Reconciliation in Research:
Working Together to Understand Change

Sahtú Research Results Workshop 2019
Tulít'a, Northwest Territories, December 10-12, 2019

Hosted by:
Nę K'ə Dene Ts'įlį - Living on the Land Forum
ʔehdzo Got'įnę Gots'ę́ Nákedı (Sahtú Renewable Resources Board)
Cumulative Impact Monitoring Program – NWT Environment and Natural Resources

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Cumulative Impact and Monitoring Program – NWT Environment and Natural Resources
Social Sciences and Humanities Research Council

Report Summary

The Nę K'ə Dene Ts'ı̨lı̨ - Living on the Land Forum and the community of Tulít'a hosted the Sahtú Research Results Workshop on December 10-12, 2019. The focus was on the connected themes of Water and Fish, Caribou, and Changes (Land and People). The aim was to work collaboratively to make sure research in the Sahtú region provides relevant information for decision-making by the communities. The workshop was co-sponsored by the ʔehdzo Got'ı̨nę Gots'ę́ Nákedı (Sahtú Renewable Resources Board - SRRB), and the Northwest Territories Cumulative Impact Monitoring Program (NWT CIMP).

Over 80 individuals participated in the workshop, with about half of the participants coming from the five Sahtú communities, half the participants coming from elsewhere in the NWT or Canada.

Over 24 current research and monitoring initiatives looking at changes in the landscape, water bodies, wildlife habitat and behavior, and availability of food sources were discussed. In the Water and Fish Focus Group, the main topics of discussion were water levels and quality, contaminants in water and fish, permafrost changes, and industrial development. Strategies to monitor caribou and the role of the communities in the monitoring were discussed in the Caribou Focus Group. Community participants made recommendations related to improving caribou monitoring, revisiting harvesting regulation, enforcement, and improving herd health. During the Changes (Land and People) Focus Group, changes in Dene béré (country food) availability, climate and weather, animal behaviour, health, cultural practices, and the economy were discussed.

Some research questions, gaps and priorities were identified. These focussed on water quality, wildlife availability and behavioural change, climate change, and the impacts on people, Dene béré access, the economy, and policies and regulations. In terms of how to facilitate research in the region, many suggestions and recommendations were produced through the workshop including: approaches for enhanced research collaboration; the need to facilitate the research process; better communication of findings; and more on-the-land research for the future.

Based on the discussion in the workshop, we can identify areas where research and monitoring would benefit from a community-led strategy. The first identified area is to strengthen the community research structure so that communities have the resources needed to initiate and oversee all the research in the Sahtú region. The second element is to identify initiatives already in place where Guardians can make a difference and be employed on a regular basis.

This workshop was an important contribution to informing the environmental research and monitoring strategy in the Sahtú Region. It helped to identify regional priorities and research gaps; build cross-cultural understanding; support regional and regulatory decision-making; identify opportunities for further collaborative research; and facilitate the sharing of knowledge.

Máhsı cho!

Máhsı to Chief Frank Andrew and the community of Tulít'a for hosting the 2019 Sahtú Research Results Workshop. Máhsı cho to Leon Andrew for his gracious role in chairing the workshop on behalf of the Nę K'ə Dene Ts'įlį Living on the Land Forum, ensuring that this cross-cultural event took place in an atmosphere of respect, inquiry, and enjoyment of the rich knowledge sharing enabled by the gathering. We are very grateful to Thom Stubbs who kindly agreed to lend his considerable facilitation skills to supporting successful workshop outcomes.

Máhsı to the Nę K'ə Dene Ts'įlį Forum members and fellow travellers who have been unfailingly committed to building and maintaining strong research relationships to address priority local and regional questions. Forum participants have been willing to take on the challenges of communication by teleconferences and zoom throughout the year, and this continuity greatly contributed to the success of the in-person gathering.

Máhsı to our interpreters, Michael Neyelle and Dora Duncan, who accomplished miracles in supporting meaningful cross-cultural communication supporting the diverse dialects of the Sahtú region (Délįnę/Tulít'a Got'įnę and K'áhsho/Dehlá Got'įnę), and helping us all to celebrate the specific meanings conveyed in two of the Dene language dialects of our diverse region. Máhsı to Kimberleigh Schultz, the McMaster University doctoral student who generously agreed to take near-verbatim meeting notes.

Thanks to Alexa Scully, whose vigorous efforts in coordination and inspired ideas for the workshop agenda were crucial motivations for community members and researchers alike to participate. We also greatly appreciate the support and contributions of DonnaMarie Ouellette and Lorraine Brekke of the NWT Cumulative Impact Monitoring Program.

All the participants will agree that we must be thankful to the cooks for the event, and to Jessie Yakeleya who helped to keep everyone comfortable and refreshed – Jessie bears special recognition since she was so interested in the discussions that she went on to a job with the ʔehdzo Got'įnę Gots'ę́ Nákedı (Sahtú Renewable Resources Board) as our Research Program Intern!

And finally but not least, máhsı to Mylène Ratelle who thoughtfully compiled workshop results and outcomes as an important marker of the research journey that the Nę K'ə Dene Ts'įlį Forum - and the Sahtú region as a whole – has been on since the Forum was founded in 2014.

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Dene Gokədá

The following terms are used in this report. For more terms that were documented during the 2019 Sahtú Research Workshop, see Appendix D.

ʔehdzo Got'ıné	trappers; Renewable Resources Councils
ʔehdzo Got'ıné Gots'ę́ Nákedı	helpers of the trappers; Sahtú Renewable Resources Board (SRRB)
Délıné	Where the waters flow (community name)
Délıné Got'ıné	People of Délıné
Dene béré	Dene food; country food
Dene ts'ılı	being Dene; Dene ways of life; Dene identity
K'áhbamítúé	Ptarmigan net lake (Colville Lake community name)
Nę K'ə Dene Ts'ılı Forum	Living on the Land Forum
Nę K'ədí Ke	Keepers of the Land; Guardians
Nío Nę P'ęné	backbone of the mountains (name for proposed Indigenous Protected and Conserved Area)
Sahtú	Great Bear Lake; name of land claim region
Sahtú Də	Bear River
shúhta goɔepé	mountain caribou
Shúhtaot'ıné	Mountain Dene
Tek'áecho	Marten River
Tu Łidlini	Ross River (community name)
Tulít'a	Where the rivers join (community name

Acronyms

ALCES	A Landscape Cumulative Effects System
CCP	Community Conservation Plan
NWT CIMP	NWT Cumulative Impact Monitoring Program
DFO	Fisheries and Oceans Canada
ECCC	Environment and Climate Change Canada
ENR	NWT Environment and Natural Resources
NWT	Northwest Territories
SRRB	ʔehdzo Got'Ine Gots'ę́ Nákedı (Sahtú Renewable Resources Board)
SSHRC	Social Sciences and Humanities Research Council

Introduction

The Nę K'ə Dene Ts'įlį - Living on the Land Forum and the community of Tulít'a were pleased to host the Sahtú Research Results Workshop 2019, focused on the three connected themes of Water and Fish, Caribou, and Changes (Land and People).

Chaired by Leon Andrew and co-facilitated by Deborah Simmons and Thom Stubbs, this workshop was an opportunity to consider the role of Dene and Métis Nę K'ədí Ke (Keepers of the Land) in research and monitoring in the Sahtú region, and to contribute to a draft Research and Monitoring Strategy based on previous work of the Forum.

Sahtú participants included representatives of ʔehdzo Got'įnę (Renewable Resources Councils) and other Sahtú leadership organizations, as well as youth. Additional participants included Forum members, the Sahtú Land and Water Board, and researchers from Environment and Climate Change Canada (ECCC), Fisheries and Oceans Canada (DFO), NWT Environment and Natural Resources (ENR), NWT Geological Survey (NTGS), and various universities.

> ⇨ **The aim of the workshop was to work together to make sure initiatives and research done in the Sahtú region provide relevant information for decision-making by the communities.**

The workshop was co-sponsored by the ʔehdzo Got'įnę Gots'ę́ Nákedı (Sahtú Renewable Resources Board - SRRB), the Government of the Northwest Territories NWT Cumulative Impact Monitoring Program (NWT CIMP), and the Social Sciences and Humanities Research Council (SSHRC).

Workshop Objectives

1. Learn about research and monitoring in the Sahtú Region, with a focus on Water and Fish, Caribou and Harvesting, and Changes (Land and People).
2. Discuss positive ways of involving communities and Nę K'ədí Ke in research and monitoring.
3. Identify research questions, gaps and priorities – accounting for community, regional, and territorial needs and objectives.
4. Move forward with a community-led strategy for research and monitoring.

The Nę K'ə Dene Ts'ı̨lı̨ Forum

The Nę K'ə Dene Ts'ı̨lı̨ Forum supports research and monitoring proponents and Sahtú organizations in sharing priorities, plans and proposals, providing feedback and guidance, and coordinating objectives and activities. The goal is to more effectively address important issues in the Sahtú. The aim is to have programs coordinated and conducted in ways that reflect regional and community priorities, engage communities, value both science and Indigenous knowledge, and support wise decision-making.

The Forum seeks to: identify regional priorities and research gaps; build cross-cultural understanding; support and protect traditional knowledge processes; support regional and regulatory decision-making; and identify opportunities for collaborative research involving communities, communication, information-sharing, and cross-cultural interpretation of research results. The Forum is chaired by Leon Andrew, and the SRRB provides secretariat support. ʔehdzo Got'ı̨nę are key Forum members. Both the SRRB and ʔehdzo Got'ı̨nę have a strong mandate in research and monitoring under the Sahtú Dene and Métis Comprehensive Land Claim Agreement – especially with respect to wildlife and wildlife habitat – and are required to take a collaborative approach in coordination with government (including ENR). Land Corporations are increasingly joining the Forum with an interest in land stewardship and the research and monitoring required to make wise decisions in resource development.

