along the shoreline, the women would often sit and wait behind boulders or in the low bushes, often among the *kwea* (dwarf birches). Once a herd started to swim across, the hunters would allow the first herd to make their way through. Once the first herd had passed and made their scent marks on the trail, the hunters knew more caribou would follow. As the following herds entered the water and started swimming, the hunters would approach in their canoes to spear or shoot the animals in the water. This strategy allowed the hunters to approach the animals and select their prey closely. Once the animals were killed, the women would appear from their hiding place and start butchering and processing the meat. The killing was usually the first and easiest step in the long and strenuous process of preparing the meat, and transporting it back to the communities.

Since the introduction of colonial government policies over the last decades and settlement into communities, Tłı̄chǵ land-use has decreased in its geographical extent and intensity. Additionally, the advance of technologies, such as the airplane and snowmobile, has made transportation easier, but simultaneously, discontinued long and hard travel by canoe and dog-teams—and thus the use of the traditional trail system into the areas farther away from the settled communities. Our strategy sought to apply similar techniques and concepts to pre-contact times, apart from killing and meat processing. Advised by local hunters, our main camp was established in close proximity, about two kilometres north of the main *Nq̄okè* (water crossing). The camp location had been used for centuries by Tłı̄chǵ and Inuit, while hunting at the *Nq̄okè*. One kilometre west of camp was a long, tall esker, stretching in a south-north direction, where we could do as hunters have always done, and watch the land for animal movement surrounding the *Nq̄okè*.



Photo 3: Caribou herd swimming across *Nq̄okè* between Fry Inlet and Kokètì. Notice lead cow with calf in front, followed by group of cows with calves, while bulls wait in back.

4.3 *Nq̄okè*

Caribou are good swimmers, and often chose to go into the water as a means to escape from predators or insect harassment. Their outer, guard hairs are hollow and provide excellent flotation, while their wide hooves can transport them quickly forward. *Nq̄okè* is a Tłı̄chǵ term that literally means “swim across”. It refers to the interface between water, land, and caribou 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 choose to swim, entering the water at the point of shortest distance to the other side (although, as pointed out by the elders, other factors such as the presence of large boulders or perceived hazards may influence the herd’s decision to cross).

Caribou leaders often choose the trail with the smoothest surface, such as small rock or sand beaches, and often avoid points with larger rocks or boulders, as protection of their hooves and legs is essential.

On Kokèti (Contwoyto Lake) several *Nq̄okè* lead to islands. Caribou often choose to swim out to islands in the summer, to avoid predators, and as the wind provides relief from insects. For example, on the southeast side of the lake, the numerous islands form chains leading to the other side of the lake. Here, the herds swim from island to island, in order to reach the opposite side.

Nq̄okè are crucial to understanding caribou migration. Local harvesters, sensing the landscape ‘as caribou would’, have expertise in identifying *nq̄okè*, and know which *nq̄okè* will be used by studying details the crossing, including but not limited to topography, surface materials, underwater hazards, and so on. Old campsites often reveal the location of the main *nq̄okè*, as they were established by hunters to easily reach the crossing without interrupting the herd movement. The program employ the same knowledge of geography and use the same campsites close to crossings, to avoid interrupting caribou movement.

4.4 *Tataa*

Tataa is another important word to understand caribou migration. It refers to caribou movement relative to water bodies, and literally means “in the midst of waters” (Whaèhdôö Nàowoò Kö 2002:21). The large lakes and numerous water bodies encountered on the migration routes create obstacles that the herds must travel around. *Tataa* is a channel of land between lakes—a land bridge that allows caribou to cross large lakes along their migration routes. A *tataa* can refer to either a small channel of land, such as the one between *Ek’atì* (*Lac de Gras*) and *Èiwets’aq̄ats’ah̀tì* (*Lac de Sauvage*), or a larger land bridge, such as the one between *Nq̄diikahtì* (*Mackay Lake*) and *Ewànit’ı̀tì* (*Courageous Lake*), or between *Ek’atì* and *Nq̄diikahtì*. The concept of *tataa* is also used by the elders to refer to a migration route, for example *Ek’atì tataa*. This *tataa* refers specifically to “land bound by Ekati [and Ewànit’ı̀tì and Nq̄diikahtì]” (Whaèhdôö Nàowoò Kö 2002:21). Used in various situations, the concept of *tataa* has several meanings depending the context in which it is used.