The Nę K'ə Dene Ts'ı̨lı̨ Forum and the SRRB partnered with NWT CIMP to coordinate this workshop, as part of its annual results workshop series that rotates among the regions. The last workshop co-hosted with NWT CIMP was the year of the Forum's founding under the name Sahtú Environmental Research and Monitoring Forum, in 2014. NWT CIMP's aim is to watch and understand the land so that it can be used respectfully forever. NWT CIMP supports projects that result in a better understanding of cumulative impacts in the NWT and inform northern resource management decision-making. NWT CIMP works with partners to understand key monitoring and research priorities, coordinates and provides funding for monitoring and research, and has a key role in disseminating the results to decision-makers and the public. Several projects presented during this workshop received funding from NWT CIMP.

Activities and Participation

The workshop included a number of activities that allowed participants to share concerns, observations, and research findings. The agenda can be found in Appendix A. The approach was highly participatory and interactive, including a mapping exercise, poster gallery walk (a sample of the posters is provided in Appendix B) and focus groups with presentations. Presenters were provided with a guidance document prior to the workshop to promote successful communication and engagement across cultures (Appendix C). In addition, a number of impromptu activities were added to the process along the way, including posting of Dene language and science terminology (Appendix D), the creation of a calendar of the main activities and proposal opportunities

scheduled in the Sahtú (Appendix E), and finally role playing of engagement between researchers from outside of the region and community leadership.

Formal sessions were coordinated to share information according to the participant's interest: these sessions were under the format of three focus groups on 1) water and fish, 2) caribou and harvesting, 3) changes in the land and people.

Presentations to the entire group of participants were also organised, with occasional round table discussions so each of the participants had the opportunity to provide feedback.

Finally, there was also the opportunity to network and discuss priorities in an informal context during meals. The gathering for food, coupled with the craft market and drumming, offered a strong cultural context to the workshop.

Over 80 individuals participated in the workshop, with about half of the participants coming from the Sahtú and half the participants coming from elsewhere in the Northwest Territories or Canada. Representatives from the five Sahtú communities (Fort Good Hope, Colville Lake, Tulít'a, Délı̨nę, and Norman Wells) attended the meeting. The list of participants can be found in Appendix F.

Role Play and Reconciliation

The role play was a very successful impromptu activity that provided community and visiting researcher participants with an opportunity to gain insights into each other's experiences of the research encounter through role reversals. Two visiting researchers (Kimberly Howland and Steve Kokelj) played the role of community research participants, and a community member (Michael Neyelle) played the role of a visiting researcher. The role playing made everyone laugh, and at the same time people were able to better empathize with each other, understanding that building relationships is crucial for successful collaborative research.

Figure 1: Participants at the Sahtú Research Results Workshop 2019 (photo credit: Colin Macdonald)

What's in this report

This report provides a summary of key messages from the 2019 Sahtú Research Results Workshop. The report begins with reflections on the theme of climate change that brought together many if not all of the participants' interests. The report then explores results of the three focus groups addressing the key workshop themes. Summaries are provided of research projects presented during the focus groups and in plenary sessions. Finally the report summarizes learnings that can inform the Sahtú Research and Monitoring Strategy.

Climate Change: Early Indicators and Importance of Collaboration

The climate changes. People living on the land are the best sentinels of their surroundings. Dene know their land and are in the best position to observe changes in the landscape, water bodies and wildlife habitat. Climate change was a central theme running through many of the discussions at the workshop.

Figure 2: Bear River (photo credit: Mylène Ratelle)

"Climate Change, that's going to affect a lot of species. Any thought about the lakes along the Mackenzie River: the lakes are dried up. It's good for the moose, all those lakes are good foraging for them but there's no muskrats. Miller's Island and west of that, all the lakes west of that island. " Daniel Jackson

"Around the Ramparts River there used to be lots of herring, now you set a net up there and there's nothing. Lucky if you get one or two. They used to have cliff swallows. There would be 1000's and now there's nothing. Wonder if it's the water from Norman Wells." Camilla Rabisca

"The Ramparts is pretty important, there are big changes. There was a lot up there and now there's nothing. They talked about that at the rapids at Good Hope, a lot of challenges. Never saw that before. Something is happening to the river. What's happening? Something is happening to the fish to the water, who's responsible?" George Barnaby

Other changes regarding the change in animal behavior and food source availability were mentioned by Sahtú community participants.

"There was a bear around town at the dump, here in Tulít'a in December. You can really see the effects of climate change. The bear should be sleeping right now." Theresa Etchinelle

"You'll notice more foxes in communities and bears too are becoming more common. Not only in Délı̨nę. All over. Seagulls are coming and nesting. Ravens are coming and nesting on houses – in town – that's not right. We live on the land, so we have to teach our young people how to live of the land, how to collect dene medicine. How to collect spruce gum. We went out last summer, and couldn't find many. Certain flowers, flowers, plants, and berries are getting dried up." Camilla Tutcho

Figure 3: Berries (Photo credit: Mylène Ratelle)

Unfortunately, all of these changes can affect the way of life of Dene in the Sahtú. These observations are essential to understand the priorities in terms of research in the region. Collaboration between land users, researchers and academics is essential to investigate the reasons for these changes.

"We know it's getting warming, affect land and mountains and food of caribou. So what's going to happen to caribou in 10-20 years if it continues to get warmer? I want to know if researchers can help with research in the mountains to help protect the caribou for future generations. It's good that you are here, we want to work together – everyone (researchers and community)." Frederick Andrew

"If our animals are gone what are we going to do? We can't depend on store bought food. We need to study what's causing these changes. We need to work together, not only us - everybody – all of you. You probably think the same. We need to work together. We need to do it for our children, for our future." Camilla Tutcho

Participants reported that there are more bugs, the summers are longer, and the weather is unpredictable. Bird migratory patterns are affected by that; birds are late coming up.

Observations and stories are part of the evidence of changes. Traditional knowledge and science are both essential to create strong evidence, which will be the foundation to further plan monitoring and management strategies, to enforce laws and to educate. As such, it is important to make decisions based on this evidence.

"Evidence Based Decision-Making is a process for making decisions about a program, practice, or policy that is grounded in the best available research evidence and

informed by experiential evidence from the field and relevant contextual evidence." (Cdc.gov)

Terminology interpretation: Evidence Based Decision

1. "Observe, see and report." Dora Duncan

2. "We study it. Once you study it, we know what it is. Where it is. And everything we need to know about that specific thing, that specific piece of evidence. We think about it and then we know what it is. " Ethel Blondin-Andrew

3. "We think about it carefully. It's part of the process. So, we know what it is as a result of our studying it." Dolphus Baton

Focus Groups

The focus groups were opportunities to bring together questions and knowledge of participants on three topics: 1) water and fish, 2) caribou, and 3) changes in people and in the Land. These focus groups allowed for free discussion by creating smaller knowledge sharing groups. It was a place for exchanges of knowledge between land users, leaders, scientists and researchers. This

Figure 4: Dəogha (Mackenzie River), from Tulít'a (photo credit: Mylène Ratelle)

section summarizes what was discussed in these sessions. Lists of focus group participants are provided in Appendix C.

1. Water and Fish

The Sahtú region has a strong connection with water bodies. The five communities are located on major water bodies: Sahtú (Great Bear Lake), along Dəogha (Mackenzie River) and on K'áhbamʃtúé (Colville Lake). As such, their way of life is connected to the water: drinking and cooking, transportation between communities and to hunting grounds, and fishing in the summer and winter. Water quality and quantity is a main concern in the region and has generated several research projects.

- ⇨ **The water focus group participants discussed the current projects and formulated new questions on: water levels and quality, contaminants in water and fish, permafrost changes, industrial development.**

Participants reported water level changes. The wetlands around Fort Good Hope are changing fast. The wetlands are important to filter and store water and provide wildlife habitat, food and medicine. Research shows that wetlands also store carbon. ECCC wetlands researcher Kirsty Gurney also mentioned that if wetlands decrease there will be an increase in organic carbon in the water. There will also be more fires, which will also affect the water quality. To keep water clean, wetlands are crucial.

Figure 5: Water and Fish focus group (photo credit: DonnaMarie Ouellette)

Contaminants in water were also discussed. Participants had heard about mercury accumulation in some lakes. For example, there is monitoring for mercury at Kelly Lake. ECCC researcher Kirsty Gurney's work involves the assessment of mercury in some water bodies and wetlands around Fort Good Hope, and the fact that mercury is accumulating in fish. Lindsay Day of the Gordon Foundation mentioned the Mackenzie DataStream tool (mackenziedatastream.ca) which is for reporting and sharing information about water quality along the Mackenzie River. This online, scientifically robust, tool is available for everyone to use and is user friendly.

NWT Geological Survey permafrost researcher Steve Kokelj mentioned that to understand future changes, we must understand past changes. Steve Kokelj studies how the permafrost affects landslides, mainly working in the mountains. Most landslides affect streams. Science indicates that there are places in the North where rain is getting stronger and more frequent, resulting in land erosion. The water deepens or disappears into the ground when there is no more permafrost to keep it on the surface.

> "Permafrost doesn't melt, it thaws. Melting is change of state, thawing is change of temperature. Permafrost isn't just water/ice, it's also rock and organic material." Steve Kokelj

Participants were aware of how changes to the permafrost, and changes to the land in general, can have a huge impact on fish and wildlife. Fisheries and Oceans Canada (DFO) researcher Kimberly Howland is doing a study in the five arms of Great Bear Lake. She reported findings that the bigger fish are being affected by changes in permafrost and depth of water. There are connections between the ecosystems and harvesting patterns: how large and how old the fish are when they are harvested. Her research team has found that the lake is not as cold as it was in the past, and that there were big changes from 50-60 years ago. The changes in fish species were also discussed by the participants.

There is a strong relationship between water, plants and animals. Observations from land users are most valuable, and there is potential to improve youth involvement in monitoring and research regarding water and fish. For University of Waterloo researcher Candice Dimock, camps on the land are a way to connect between individuals, and between people and their environment. She was part of the Water Knowledge Camp at Tek'áicho Dá, Sahtú Də (Marten River, Bear River) in August 2019, which brought together community members and researchers. It was a space for exchanging knowledge and raising concerns about water. It was also a great opportunity to pass on the teachings from Elders to youth. Priorities and perceptions about drinking water were discussed at that camp. Data on the drinking water from the communities' water systems is publicly available.