The program makes use of *nq̄okè* and *tataa* to understand how and where caribou herds will travel over the vast barren landscapes. By relying on these concepts, along with the collar information provided by ENR, the teams can place themselves in the best location prior to the arrival of the herds.

4.5 Waiting as Methodology

The “do as hunters do” methodology is inherently based on moving and waiting. As caribou herds are constantly moving, hunters identified the best-known location to meet caribou, travelled to those locations, and waited. By doing as hunters do, and including waiting in our methodology, we engaged with the land and became active participants in the research. For an anthropological perspective, there are numerous research benefits related to waiting. Waiting was a time for the casual conversation about research topics, the land and culture. Furthermore, waiting was an opportunity to feel and become a part of 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 2 and 8 hours each day, during morning, midday and evenings, we had the opportunity to observe the weather systems move over us, feel the shifting wind, the rain and the cold, and—delightfully—the heat of the sun once the clouds cleared, and the swarms of mosquitos, once the wind calmed. Living in close contact with the land fosters a connection with elements of de that goes beyond mere observation. As a traditional knowledge framework, we recognize that knowledge is at times revealed through “dreaming.” Sitting in silence on the esker,

watching for ours on the barren land, one can close one’s eyes and drift into short sleeps, while the other team members are watching. In Tłıchǰ, the word to dream— “*nate*”—is the same word as to foresee (“*nate*” - pronounced nah-te) (Helm 1994, Goulet 1994). As the Tłıchǰ language reveals, one can foresee a situation by dreaming, just as in one’s dream the land and animal spirits can communicate with the dreamer. It is important to recognize this potential and engage with the environment as people have done for generations while waiting for caribou on the eskers.

Waiting is therefore not intended as a resting activity, but rather as a vigilant watch, a state of mind in which the group engaged daily on the land. A type of engagement as hunters have always done, to acquire knowledge of the local situation. Expending large amounts of time, days and weeks on the land, was an essential part of our methodology, critical for our ability to conduct research and record information. In this first year of the project, we completed 28 days of fieldwork, 15 days of which we did not see any caribou. Had we not allowed for time to wait for caribou to appear at certain *Nq̄okè*, we would not only have seen fewer caribou, but failed to experience and record daily changes to our local environment, and the important time between the passing of the herds, a critical aspect of our holistic framework. Thus, we applied similar techniques to the hunters “back in the days,” when people travelled by canoe to the barrenlands to meet caribou at the *Nq̄okè*.



Photo 4: John Franklin Koadlak, Jorgen Bolt and Michel Louis Rabesca positioned on esker west of camp, watching land surrounding *Nq̄okè* and south towards Fry Inlet. The team spend hours on this esker every day.

4.5.1 Time

The Do as Hunters Do methodology requires ample time due to its on-the-ground approach. Without the funds for daily use of a helicopter or floatplanes for transportation, we use a traditional approach to ‘hunting’ for caribou and move on the land by boat and foot. This approach requires time to adjust to the daily and seasonal weather pattern. During the second week of July, we experienced five days of strong northwest winds, between 30 and 40 kilometres per hour. At the same time, the large herds moved from

the peninsula southeast of our camp to the western arm of Fry Inlet, approximately 20 to 30 kilometres west of camp. We could see them with binoculars from the high esker behind our camp. Using the 16-foot aluminum boat, we could have travelled right up the inlet, next to the herd. Unfortunately, the 40-kilometre northwest wind and ensuing waves stopped our attempt to travel by boat. Additionally, 20 kilometres was too far to walk, as we also needed to return to camp at night. The only method we could apply was waiting. We established ourselves on the sheltered part of the esker with warm clothes, scopes and binoculars. From there we continued to watch the *Nq̄ʔokè* and adjacent land for any animal movement, hoping that another herd would follow. And a herd did follow—four days later. This approach is similar to what would have occurred during a traditional hunt. Weather decides everything on the barrenlands; the wind and waves direct all our movements and actions; thus, plans get delayed and remade constantly. The most appropriate method to apply is time, implemented by waiting and watching.

A long-term approach is necessary if we are to get more than momentary observations, and if we are to understand the behavior of caribou on the land. Long term, both in terms of years of repeated research and in term of days, weeks and months consecutively living in the same landscape and moving over the same geography as the animals. Only by such a long-term on-the-land approach can we start to make patterns of the glimpses.

4.6 Walking as Methodology

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 and document clues of presence left behind by animals. The teams walked between five and 15 kilometres per day. After the 28 days of field work this year, we had covered 481 kilometres by foot and boat. The long walks into surrounding landscape from camp were made from one high point to the next. As we reached a high point, such as an esker or hilltop, we would sit, watch over the surrounding landscape, and wait. If no animal movements were seen for 1 to 3 hours, we proceeded to the next high point, and continued watching. This is the same method as hunters use when hunting for caribou on the barrenlands in the fall.

Walking along the caribou trails proved a valuable method for monitoring, and understanding their behavior intimately. We identified the herd’s preference for types of terrain during migration, as well as the types of terrain avoided, which vegetation was foraged, and the signs of other animals or predators in the vicinity of the herds. For example, walking through a boulder field next to a water crossing can expose the presence of predators, such as wolverines, as well as the time the predator was there, and their activity. Or, walking along the shoreline in the morning hours can reveal animal activities of the night before, since wolves or wolverines will often follow the shoreline to detect scents from the other side of the lake. Finding sandy areas along the shore and walking them proved a valuable method to notice any predatorial activities from the nights before.

Walking is also the least intrusive form of monitoring, as no permanent mark is left and no excessive noise is made. As wildlife, humans do leave a mark of scent, by rubbing our rubber and leather boots or clothes against rocks or vegetation. As directed by the elders and the harvesters, we took care to never walk directly in any caribou trails for two to three days after a herd had used them, to avoid disrupting the caribou scent on the trails, in case other herds would follow in their footsteps. Most days, we avoided the caribou trails altogether, following ridges or eskers because they provided the best lookout points. The observational details we collect while walking over longer distances, and the large amounts of time we have to investigate and document is the essence of a boots-on-the-ground approach to caribou monitoring.

5. Finding Caribou

The summer range of the Bathurst caribou is vast. Consequently, the main challenge for monitoring caribou is finding the herds. The movement of caribou is generally anticipated from the calving grounds, in mid-July, in a southwesterly direction towards the Kokèti general area; then in July and August, further southwest towards Deèzàati (Point Lake), Yamba Lake or south towards Ek’ati (Lac de Gras). However, at a finer scale, the herds movements are very unpredictable; especially, when it comes to which valleys, shoreline or which specific *Nq̄okè* the herds will use. When you stand on the northern shore of Kokèti and walk south into a wide open treeless terrain, the barrenlands between the calving grounds and the treeline appear endless, and the task of finding caribou seems seemingly impossible. The knowledge of the team’s elders and local harvesters, as well as scientific data allowed us to locate the herds and position ourselves in the right location.

5.2 Collar Data

The collar information gives a specific geographic location of male and female caribou. Every fourth day, ENR caribou biologists provided locating information over satellite phone. The benefit of collar information is that it provides the exact location of caribou at a specific time every fourth day. The challenge for the program is knowing where the herds are during the four days in between. Following the movement south from the calving grounds, the post-calving aggregation happens in July: from that time, caribou spread out in larger herds. During the aggregation, the animals gather in large groups and move with purpose at a fast pace. So, if a herd is located one side of a lake on the day we receive the collar information, it might move to the opposite side of the lake by the next day. Or one herd might split into two herds and move different ways. The challenge for us was to try to keep track and estimate their movement and locations in the four-day period between communications from ENR biologists.