Other topics discussed during this focus group concerned the potential impacts of oil seepage into the river, the impacts of human-made islands and the levels of persistent organic pollutants (POPs) in the water and fish.

2. Caribou and Harvesting

Caribou are essential to Dene and Métis ways of life in Sahtú communities. Caribou is a sacred animal for Dene people. It provides food, tools, and clothing.

> "Our Elders always looked after their habitat. If you mess it up, they said the caribou will not come back again. We have to keep it clean for them to hang around." Leon Andrew

> "Good example, caribou horn – use it for carving, yes, but a long time ago. They don't break. When you see caribou fight – moose too – they bend, don't break when they're interlocking. Use as ice chisel, at that time maybe the use a bow had at end of bow. " Frederick Andrew

The participants expressed the importance of maintaining this relationship for the next generations.

> "I can't imagine a world without caribou and our people without caribou (…) How can we save it for the rest of the generations?", Ethel Blondin-Andrew

> "We have to think about the younger generation. Why do you think they are sitting here? They are thinking about their future. They're coming to us - someday they're going to have a family of their own. Now is the time to do things right." Frederick Andrew

One way to keep this relationship between Dene and caribou alive is by passing down knowledge, techniques and values to the younger generation. Traditional knowledge and teachings were mentioned on several occasions.

"Young people should know as much of that knowledge about caribou, skin, dress, and anatomy (parts inside, outside), they hunt and skin but don't know all the parts of the caribou. Someday I don't mind – I'd really like to teach them. We have to value all the parts." Frederick Andrew

"Talk to the young hunters: Don't shoot too many, just what you need. And the moose too. In the springtime we suggested to the hunters not to shoot cow and calf, a lot of them live by that rule. Go by, look for bull." Michel Lafferty

Traditional knowledge can assist monitoring efforts by having trappers and hunters assessing the signs on the snow. The land users are also in the best position to know about caribou behavior, habitats and the factors impacting those.

"Caribou like to come up and down Canyon Creek. Wolves on Bandy Lake. ENR put out a thing when they were coming into town. Muskox come down when you kill the wolves, and the muskox chase away caribou. I'm concerned about impacts of wolf-cull on the ecosystem." Jaryd McDonald

There are also concerns regarding caribou harvesting. Participants raised several issues regarding the current caribou harvesting practices and regulations, such as the Wildlife Act. Some participants mentioned that the traditional approach might interfere less with the caribou herd and habitat.

"Elders say caribou have a mind of their own, like a human, they come and go. The advice of Elders, is we should just leave them. Don't bother them. But we're doing all this stuff here, and I'm starting to think the best way is just to leave them." Douglas Yallee

However, participants still acknowledged the importance of not harvesting too many animals to have a healthy herd, and respecting everyone in the region relying on the caribou.

"They're around, they're not going to disappear. There are caribou born every spring. But I hear rumours about people abusing the caribou herd. They can't come back up if you shoot that many." Michel Lafferty

Not only are direct human interactions, such as hunting too many caribou, a factor of concern, but other human activities that emit noise in the caribou habitat are also reported by participants as a factor that is negatively impacting the caribou herd. During the focus group, the noise emitted by helicopters, jet boats, fireworks and snowmobiles was reported as a disturbance to the caribou.

"Non-hunters in the Wells, in the mountains, mile 50 stay at mile 25, then mile 70 where the big herds are. There's an easy-access road. People who aren't going to hunt go out there to party. Throw a fireworks show. We were out there at mile 25 and they were at mile 70 shooting off fireworks and drinking. Uncle Harold was angry. People skidooing out there – scaring animals away." Jaryd McDonald

Participants also reported that other animals and environmental factors might impact the caribou.

> "Muskox are taking over caribou territory outside of town." Jaryd McDonald

Muskox are perceived to be a competitor to caribou, causing caribou to move away. In addition, their dark color makes it dangerous when driving at night and they represent a physical danger as the muskox can charge at people.

The management of caribou harvesting, even though it is perceived as beneficial, does not seem to be working in its current form for the Sahtú participants.

> "Why is there a Total Allowable Harvest now punishing people that live off the land?" Ethel Blondin-Andrew

The residency clause in the *Wildlife Act* was also widely discussed. In this current form, the residency requirement is short (12 months) allowing newcomers to hunt on traditional lands.

Participants expressed concern with impacts of mineral exploration and development. Noise from mining industries, as well as roads built to facilitate resource development, were raised by the participants as impacting both caribou habitat and behaviour and harvesting practices.

Finally, concerns were raised about the efficiency of the coordination across boundaries (e.g. Yukon and NWT) as caribou move freely across the boundaries.

Figure 6: Caribou focus group (Photo credit: Colin Macdonald)

The SRRB was planning to convene a series of Public Listening (Hearing) Sessions to address the central question, "What is the most effective way to conserve caribou?" The scope of the sessions would include the three kinds of caribou that live in or travel through the Sahtú region: barren-ground caribou (what scientists call Bluenose West and Bluenose East herds), boreal woodland caribou, and mountain caribou. The Public Listening Sessions would be an opportunity to hear what the Sahtú people, governments and the public have to say about five "hot topics."

The first Public Listening Session, co-hosted with Colville Lake on January 21-23, 2020, would addresses the question, "What is the most effective way to regulate the harvest of caribou?" The aim is to create an approach to caribou harvesting that is effective and addresses conservation concerns.

- ⇨ **Strategies to monitor caribou and the role of the communities in the monitoring were discussed. The recommendations can be classified under four components: 1) improving the caribou monitoring, 2) revisiting the quota for the Sahtú communities, 3) create a stronger system and enforcement, and 4) improving herd health.**

1) CARIBOU MONITORING

The first step suggested would be to improve the system for monitoring caribou. Participants reported that the current strategy of using collars to locate caribou and conduct aerial surveys is invasive and inaccurate. In the Sahtú region, people are opposed to putting collars on caribou. Cameras are being used in Náats'įhch'oh National Park Reserve to monitor presence of caribou and other wildlife non-invasively, but other methods may be needed to address questions about caribou status.

The participants mentioned that harvest monitoring is really important. Harvesters have the knowledge to monitor caribou. Nę K'ądí Ke and youth should be involved in monitoring caribou.

2) *REVISITING HARVEST REGULATION*

In the Sahtú, Indigenous harvest regulation systems defined in community conservation plans (CCPs) are replacing the Total Allowable Harvest and tag system for regulating caribou harvest. Délįnę has developed a plan that's been approved by the SRRB and the Minister of ENR, and Colville Lake has submitted a plan to the SRRB for approval at the Colville 2020 Public Listening Session.

> "Wouldn't it be generational data to determine harvesting needs? So, they know, they know their harvest knowledge. No one has to tell them that, they know that." Ethel Blondin-Andrew

The foundation of Dene harvest regulation is to take what is needed, not more. It is essential to remember that harvesting is a way to get local healthy food for Sahtú communities. Market food is expensive. But Dene have always harvested alternative species or in other areas when certain wildlife become less available. In fact, this is the basis for the annual seasonal harvest system, which must change with changing environmental conditions.

"When people get hungry there's no way you can stop that." Leon Andrew

Participants do not support sport hunting, which is not consistent with Dene values in maintaining respectful relationships with caribou. There is some interest to look into the Kugluktuk Angoniatit Association's strategy as they created designated areas where residents can hunt.

The residency requirement should also be revisited. Sahtú residents believe that the requirement is not long enough, allowing people who do not share a traditional way of life (e.g., temporary teacher, nurse) to hunt on their Land.

3) CROSS-REGIONAL RELATIONSHIPS

Participants suggested that agreements could be developed between communities. In order to hunt on another territory, hunters would need permission from the host community. Non-residents or new residents of the communities would also seek community permission to harvest.

Local monitors should have the role of monitoring hunting grounds. These monitors know where to enforce the regulations and could set check points along the river and on the trails. A system based on wildlife cameras, the guardianship program, and partnership with a governmental structure (e.g., ENR) can lead to a proper strategy to have boots on the ground and ensure correct harvest monitoring.

4) IMPROVING HERD HEALTH WHICH WILL IMPACT HARVEST POTENTIAL

Participants highlighted that it is essential to consider factors other than harvest regulation to conserve caribou. They suggested considering how impacts of resource development, caribou-predator relationships, wildfires, and competitor species can be addressed. For example, muskox is impacting caribou. An option to manage caribou, which is traditionally harvested while muskox is not, would be to support increased muskox hunting in some areas. There was also a recommendation to implement a regulation to limit human noise around herds.

Concerns varied slightly across communities. The following comparative table reports the needs and concerns mentioned by delegates from each during the focus group.

Table 1: Caribou and Harvesting Concerns by Sahtú Community

Topic	Colville Lake/ Ft Good Hope	Tulít'a	Délı̨nę
What kinds of caribou most concern you?	Bluenose West caribou	All caribou are important	Barren-ground (Bluenose East) caribou
What are the main conservation concerns?	• Reassess the residency requirement • Get permission from Indigenous government • Continue harvest monitoring with Guardians	• Assess human impact on herds (e.g., roads) • Assess the impact of climate change on herd • Enforce and review local hunting regulations, residency, permits, licensing	• Assess the impact of development and climate change, species competition on caribou herd and habitats. • Revisit the permits for development and mining. • Limit sport hunting.

Topic	Colville Lake/ Ft Good Hope	Tulít'a	Délı̨nę
	• Improve Traditional Teachings: Make sure all the animal parts should be used	• Traditional teachings: every part of caribou is used for subsistence, no wasting • Harvest monitoring	

3. Changes (Land and People)

The Changes focus group generated some options for solutions to current challenges. The discussion encompassed changes for several human components, including health, behavior, food sources, economy, and culture.

⇨ **Changes in Dene béré (country food) availability, in climate and weather, in animal behavior, in lower health, in cultural practices and in economy were topics discussed during this focus group.**

Participants shared stories regarding how the climate was changing in the region. Temperatures are getting warmer, the landscape is more dry and there are changes in fire (behaviour, intensity). These changes impact the environment and animal habitats. More animals such as foxes and wolves have been observed within communities in recent years.