5.3 Local Knowledge

The collar data provided approximate locations of various caribou populations, but since the herds can move long distances each day, local knowledge was necessary to identify where to best position ourselves to intercept the herds before they moved to areas inaccessible using the means at our disposal. Locating the camp by frequently used *Nq̄okè* and waiting is the traditional and most efficient way to ensure to meet caribou. However, the decision on which *Nq̄okè* and caribou trails are used during a year and where to position the camp were questions that collar information could only answer with a large degree of approximation. Local knowledge identified which locations would be best suited to have a semi-permanent camp. John Franklin Koadlak, who has lived most of his life on Kokèti, pointed out the best camp locations, and where to go by boat and foot to meet the herds. His detailed local knowledge of geography and topography, by land and water, proved vital for our ability to position ourselves. In the entry from the field journal recorded on July 13th, 2016, reads *“John Franklin Koadlak, a local Inuk who has grown up and lived all his life at Kokèti, and I were sitting on the high esker by Fry Inlet. As we sat there in the wind, watching south over the peninsula between Kokèti and Fry Inlet, he pointed to the southern horizon and said “there, can you see them sky-lining?” With my binoculars, I could barely see a blurred mass mixed with heat waves on top of the hills 15-20 kilometres south. “There they are,” he continued.*

“They’re going northeast into the wind. Towards Contwoyto Lake. We can go there tonight. If you’re lucky, you get a glimpse of them”.

The journal entry provides a good description of the challenges we faced finding and position ourselves on the path of herd’s migration. We learned that the success of the program is dependent on following exactly what people have always done on the lake, travel similar routes, set camp at the historical campsites and walk the caribou trails. The act of monitoring became an act of trying to position oneself at places where one anticipates caribou would move through. In Tłjchq, Kokèti 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 protection from wind or proximity to hunting locations. The program used the same sites for the same reasons.

6. Teams

The monitoring program will consist of two teams of four monitors (consisting of three community members and one researcher) who alternate two-to-three-week shifts. The teams consist of one elder, a younger hunter, a hunter/safety person, and a TK researcher. The team personnel are selected based on their knowledge of the land and caribou. This team structure provides each member with specific roles and daily responsibilities. By Tłjchq Government policy, all trips on the land are required to have a person with a Wilderness Safety Certificate, who can provide first aid and wildlife safety. The safety person is also chosen based on his/her knowledge of caribou and on-the-land skills.