One of the main concerns mentioned is that the Indigenous Dene béré system is becoming expensive. People need money for gas and equipment to travel on the land. They have to work, and don't have time to go out on the land to go hunting. Because of the change in migratory patterns, hunters have to travel further to find caribou. Barriers to accessing Dene béré were discussed.

Participants mentioned changes in the availability of Dene béré such as berries. Communities need to consider how to improve access to Dene béré in this context. The transition from Dene béré to store food and the challenge of encouraging young people to eat more Dene béré were mentioned by participants. Food security and access to Dene béré are interconnected in the Sahtú region. Several options for supporting community food systems were discussed, such as:

- Getting funds to install solar panels on a food preparation trailer already available in some communities
- Sharing food among communities; for example Délı̨nę can provide fish in the summer while Tulít'a could provide moose to other communities according to the season
- Building a public camp on the land to facilitate the harvesting

The health of people was also identified as worsening. Pollution, and contaminants in water, fish and wildlife were major concerns (e.g., mercury in fish). Contaminants were generally associated with resource development. This issue was perceived to be associated with higher disease and

cancer rates. More travelling, and the use of motor vehicles were also identified as having potential effects on health, both due to the physical dangers, as well as the reduction of physical activity. The physical danger of going on the Land due to changes to the landscape was also discussed. Some of the options were to:

- Create a knowledge network to report where there are unsafe locations. This could be based on an initiative done in Nunavut SIKU, with the creation of an application called SIKU (Indigenous Knowledge social network).
- Involve Guardians in the identification of dangers and in maintaining the safety of trails.

Not only would the creation of a map for safety reasons benefit the region, but early environmental changes could be monitored through this mapping system. Participants mentioned the importance of traditional knowledge to identify early indicators of climate change. Nę K'ədí Ke would be the best resource to support this initiative. Forests and vegetation are changing, and participants reported a strong need for more monitoring.

Changes in cultural practices in the current economical context were discussed. Participants wondered what the job opportunities would be in the future, and reflected on the nature and role of a mixed economy. Women are interested in having a role to play in this new mixed economy, for example by selling crafts. In addition, differences in the impact of climate change can be observed between genders in their traditional roles. While men will change their location for hunting if the animals change migration patterns, women will not be able to prepare traditional foods or medicine if there is a drought affecting spruce gum and berry patches.

A discussion was held on how the way of life is changing because the environment and forest is changing. On the land camps, which increase intergenerational relations, are important for culture conservation and health improvements for the Sahtú region.

Figure 7: Focus group on Changes in people and on the Land (photo credit: Colin Macdonald)

Presentations: Current Research and Monitoring in the Sahtú Region

⇨ **We learned about different initiatives, projects, and programs currently happening in the Sahtú region, or recently completed through a poster gallery walk, presentations in focus groups and plenary sessions, and informal discussions. Participants shared about 13 research projects, and we were informed about three frameworks for environmental deicion-making.**

The projects presented by researchers provided a snapshot of the state of research related to the three workshop themes. One additional theme regarding frameworks for drawing upon knowledge for wise decisions emerged in three of the presentations. The following summaries are clustered by theme as follows:

1. Water and Fish
2. Caribou and Harvesting
3. Changes (Land and People)
4. Knowledge for Decisions

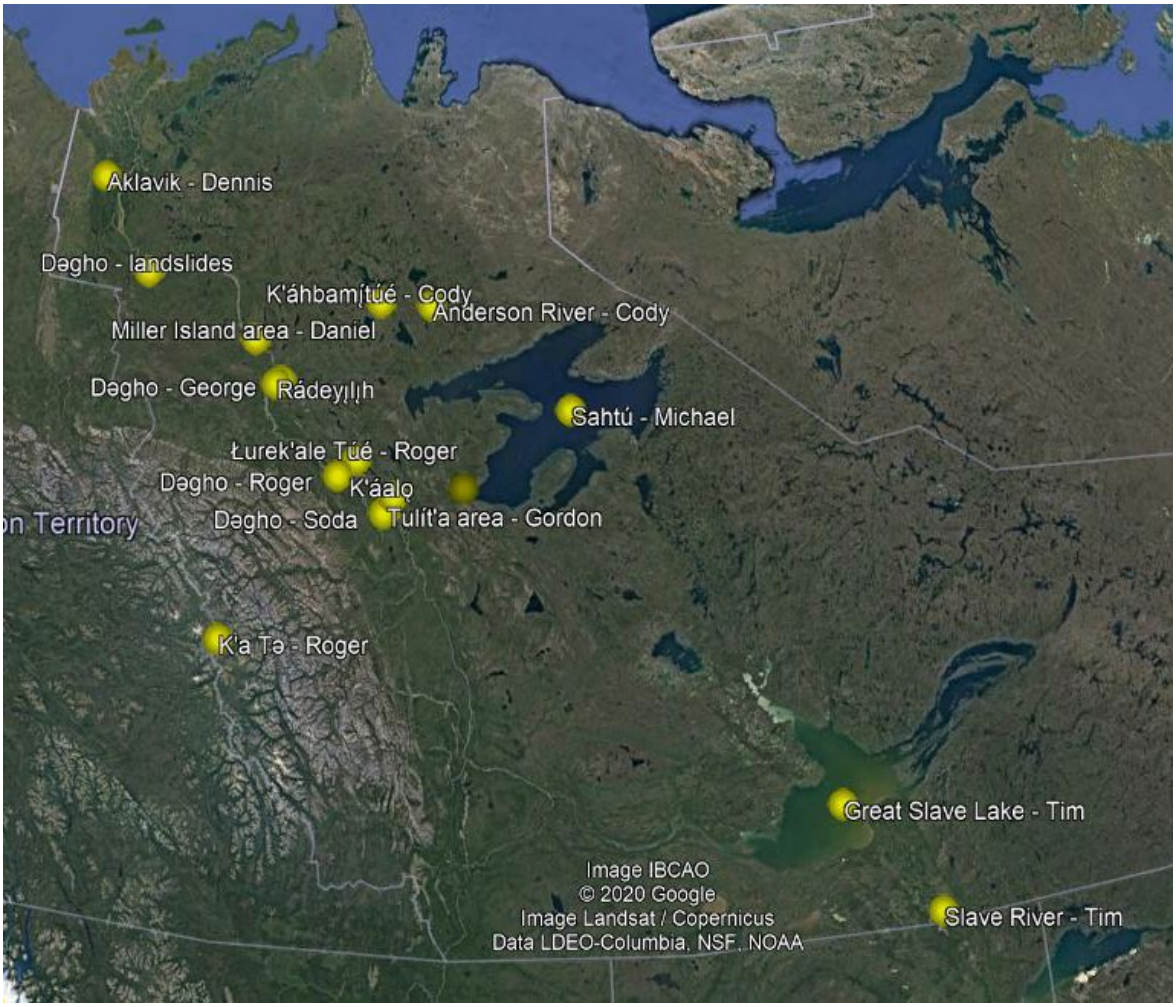

Figure 8: This map shows the geographical scope of knowledge and interests represented by participants at the 2019 Sahtú Research Workshop.

Theme 1 Presentations: Water and Fish

Managing and Sharing Water Monitoring Data

Presenter: Lindsay Day (Gordon Foundation)
Contact: lindsay@gordonfn.org

The Mackenzie DataStream is an open access hub for sharing water data. DataStream is a collaborative initiative led by The Gordon Foundation in partnership with regional monitoring networks. The mission is to promote knowledge sharing and advance collaborative water stewardship. The website is a friendly visual tool which makes monitoring results easier to understand. In fact, it provides a place to store, share, and compare water monitoring results across watersheds. The website currently includes the water quality data from 1,112 sites along Dəogha (the Mackenzie River). Knowledge based on this data can be translated into action to protect the health of watersheds on which we all depend.

Understanding Landscape Change through Permafrost Monitoring

Presenter: Steve Kokelj (NWT Geological Survey – NTGS)
Contact: Steve_Kokelj@gov.nt.ca

The principal Investigator is Steve Kokelj; NWT CIMP assists with funding this project.

This research focuses on permafrost and terrain stability in the Northwest Territories, and the influence of permafrost thawing on infrastructure stability, and terrestrial and aquatic systems. Field observations, remote sensing, historical climate data, regional ground temperature and numerical simulation were used to investigate the permafrost thawing and its effects. The project also integrates a strong communication component of making geoscience information accessible to the public. Rainfall will have significant impacts on the geomorphology of permafrost landscapes. The ''mega slump'' are now common in formerly glaciated, fluvially incised, ice- cored terrain of the Peel Plateau, NWT. These thaw slumps can displace materials from slopes to valley bottoms, reconfiguring slope morphology and drainage networks. The number and size of active slumps and debris tongue deposits has increased significantly with the intensification of rainfall. The analyses of high resolution climatic and recent photographic time-series show strong linkage amongst temperature, precipitation and the downslope sediment flux from active slumps. In addition, ice-wedge were investigated. In the northernmost dwarf-shrub tundra, ice-wedge polygons cover up to 40% of the ground surface. The largest ice wedges are in peatlands where thermal contraction cracking occurs more frequently than in nearby terrain

Figure 9: Landscape change (credit: Steve Kokelj)

with fine-grained soils. The composition of the soil impacts the ice-wedge. Climate change impacts the permafrost and the ice wedges and increase the susceptibility to degradation.

Understanding Changes in Aquatic Ecosystem Health and Water Quality in the Fort Good Hope – Ramparts Area

Presenter: Kirsty Gurney (Environment and Climate Change Canada)
Contact: Kirsty.Gurney@canada.ca

The principal Investigator is Kirsty Gurney; NWT CIMP assists with funding this project.

This project is part of an ongoing collaboration with Fort Good Hope and aims to develop and implement sampling protocols for long-term, community-based, monitoring of aquatic ecosystems near Fort Good Hope, to help understand how landscape-level environmental changes (climate change, increases in forest fires) might impact water quality in this area. Between 2017 and 2019, the team studied variation in water chemistry and invertebrate communities in freshwater ecosystems, including wetlands and some larger lakes (hereafter ponds), within the recently established protected area, Ts'udǝ́ NJlJné Tuyeta. Preliminary analyses of data collected during this study suggest that the ponds studied are (i) physically and biologically diverse and (ii) characterized by clean water (with very low levels of contaminants). Both the physical and biological characteristics of these ecosystems, however, are likely to be affected by predicted increases in forest fire frequency, and these effects may be amplified on smaller wetlands. Ongoing work with partners in Fort Good Hope continues to focus on training Indigenous Guardians and monitoring the health of freshwater ecosystems as it relates to environmental change.