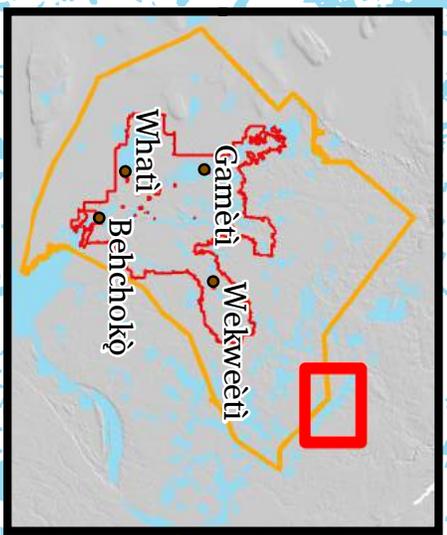
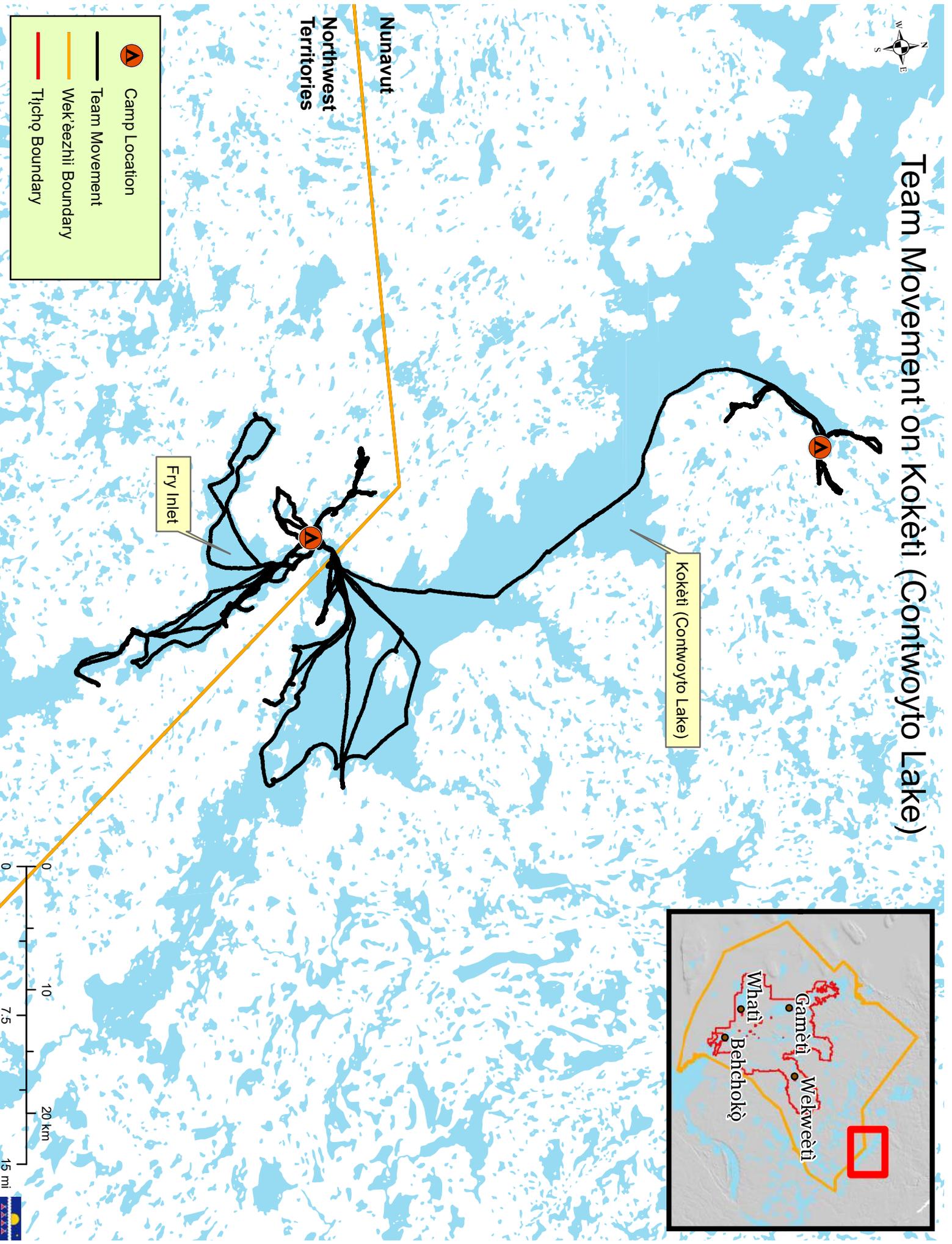
A TK researcher will accompany the monitors to document their traditional knowledge on the land, by field note-taking, GPS and photo-documentation. The advantage of having a TK researcher on-site is documentation of TK through casual discussions and individual sessions with monitors *in situ*. This kind and quality of information cannot be completely captured with standardized templates. Prior to the field work, the teams conduct a three-day planning workshop, to unify the teams and collectively develop a field plan.

7. Study Area and Timing

The study area for the pilot season was decided collaboratively between the Tłjchq Government and ENR. We decided to test the program on the summer range of the herd around Kokèti. The summer range is a vast area from the calving grounds and south closer to the treeline. The post-calving aggregation is the time the herds of cows from the calving grounds mix with the bulls, and form large herds, numbering thousands of animals, that roam over the vast barrenlands. This period—July to August, - is the most interesting, ecologically, as the herd migrates from its calving grounds, and between *Kokèti* (Contwoyto Lake) and the *Ek’ati* (Lac de Gras) area. There are several under-researched factors affecting caribou in this area that could affect the caribou within its summer range, these include insect harassment, predators, climate change, and anthropogenic factors, which the program will identify.