Figure 10: Wetlands (Photo credit: Kirsty Gurney

Long term Monitoring of Sahtú (Great Bear Lake) fisheries and the Aquatic Ecosystem

Presenter: Kimberly Howland (Fisheries and Oceans Canada -DFO)
Contact: Kimberly.Howland@dfo-mpo.gc.ca

The principal investigator is Kimberly Howland; NWT CIMP assists with funding this project.

This project is done in collaboration with Délı̨nę. This study uses long-term monitoring of the fisheries and aquatic ecosystem, water quality and the components within the ecosystem in each of the five arms on Sahtú (Great Bear Lake) to inform decision making. The method combines biological, limnological and paleolimnological data to study past, present and future impacts of climate change on Sahtú ecosystems. The data from the monitoring of lake trout and cisco provides information on the biology of fish in the lake and different ecological characteristics and roles in the Sahtú food web. The study includes the spatial coverage of different habitats, and it looks at the whole fish community together with water quality, primary productivity and invertebrate production which are essential for supporting fish populations. The study was first initiated in 2008. The baseline data collected through this study will form an important basis for tracking and understanding the cumulative effects of climate change, fishing and other human induced drivers on the Great Bear Lake ecosystem and its fisheries.

Cross-Cultural Water Research Camps (Nę K'ə Dene Ts'ı̨lı̨ Forum)

Presenter: Candice Dimock (University of Waterloo)
Contact: Candice.Dimock@uwaterloo.ca

The principal Investigator is Jennifer Baltzer and the project is in partnership with the SRRB; the main funder is Global Water Futures.

The first of three Cross-Cultural Water Knowledge Camps, held at Sahtú Dá (Great Bear River) at Tek'áıcho Dá (Marten River) from August 19-26, 2019, was an opportunity for Dene and Metis people of the Sahtú and academic researchers to come together on the land to share knowledge about water, climate change, and environmental monitoring. The camp's design was based on the Cross-Cultural Research Camp model for co-production of knowledge. The camp aims to provide interactive experiences arising from on-the-land practices and dialogue with traditional knowledge holders combined with science-based research and monitoring techniques and methods. Community members and researchers identified priority areas of concern resulting in enhanced understanding of the need to merge scientific environmental knowledge with traditional knowledge. There is the potential to develop a research-based water and insect monitoring collaboration that would help build capacity and local employment opportunities for Guardians who could help researchers identify and navigate traditionally relevant locations. A need was identified by ENR for greater support from community partners, such as the SRRB, to better link Guardians and youth with current community-based water monitoring initiatives in the Sahtú. Throughout the camp, the youth were offered many opportunities to continue developing their leadership skills. A Cross-Cultural Water Knowledge Research Camp Resolution was drafted, which outlines the actions that should be taken related to youth leadership, climate change, drinking water, and environmental monitoring.

Theme 2 Presentations: Caribou and Harvesting

The Shúhtagot'ıné Cultural Landscape Project

Presenters: Glen MacKay (NWT Cultural Places Program and Leon Andrew (SRRB and Canadian Mountain Network)
Contacts: Glen_MacKay@gov.nt.ca ; lamountaindene@theedge.ca

The principal Investigator is Thomas Andrews; the main funder is the Canada government- commitment to the International Polar Year.

The NWT Ice Patch Study was developed in partnership with the Shúhtaot'ıné (Mountain Dene) residents of Tulít'a. The study explores how Shúhtaot'ıné traditional knowledge, collected through the direct participation of Elders in archaeological fieldwork, science camps with Elders and youth, Elder interviews, and traditional land-use mapping, is informing the interpretation of archaeological data collected at alpine ice patches in the Selwyn Mountains. Ground squirrel snares, arrow shafts still attached to arrowhead, and caribou fences are examples of what were found in the ice patches. While knowledge of bow-and-arrow and snare technologies persists in Shúhtaot'ıné culture, Shúhtaot'ıné oral history does not contain detailed knowledge of throwing dart technology. Shúhtaot'ıné land-use practices involve long-distance travel in all seasons. Safe travel in the alpine landscape requires detailed knowledge of environmental conditions, such as snow and ice conditions, and respectful engagement with the spiritual entities inhabiting the landscape. With climate change the ice patches are melting really fast, one ice patch was 3000 years old and disappeared from 2009-2011. Ice patches, which hold precious historical and ancestral information, are melting away rapidly with climate change.

Exploring the Population Dynamics of shúhta goʔepę́ (northern mountain caribou) in the Mackenzie Mountains

Presenter: Thom Stubbs (ALCES, Headwater Group)
Contact: Thom.Stubbs@headwatergroup.ca

The principal Investigator is Matt Carlson (mccarlson@alces.ca) from ALCES; Cumulative Impact Monitoring Program (NWT CIMP).

A collaboration of traditional and scientific knowledge holders came together to explore future population scenarios for shúhta goʔepę́ of the Mackenzie Mountains. Shúhtaot'ıné and the Tulít'a and Norman Wells ʔehdzo Got'ıné have been seeking to understand cumulative impacts affecting shúhta goʔepę́. The Sahtú Decision Support Tool ALCES (A Landscape Cumulative Effects System), a population and landscape simulator, was used to test questions relating to the mountain caribou population. Sahtú ALCES develops assumptions for future changes to the environment, development and population to estimate future landscape scenarios. A working group of Shúhtaot'ıné from Tulít'a and Ross River Yukon came together with caribou biologists to identify factors influencing shúhta goʔepę́ and developed an overall impact hypothesis. Analyses of the population dynamics of northern mountain caribou revealed insights into the sensitivity of caribou populations to variation in habitat (both quality and quantity), natural mortality (predation, winterkill), to human harvest (Indigenous harvesters, residents, sport hunters), and

climate change. The conditions that contribute to relatively large and stable shúhta goɔepę́ populations include: relatively low year-to-year variation in climatic parameters and forage production; minimal loss of caribou habitat quality or area associated with directional climate change; low rates of human harvest; and predator populations that are dependent on caribou population size. Conditions that contribute to reduced and highly variable shúhta goɔepę́ populations include: high variation in climatic conditions and forage production; incremental loss of caribou habitat (quality or area) associated with directional climate change; high rates of harvest due to hunting by Indigenous harvesters, residents, and sport hunters; and predator-prey dynamics where wolves are sustained primarily by moose (and/or other prey species), and incidentally kill caribou through the year. These results underscore the challenges of managing mountain caribou herds that are subject to highly variable vital rates and population sizes under conditions of high environmental variance, increasing predator populations, multiple stakeholders each with harvest expectations, and shifting landscape conditions associated with climate change. These sensitivity analyses reveal the benefits of adopting conservative harvest rates for mountain caribou populations.

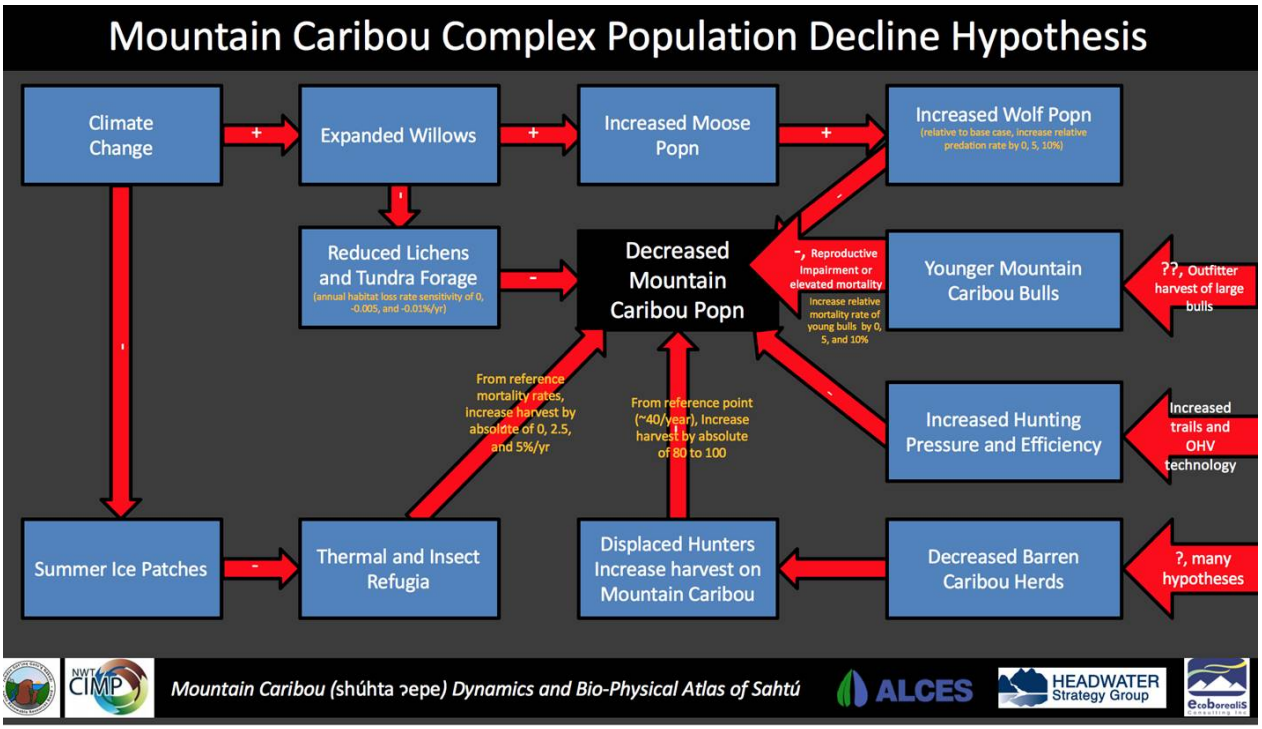

Figure 11Ł Interactions potentially affecting the caribou (Figure credit: Thom Stubbs)

Nááts'ıhch'oh National Park Reserve Research

Presenters: Johanna Robson and Sheena Parsons (Nááts'ıhch'oh National Park Reserve)
Contacts: pc.Tulít'ainfo-infoTulít'a.pc@canada.ca

The research aims to improve the caribou monitoring in Nááts'ıhch'oh National Park Reserve. In the Sahtú land area, the team study two herds (Redstone and South Nahanni herd). The techniques used for monitoring are non-invasive and are mainly realized by motion-triggered cameras, which require annual servicing to collect batteries, memory cards, and replacement if there is damage. The monitoring network is 61 cameras in total. The project gathers information on where they rut near Howard's Pass. There is only one year of data on the Redstone heard, which shows they calve near Moose Ponds. For the South Nahanni Herd, there are some concerns about the road's presence, which was established by mining companies before the park existed. The caribou activity might decrease with increasing traffic (e.g., cars, trucks, bulldozers, ATVs). For the South Nahanni Herd they looked at arrival, abundance moving through, calving, recruitment, and sex ratio. One of the long-term objectives is to see which areas are used at different times over the year and for what (e.g., calving time). It is possible that there is some migration overlap, but the two herds are two distinct populations. The latest data shows 218 caribou in the Redstone herd. The cameras set up along the road also captures vehicle use and wardens try to use these images to increase enforcement.