Kokèti covers a large portion of the summer range of the herd. Once we decided for the summer range, we chose to establish the base camp on the lakeshore, and use the large lake to access various locations on the summer range, both in Nunavut and Northwest territories. The study area and timing of the program will likely change as the program evolves and we continue to develop our methodology.

Team Movement on Kokèti (Contwoyto Lake)



8. Recording Knowledge

We chose to adopt a participatory action research approach (PAR) as the overarching framework for documentation during the field program. Participatory action research is a research approach emphasizing a close working relationship with the research participants, evolving research questions, and fact-finding through collective efforts. Contrary to other forms of investigation, participatory approaches democratize knowledge production and decision-making, and foster opportunities for empowerment for those involved (Legat 2012). The ability to become engaged as a team through participatory research (“do as hunters do”) enables researchers to learn and explore emotional, spiritual and cultural transformations. Taking a participatory approach provides opportunities for learning ways of knowing that are uncommon to western thought. Such experiences let the researcher deal with the realization that there are numerous ways of experiencing and interpreting the world, each of equal value. In situations that challenges one’s conceptions of reality and the ‘normal’ manner of classifying data, the researcher has to choose how to proceed with documentation, and either record the explanation as a valid or disregard the explanation as imaginary. The purpose of taking a personal experiential approach and using naïveté as tool allows the researchers to be open to other cultural ways of interpreting, perceiving and knowing the world (Young and Goulet 1998). Such an approach is necessary to focus on the emic voice and actively avoid biased interpretations. Therefore, fieldwork not only entails the collection of information, but is a totalizing experience that engages the whole being of the participants (Okely 1992).

8.2 Recording Landscape Associations

Caribou monitoring and the recording of TK is inextricably related to the Tłjchq concept of land. Located in the barrenlands (tundra) region of the Northwest Territories and Nunavut, the vast subarctic prairies surrounding *Kokèti* are dominated by granitic outcrops, glacial outwash, shallow basins filled with water, kettle lakes, eskers, moraines, drumlins, glacial erratic rocks, and other landscape features created by continental glaciation. We considered such geomorphological features, as well as cultural associations to identify locations where caribou travel, feed, rest or move at certain times of the year. By conducting observations from the key locations described below, we document information about the factors affecting the herd.

8.2.1 Observations at *Nq̄okè*

Nq̄okè are the closest points of contact between land across waterbodies, used by caribou to cross the numerous large lakes dotting the tundra. *Kq̄keti*, the largest water body within our study area, has numerous eskers used as *Nq̄okè*. *Nq̄okè* eskers are typically long twisted ridges formed by the movement of ice melt and deposits of sand and gravel reaching from shore, or in between islands. As part of our methodology, waiting at *Nq̄okè* allows the researchers to “do as hunters do” and therefore:

- Observe animals in close proximity
- Observe herd dynamics
- Observe predators following or waiting for the herds and their behavior in close vicinity
- Determine the relative importance of attributes such as the presence of sand, rocks, and orientation in regards to prevalent winds for caribou choice of crossings

8.2.2 Follow *Ekwo Eto* (Caribou Trails)

Ekwo eto (photo 6) are numerous and interspersed throughout the Northern landscape. The location and significance of caribou trails is recorded to help locate animals across the land, determine animal distribution, and document caribou behavior. Observations related to caribou trails include:

- Caribou forage and diet
- Predator behavior
- Cow-calf relationships (calves falling behind, and cows searching)
- Estimates of the number and health of injured animals falling behind, and their interaction with predators

8.2.3 Follow *Ti K’abàa* (Shorelines)

The analysis of *ti k’abàa* (photo 5) is functional to understand both *nq̄okè*, constraints on movement, and presence of predators. The analysis of local shorelines enables the researchers to:

- Understand how shorelines are used in the context of *nq̄okè* and *tataa*.
- Observe animal signs in soft material such as sand.
- Observe predators, since they usually walk along shorelines to smell anything that comes downwind from the lake.
- Observe and record the locations of “white shores,” where caribou hair dispersed by the herd during swimming accumulates on the beach, giving the impression of snow or white foam.