Learning About Muskoxen

Presenter: Kevin Chan (ENR)
Contact: Kevin.Chan@gov.nt.ca

It is important to look at ecosystems as a whole, not only at a single species. As such, to identify the health of the ecosystem, and the health of caribou herds, it is beneficial to look at muskox. Muskox are usually living in tundra, not in the boreal forest. However, in recent years muskox have been seen more frequently in the Sahtú region. Sahtú residents observe that muskox are in direct competition with caribou, driving them away. However, it is unclear if the caribou are pushed out by the muskox or if the caribou are simply changing habitats. Predation and climate change will be factors to integrate in this assessment. This new 2-year study aims to estimate the abundance of muskox in the Sahtú. The last estimate was done in 1997. The team is working with Gwich'in, and Sahtú Dene communities to see how far muskox have gone (e.g. did they cross the river toward the west?). A comparative study will be done to know how caribou are doing in areas without muskox. The community is invited to discuss the areas considered as a priority.

Figure 12: Research Director Leon Andrew and Executive Director Deborah Simmons of the SRRB, talking about the Sahtú initiatives (Photo Credit: DonnaMarie Ouellette)

Theme 3: Changes (Land and People) Projects

Food Security, Dene Béré and Climate Change in the Sahtú Region

Presenter: Mylène Ratelle (University of Waterloo)
Contact: mratelle@uwaterloo.ca

The principal investigator is the SRRB; the main funder is the Canadian Institutes of Health Research.

The aim of the project is to assess food security and to increase resilience to climate change in the region. The SRRB documented the food security issue in the community using a survey in Tulít'a. In addition, nutrients will be measured in blood samples already collected from participants and then compared to deficiency thresholds. These results will be used to identify the most vulnerable groups in the region and investigate the role of Dene bérés in preventing food insecurity. Each participant will receive his or her individual results. A two-way knowledge exchange will be conducted to discuss challenges and solutions to food security and the role of Dene béré. Even if food security is very low, the majority of people said they were not left hungry when there was not enough money to buy food. Preliminary results indicate that Dene bérés, directly harvested or shared, play an important role when people cannot afford food from the store. The next step is to discuss how to promote Dene béré in the Sahtú.

Learning From and Enhancing Community Capacity for Climate Change and Food Security (C4FS) Action in the NWT

Presenter: Kelly Skinner (University of Waterloo)
Contact: kskinner@uwaterloo.ca

The principal Investigator is Kelly Skinner; the main funder is the Canadian Institutes of Health Research.

This research aims to support community capacity to address priorities and inform both climate change and food security action and support structures at local, regional, and territorial scales. Using a Participatory Action Research approach and involving traditional knowledge, it is critical to understand how climate change impacts food systems, as Dene béré is linked to the health of the environment and the land, as are the health of community members and the long-term sustainability of communities in the North. This research examines research questions related to food security and climate change across four cross-cutting themes: traditional knowledge; governance; youth; and sex and gender using a case study approach. The research involves six case study communities (Tuktoyaktuk, Paulatuk, Délı̨nę, Whatì, Wekweètì and Kakisa). These case studies were chosen based on existing researcher-community relationships and the alignment of community needs with the project. The assessment of what to do with the food processing trailer in Délı̨nę, and the training offered to the community members in 2019, was part of this project. The aim is to increase the community leadership abilities in the context of the promotion of wild foods and food security in a changing environment.

Contaminant Biomonitoring in the Northwest Territories

Presenter: Mylène Ratelle (University of Waterloo)
Contact: mratelle@uwaterloo.ca

The principal Investigator is Brian Laird; the main funder is the Northern Contaminants Program.

The biomonitoring project aimed to measure the contaminant levels in residents. The project was developed after the government recommended not eating certain fish species from some lakes to limit mercury exposure. Over 100 toxic substances were tested in hair, blood, and urine. This project happened in nine communities of the NWT, including Fort Good Hope, Tulít'a and Délı̨nę (2017-2018). Individuals received their own results. The levels of the majority of contaminants were generally low, except for lead levels, which were slightly above normal in the Sahtú region. The next step is to investigate why lead levels in the urine and blood of the Sahtú participants were elevated.

Bridging Visions for Conservation and Development in Nío Nę P'ęné

Presenter: Kimberleigh Schultz (McMaster University)
Contact: schultzk@mcmaster.ca

The principal Investigator is Leon Andrew; the main funder is the Canadian Mountain Network.

Nío Nę P'ęné - Trails of the Mountain Caribou area, has been a gathering place for people and caribou for thousands of years. The focal points of the research are the health of shúhta goɔepé (mountain caribou) and Dene ts'ı̨lı̨ (being Dene; Dene identity or ways of life). The partnering communities are developing a plan for research, monitoring and land protection to achieve their vision for keeping Dene kədə (language), Dene ts'ı̨lı̨ (ways of life), and Dene ɔeɔa (law) strong in coexistence with caribou. Partners include Tu Łidlini (Ross River) Dena, Norman Wells and Tulít'a ʔehdzo Got'ı̨nę and SRRB, Norman Wells and Tulít'a ʔehdzo Got'ı̨nę (Renewable Resources Councils), the Tulít'a Dene Band, and the Tu Łidlini (Ross River) Dena Council. The approach involves a robust combination of Indigenous methodologies and scientific inquiry. The outcome will be a body of evidence about the biological and cultural significance of the Níǫ Nę P'ęné area, as well as a framework for caribou conservation and habitat protection.

Theme 4: Knowledge for Decisions

NWT Cumulative Impact Monitoring Program - supporting decision making in the Sahtú

As presented by Lorraine Brekke, NWT CIMP

NWT CIMP is part of the co-management environmental regime under the Mackenzie Valley Resources Management Act. NWT CIMP has a steering committee which provides advice and direction to the program. The program was implemented in 1999, to support the interests of decision makers from the communities' leadership and government. The Indigenous Steering Committee includes delegates from Indigenous governments, the territorial and federal government, and observers from co-management boards.

NWT CIMP is funded by the government, and uses environmental monitoring to monitor the Land so it can be used respectfully. NWT CIMP works with partners to understand key priorities; coordinate funding, research, and analysis to investigate these priorities; and communicate the results to decision makers and Indigenous governments.

⇨ "The vision of the NWT Cumulative Impact Monitoring Program is 'to watch and understand the Land so that it can be used respectfully forever." (NWT CIMP)

The NWT CIMP Pathway Approach (research cycle) is the following: 1) define a purpose (what is the need); 2) identify key connections (who are the partners); 3) review the current knowledge; 4) ask the right questions; 5) make a plan; 6) collect the information; 7) analyze the information; 8) report the findings; 9) integrate the findings in decision making and adapt to changes.

Results are widely available in both technical and plain language formats. The information can be found online on the NWT discovery portal. The final reports, papers, posters, presentations and project summaries can be easily retrieved. The website (nwtcimp.ca) also includes videos, their priorities, and funding opportunities.

NWT CIMP has a strategy to promote the integration of traditional and local knowledge in the monitoring of local trends. Since 2011, the focus of the program, based on local priorities, is the barren ground and boreal caribou, water and fish. The NWT CIMP currently funds nine projects in the Sahtú region. In total, 18 projects were funded in the region since 2004.

Table 2: Sahtú Projects Currently Funded by NWT CIMP

SAHTÚ			
Caribou		**Water**	
SRRB	Diversity and Spatial Organisation of Caribou	Tsá Túé Biosphere Reserve	Traditional Knowledge of Great Bear Lake and Its Watershed
SRRB	Dene Mapping Project	ECCC	Water Quality in Fort Good Hope – Ramparts Area
ENR	Community-Based Wildlife	ENR	Central Mackenzie Water and Benthic Invertebrate Sampling
UCalgary	Community-Based Wildlife Health Monitoring	NTGS	Understanding Landscape Change through Permafrost Monitoring
Fish		**Other**	
DFO	Long Term Monitoring of Great Bear Lake Fisheries	SRRB	Environmental Decision Support Tool

Delegates from the funded projects were present at the meeting to discuss the projects' approaches and results with the communities. This networking opportunity allowed for the return of results (previously identified as a key element of success for the NWT CIMP), and also allowed them to reassess whether the research was still aligned with the needs and priorities of the

regions and to figure out together how to move forward. The various funded projects are different in their essence but provide key findings that are extremely valuable for the decision makers. Recent projects presented at the 2019 Sahtú Research Workshop are good examples of this:

- Kirsty Gurney's research focuses on a water quality monitoring network in wetlands, implementing sampling protocols for long-term, community-based, monitoring of wetland ecosystems. The impact of anthropogenic disturbances on water quality will be used to facilitate decision making for Fort Good Hope as well as for the Sahtú Water Board.
- The Sahtú Decision Tool Project, led by the SRRB, shows data sets, maps and figures of possible scenarios of how things might look based on different indicators of the use of resources. The extensive knowledge gathering initiated by the SRRB also resulted in the development of a tool to support environmental decisions. This new knowledge will help to better plan land use, mainly realized by the comanagement boards and the communities' leadership.
- Kimberly Howland's study uses long-term monitoring on Great Bear Lake of the fisheries, aquatic ecosystem, and water quality, to inform the Department of Fisheries and Ocean Canada (DFO) and the water board to facilitate decisions.
- The project led by Dr. Kokelj provided maps of the permafrost features as well as knowledge on sensitive terrain, which is an important first step in response to community concerns about the physical dangers of going on the land and the planning of infrastructure.

All of the projects integrate traditional knowledge, and clearly benefit from this input. All researchers funded by the NWT CIMP developed a strong partnership with communities and both the residents and researchers agree that this is the key to their success.

The meeting in Tulít'a strengthened the partnerships and engagement of researchers with the communities, as NWT CIMP relies on a partnership approach to ensure its success. As per the NWT CIMP key principles, there was a focus on monitoring that is relevant to decisions about land and water use in the NWT. Numerous Indigenous government delegates from the Sahtú attended the meeting.

Figure 13: NWT CIMP blueprints for 2018-2019 are Fish, Water and Caribou (Figure credit: NWT CIMP)

In addition, the meeting outputs helped define new needs and priorities, engaged new partners in the process, and provided a preliminary review of the current knowledge on these issues. This workshop was directly connected to the aim and research approach of the NWT CIMP.

Draft Framework for Forest Management

Presenter: Tom Lakusta and Shawn Maxwell (NWT Environment and Natural Resources)
Contact: Tom_Lakusta@gov.nt.ca ; Shawn_Maxwell@gov.nt.ca

The Government of the Northwest Territories (GNWT) is making amendments to and combining the existing Forest Management Act and Forest Protection Act to create the new Forest Act. The existing acts were outdated and didn't do a good job of dealing with forest-related issues like biomass, or some aspects of how wildfires and fire bans are handled. A new Forest Act will provide an update to the current forest legislation by expanding the focus beyond the economic value of timber to a holistic view that allows for the sustainable use of forest resources within a framework that maintains ecosystem health. The new legislation, which will be created in collaboration with Indigenous governments and organizations, regulatory boards, stakeholders and the public, includes mechanisms for the cooperative management, monitoring and protection of forests in the NWT. In Spring 2019, the draft legislation revamping the protection and use of NWT forests has been put on hold. The public will be invited to comment once again on the draft legislation through a review process carried out at a future date.

Species at Risk Assessments and Research Needs

Presenter: Colin Macdonald (Northern Environmental Consulting & Analysis)
Contact: northern@granite.mb.ca

The Species at Risk Committee is established under the Species at Risk (NWT) Act to assess the biological status of species that may be at risk in the NWT. As part of the assessment, the Species at Risk Committee identifies threats and positive influences on species and their habitats. They may also recommend conservation actions. In the last two years, the committee completed the assessment of some animals, including some bee species and the caribou. The caribou was identified as of Special Concern in the Northwest Territories. It may become threatened or endangered in the Northwest Territories because of a combination of biological characteristics and identified threats. The species may become threatened if negative factors are not reversed or managed effectively. Northern mountain caribou is vulnerable to the effects of climate change, particularly the already noticeable decline in ice patches in the Mackenzie and Selwyn mountains. Other threats include harvesting, recreation activities, resource development, and disrespectful harvesting behavior. There are several elements that may be positively affecting caribou: cross-regional community conservation planning, protected areas, clean-up of some contaminated sites, enhanced monitoring, increased research (scientific and Indigenous knowledge) on the effects of climate change, seasonal habitat and caribou health and behavior, and implementation of respectful caribou harvesting practices. It is also essential to provide structural support for management interventions leading to meaningful actions.

Other Sahtú Projects

Other projects currently conducted in the Sahtú region and led entirely by Sahtú residents and in partnership with the ʔehdzo Got'ıę Gots'ę́ Nákedı (Sahtú Renewable Resources Board – SRRB) are:

- Healthy Country Planning and Wildlife Conservation in the Sahtú Region
- Sahtú Tracking Change: Local and Traditional Knowledge in Water Governance (in partnership with Délıę, Tulít'a, Fort Good Hope, and the SRRB)
- Sahtú Harvest Study
- Sahtú Regional Environmental Monitoring and Decision Support Tool Set
- Dene mapping project repatriation and analysis: Understanding valued places at the intersection of caribou ecology and harvesting
- "Nę K'ádí Ke – Keepers of the Land in the Sahtú Region" (in partnership with the Sahtú Dene Council)
- From Dene Kedə to Dene Ts'ıl: Rethinking Resurgence in the Sahtú Region, Northwest Territories (Dene Kədə to Dene Ts'ıl Working Group)
- Nío Nę P'ęné - Trails of the Mountain Caribou: Renewing Indigenous Relationships in Conservation (Nío Nę P'ęné Working Group, Canadian Mountain Network, Climate Change and Health Adaptation Program Canada)

Research Questions, Gaps and Priorities

When the research results were shared and discussed, it was clear that there were still some research questions, gaps and priorities related to community, regional, and territorial needs and objectives that were left unanswered. As per Objective 3, below is a list of specific questions on water quality, wildlife availability and behavioral changes, climate changes, and policies and regulation. This list is based directly on questions asked during the meeting. While this list is likely not exhaustive, it sheds some light on the areas which should be investigated in the future. These questions can guide further research and initiatives in the region.

Water and Fish

Pollution/ water quality:

- What is the impact of oil development and transport seepage into the river at Norman Wells?
- What are the levels of arsenic at mile 222?

Changes of species:

- Why and how are salmon coming up the Anderson river by Colville Lake?
- Sighting of Salmon in the Mackenzie River? How is that going to affect other species?
- How will the new fish affect other fish?

Changes in water levels

- Why are lakes by Millar Island drying up?

Caribou and Harvesting

Better assess the determinants of caribou herd health:

- How will invasive species (e.g., muskox) impact caribou?
- How to integrate the interactions of predation to estimate caribou herd count?

Harvesting policies:

- How can we be heard by the government on the subject of harvesting regulations?

Changes (Land and People)

The impacts of climate change were a recurring topic during the workshop:

- What changes of temperature have there been in Great Bear Lake in the last 20 years?
- Why are bears around in December?
- What is affecting the Muskrat population?
- Will the changes in animals lead to a Dene béré shortage?
- How is fire and new growth affecting trapping and trail use?

The challenges of the communities in the face of changes was also a topic of interest:

- How to promote Dene béré and make it available to youth?
- How to revitalize the language? How can we make our languages strong again?
- How to protect areas?
- How can we improve the role of the communities in fire management and response?
- What is the impact of changes (economy and climate) for jobs in the North?
- How can we implement a better mixed economy?
- How can communities benefit from new opportunities for jobs in the future?
- How can we promote the role of women in a mixed economy?

Figure 14: The workshop (photo credit: Colin Macdonald)

Collaborative Research in the Sahtú

One purpose of this workshop was to discuss the best approach for doing research in the Sahtú. A collaborative approach is beneficial for research: we all want to work together to improve things.

> "Nice to see everyone talking. One thing to keep in mind, we're people. People from the north, people from the south – we're one." Gordon Yakeleya

One great advantage of having a group of diverse people with different backgrounds coming together is the opportunity it provides to build on diverse experiences, knowledge and perceptions to find solutions for specific issues. This refers to the concept of biocultural diversity.

> ***" Biocultural diversity is an evolving perspective for studying the interrelatedness between people and their natural environment, (…). Developed in the 1990s in order to denote the diversity of life in all its manifestations—biological, cultural and linguistic—co-evolving within complex socio-ecological systems (…). Biocultural diversity is not conceived as a definite concept providing prescriptions of what to see and study, but as a reflexive and sensitising concept that can be used to assess the different values and knowledge of people that reflect how they live with biodiversity." (Elands et al., 2019)***

Biocultural diversity: What does it mean in the Sahtú?

"The Sahtú has five communities, but we have different pronunciations for caribou. I say this because it's so important that you really respect our languages, small details (in terms for caribou/pronunciation) mean big things." Frederick Andrew

Research can be defined as the creative and systematic work undertaken to increase knowledge to reach new conclusions. There are academic and governmental research (usually based on 'western' or *mula* science using a systematic method) but there is also on the Land research (usually based on traditional knowledge). In both cases, research aims to describe, explain, predict, and potentially control the observed phenomenon. As such, everyone has a role to play in Research and Monitoring.

Moving Forward with a Community-Led Strategy for Research and Monitoring

Objective 4 of the forum was to use the discussions through the workshop to recommend a community-led strategy for research and monitoring. Many topics to be integrated in research priorities and monitoring strategies were mentioned in the previous sections. However, several suggestions and recommendations for how to facilitate the research process in the region were also emitted through the workshop. Workshop participants reflected on the research cycle that was diagrammed on a flipchart. Relationships are key to all stages of research in the Sahtú.