Photo 5 (left): Caribou tracks along shoreline of Fry Inlet. Notice amounts of hair washed up on shore after herds crossed *Nq̄okè*.

Photo 6 (right): Michel Louis Rabesca and Leon Ekendia following fresh caribou trails, east of Fry Inlet.

8.2.4 Observations from *Daka* (Elevation Points)

Daka (elevated points) across the landscape such as *hozi shia* (hills on barrenland) and *what’aa* (eskers) (photo 4) were extensively used by the team to choose the direction of travel, locate features such as favorable pastures rich in lichen and other forage, track the progression of predators and other species, and as points of observation with limited insect harassment. Elevation points are useful to:

- Gain an understanding of the caribou movement over various types of landscape features.
- Understand insect harassment and the factors affecting its intensity such as wind speed and weather.
- Assess vegetation quality and caribou forage areas.
-

8.3 How We Document

8.3.1 Qualitative Techniques

Documentation of TK occurs during monitoring sessions throughout the day, including discussions in the mornings and evenings. The advantage of having a TK researcher on-site is documentation of TK through casual conversations and individual sessions with in situ monitors. We follow standard Tłıchq Research and Training Institute (TRTI) methodology for traditional knowledge research (Tłıchq Research and Training Institute 2012, 2013, 2015 and 2016). This documentation technique applies to both the open-ended and semi-structured methods.

8.3.1.1 Field Notes Protocols

Field notes protocols were created to provide consistency between the researcher’s observations. Table 1 below provides an overview of the information collected by the researcher each day.

ITEM	DESCRIPTION
WEATHER (from portable weather station)	
Temperature:	Humidity:
Wind Speed:	Wind direction
Weather Notes: <i>describe daily weather</i>	
Weather/Insect: <i>describe insect harassment in relation to weather and wind speed</i>	
Weather/wildlife: <i>describe wildlife activity in relation to weather</i>	
WILDLIFE OBSERVATION NUMBER	
Number of animals:	Species:
Description: <i>describe animal activity, including location, behavior, signs, and method and location of observation.</i>	
TK NOTES	
Title: <i>key word used for content analysis, i.e. caribou hunting on Kokèti</i>	Description: <i>Describe elder’s knowledge</i>
END OF DAY SUMMARY	
Km travelled:	Total time of observation:
No. of animals: totals	Key Tłıchq words/concepts:
Highlights for the day:	

Table 1: Template for observations.

The template provides consistency to the daily observations and experience of the team. The recording is completed in a field journal, using rite in rain™ waterproof writing equipment. A designated number is assigned for each new observation. The template systemizes the recording, while the notes themselves are flexible and open-ended, to allow for different durations of each observations, and adjusting to the nature of the elders’ descriptions. The note-taking is conducted throughout the day by the researcher, in accordance with explanations made by elders.

At the end of each day the totals for the day are tabulated into a master sheet saved into a shared drive. Photographs and spatial data in the form of tracks and waypoints are saved into separate folders, one for each day of fieldwork. Spatial data totals of the day are analyzed each evening by the lead researcher to identify gaps in spatial coverage of areas, update team progresses, and identify new areas to present to the group for discussion. A morning meeting is held to discuss the previous day’s observations and plans for the days monitoring activities and locations.

8.3.2 Researcher and Elder

Personal knowledge, including the researcher’s western academic background and professional background can become a source of bias when working with indigenous peoples’ knowledge of the land. It is often necessary for the researcher to undergo a process of acknowledging one’s own limitations, recognize personal points of view and opinions, avoid judgmental approaches and appreciate the differences. We define this process as maintaining naiveté, described as the skill of the researcher to be a novice, someone who genuinely wants to learn a new culture (Russel 2006). In this program, the relationship between the elder and the researcher is akin to that of an elder and a junior hunter, and can be summarized into the role of teacher and participant-observer. From the researcher perspective, participant-observers are insiders who participate, observe and record aspects of the life around them, in this case the TK of elders and harvesters.

Techniques for eliciting and documenting information are often based on the personal characteristics of each elder. Each elder had different knowledge and different ways of expressing himself. Some elders elaborated more than others and chose to communicate in long monologues. During such conversations, it is better to adapt to the characteristics of the elder and sit and listen without interrupting, rather than interrupt with a series of questions (Jacobsen 2011).



Photo 7: Jorgen Bolt, Archie Black and Moise Rabesca sharing knowledge, as Domenico Santomauro documents.

This method follows the cultural characteristics of learning among the Dene and Tłı̨chǫ cultures, in which knowledge is transferred mainly by personal observation, experience and storytelling, rather than solely by direct question-and-answer (Legat 2012; Goulet 1998). The Tłı̨chǫ and other Dene peoples share similar cultural attributes related to learning that are different from those of Euro-Canadian societies. The elder wants the researcher to learn in the same ways that they learn, preferably through personal experience and observation (Legat 2012, Goulet 1998, Guedon 1988, Ridington 1988). The use of direct questions often yields useful information and descriptive stories of the land, but open-ended conversations in which the elders take the role of teachers and explain the areas they feel important from their own experiences on the land are usually the most successful and insightful. This method of research is more in-tune with Tłı̨chǫ traditional forms of teaching and, thus, enhances the research process.

8.4 Quantitative Techniques

For the pilot year, the use of quantitative techniques was limited to recording weather observations using the weather station, the movement of animals using GPS data, and direct observations of amounts of wildlife including estimates of cow/calf ratio and predator’s distribution within the landscape. The analysis of this data is correlated to the qualitative descriptions by elders. Further initiatives are being considered; these may include pellet collection for DNA analysis, and scientific observations of caribou behavior using standardized form to conduct comparative analyses.

8.5 Analysis

The complex methodology of the TK program—combining ecological observations with cultural knowledge about landscapes—requires a multidisciplinary data analysis approach. Information collected in field journals during the pilot season of the program was collected using Participatory Action Research (PAR) and ethnographic documentation, and analyzed using content analysis, a technique that systematically categorizes and describes written, spoken, or visual forms of communication. This method was chosen as the primary technique of data analysis because it allows for qualitative text interpretation, while providing a framework of data analysis that can be employed for the duration of the multi-year program.

The field journals captured specific field observations of wildlife and statements made by elders and monitors during daily observations and team meetings. Content analysis of the recorded field data was completed by TK researchers using standard TRTI research analysis methodology (Tłı̨chǫ Research and Training Institute 2012, 2013, 2015, 2016). Content analysis consisted of developing categories and identifying sub-themes and codes within each category. The categories parallel the monitoring focus of (1) caribou; (2) habitat and environment, (3) predators and (4) industrial disturbance, while the emerging sub-themes and codes often cross between the categories. We approach content analysis using both quantitative techniques, for specific observations, and qualitative techniques for recorded TK statements.

The monitoring indicators were delineated prior to and during the field season. Next, we identified main categories from the statements collected in the journals. The statements were divided into categories (i.e. caribou). Categories were coded using keywords selected from the elders’ statements; this way, each category was imbued with meaning and personal stories from the elders’ lived experiences on the land. These were subsequently divided into sub-categories as required to provide the necessary definition to

each topic (i.e. caribou health). The result of content analysis are tables of statements, from which inferences about trends, patterns, and correlations can be made.

Additional statements collected by the researchers relate to team experiences, often of multi-day events, as well as experiences of weather systems or recurring animal observations. By using the ethnographic and PAR format of data gathering, the researchers were able to observe and live each phenomenon from the point of view of the subject of the study, and document traditional knowledge. In TK research, it is often challenging to include knowledge that is shared privately between elder and researcher, as some types of knowledge are only shared in certain situations and to certain people. For example, knowledge of grizzly bears will not be discussed openly among team members in the field. Or, knowledge of spiritual aspects of caribou migration can only be shared to certain people. This form of knowledge often escapes the boundaries of theoretical classifications and categories. Therefore, in employing content analysis as sole analytical technique, the researcher risks losing the depth and intensity of the lived experience as part of the “hunting team.” As an attempt to avoid this, we combined content analysis with qualitative descriptions of the lived experiences.

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