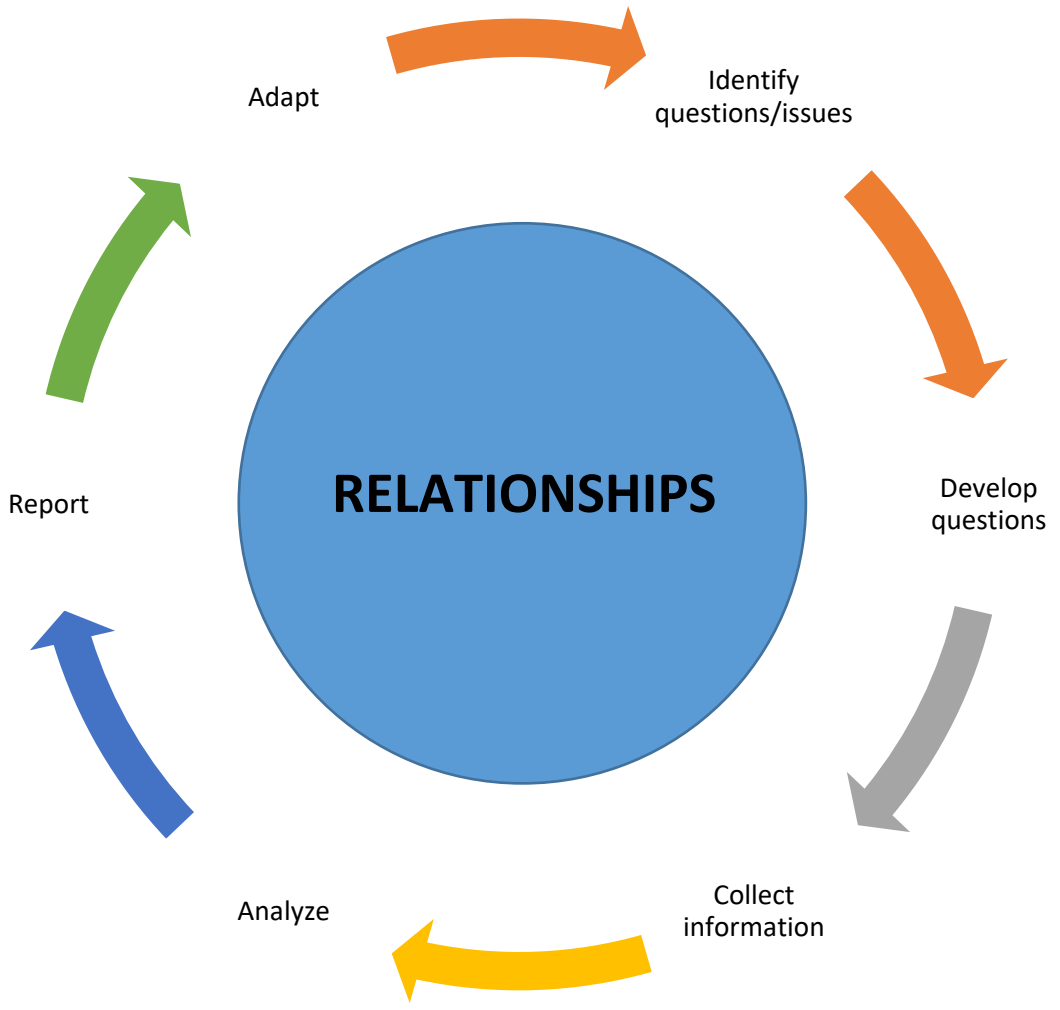

Figure 15: Research Cycle Diagram

Research Collaboration

- The scientists should repurpose study data for community benefits
- The scientists should consider community members as co-researchers
- The scientists should respect OCAP principles: Ownership, Control, Access and Possession, which is essential for research with/by Indigenous peoples
- It is important to have a mutual understanding with both the community and outsiders about the steps involved in the research and share mutual expectations on deliverables, processes, costs and timelines

Research Process

- It is very important for researchers to consult Elders in each step of the project
- The scientists should engage findings users in the planning of research projects; plan costs ahead; and invest time in these relationships
- It is essential to maintain the relationship: the planning of regular teleconferences is good. The research team will need to cover honoraria for participating
- The communities should work with the research team on finding ways to include traditional knowledge in the project
- Engage youth, like by visiting a school and talking to the students

Communication of Findings

- Scientists should come back to communicate findings in plain language and use a lot of visuals
- Scientists should communicate using relevant ways like social media
- Scientists must validate the messages and means of communication with community partners
- Good communication might involve the translation and interpretation of the research findings

On the Land Research for the Future

- Communities should provide on the land opportunities for youth to learn harvesting skills
- Communities should send youth on every hunt, as a great way to share traditional knowledge
- Communities should involve youth in studies and in sampling in their area

Challenges

There were other challenges expressed regarding research, which can potentially lead to further policies and new structures in the NWT. There are capacity issues at the community level for research review, planning and support. There is the need to obtain funds to dedicate to community members for the licensing review.

Indigenous Knowledge and Science

There is also the will of the community to document their own knowledge.

"A lot of change impacts on our people our culture. We have to get back history, traditional knowledge, everything. Mind our Elders. Nothing is written down. We have to write it down. Document it so we can use it later on for learning." George Barnaby

Participants expressed that the "two-eyed seeing" approach for combining science and Indigenous knowledge is extremely valuable for research in the region, that the youth would benefit from both, and that the community should encourage the development of the two-eyed seeing perspective.

Figure 16: Youth involvement (photo credit: Colin Macdonald)

Ways of Involving Communities and Nę K'ǝdí Ke in Research and Monitoring

One of the objectives of the forum (Objective 2) was to identify ways of involving the communities and the Nę K'ǝdí Ke programs in research and monitoring in the Sahtú region. There is definitely an opportunity to build a program further integrating Nę K'ǝdí Ke in research and monitoring, which would be supervised by the communities' leadership.

Sahtú residents have the knowledge to contribute to the monitoring (water, fish, caribou). Their increased involvement in the Sahtú region would benefit the resource monitoring and management.

"As Sahtú Dene People, we must assert our rights'' (heard during the workshop)

Based on the discussion during the workshop, we can identify areas where the research and monitoring would benefit from a community-led strategy. The first identified element is to strengthen the community structure so that the community has the resources needed to initiate and oversee all research in the Sahtú region. The second element is to identify initiatives already in place where Nę K'ǝ́dí Ke can make a difference and be employed on a regular basis.

Strengthen research direction and supervision in the Sahtú

There were other challenges expressed regarding research, which can potentially lead to further policies and new structures in the NWT. There is a capacity issue at the community level for reviewing research, planning and support. There is the need to obtain funds to dedicate to community members for the licensing review.

The Sahtú region already has boards and committees with an interest in research, such as the SRRB, the Sahtú Land and Water Board, the Sahtú Secretariat Inc, as well as the leadership in each community. However, research is not a main feature of their mandate, and a lack of specific structures to support research in the Sahtú has led to the situation where the research is not entirely coordinated by the main users. Engagement from scientists is essential but the context results in difficulties in mobilizing responses as the communities do not have all the resources needed. A devoted Sahtú research committee could access financial resources through public funding, look at priorities in the region, and find the right partners to work on meeting local needs. This committee would benefit research in the region. The committee might include representatives from the Boards (NWT CIMP, SRRB, etc) facilitating the research process, as well as Elders, youth and local government representatives.

In the Yukon, there is the Arctic Institute of Community-Based Research (AICBR), which is a non-profit organization that works to bring together multiple groups and sectors on issues that are identified by and relevant to the communities. There are also other types of management boards possible, like the creation of a new department of the Aboriginal Aquatic Resource and Oceans Management (AAROM) Program, which supports Indigenous groups in Canada as they develop, grow and maintain aquatic resources and oceans management departments.

The creation of a committee would lead to a regional process of initiating research based on local priorities, overseeing research in the Sahtú, and supporting the sharing of results. This committee could also support jobs in research and monitoring for Nę K'ǝ́dí Ke.

Finding Specific Opportunities for Nę K'ǝ́dí Ke

The Guardian program is a federal financial opportunity to exercise responsibility in Indigenous stewardship of the traditional lands, waters, and ice. The Sahtú Dene Council and communities are leading Nę K'ǝ́dí Ke initiatives. Nę K'ǝ́dí Ke can benefit from having more opportunities for employment on the Land, while the Land would benefit from having them be employed. K'atl'odeeche First Nation in the Dehcho has established a land monitoring project, based on traditional knowledge and experience, as well as contemporary technology and techniques, to guide land management decisions.

In the Sahtú region, there is clearly a need for monitoring support. Through this forum, several initiatives that are already in place mentioned the need for land-specialized observations and techniques, which can be led by the Guardians. These initiatives are:

Partnership with organizations overseeing monitoring

- Monitoring of fish in Great Bear Lake, wetlands around Fort Good Hope (NWT CIMP)
- Maintaining the camera network in parks (Park Canada)
- Water monitoring in the Sahtú (ENR)

Potential to integrate the Guardians' role in the Forest Management Act which is being reassessed

- Monitoring of wildlife for resource management (e.g., caribou survey) and fire vulnerable sites
- Monitoring trails and hunting grounds for permafrost thawing and landscape changes
- Assessing changes in habitats of animal species (mapping grounds)

Developing a new partnership with the federal government to answer priorities related to resource management in the Sahtú region

- Patrols on hunting grounds and caribou habitats to ensure that the level of noise stays low
- There is support to strengthen boundaries for hunting and to enforce harvesting requirements. The Guardians would benefit from having the power to fine offenders

The SRRB has a strong role in research in the Sahtú region. The SRRB would be in a good position to support these partnerships.

A Final Word

People living on the land and from the land are in the best position to care for the environment.

> "Moccasins on the ground. Our land, our responsibility" (heard during the meeting)

The 2015 Truth and Reconciliation report highlighted the role of institutions of learning and governance in Canada's destructive history of colonialism. The focus was residential schools, but institutions engaged in research also bear great responsibility in legitimating colonial power structures and undermining Indigenous governance systems and ways of life. There are opportunities to improve research and monitoring in the region by strengthening the roles of the communities, Nę K'ádí Ke and local actors. A collaborative approach between Indigenous researchers and scientists is a first step in the right direction. This workshop was a great opportunity to identify regional priorities and research gaps; build cross-cultural understanding; support regional and regulatory decision-making; identify opportunities for further collaborative research, and facilitate the sharing of knowledge.

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Index of Participants

Appendices

APPENDIX A – Workshop Poster and Agenda

SAHTÚ RESEARCH WORKSHOP

People from Sahtú communities and across Canada are gathering in Tulít'a this week for the ***Sahtú Research Workshop.***

The Sahtú Research Workshop is taking place on **December 10 -12**, at the Arena. Community members are welcome.

Key Themes

- Water and fish
- Caribou
- Changes: Land and People

Join us for a feast and drumming!

Tuesday, December 10, 5:30 pm, at the Arena

Hosted by Tulít'a and the Nę K'ə Dene Ts'įlį - Living on the Land Forum. Sponsored by the Sahtú Renewable Resources Board, Cumulative Impact Monitoring Program, and Social Sciences and Humanities Research Council.

Tuesday, December 10 – Setting the Stage

Location: Arena. Breaks, refreshments, lunch and feast provided!

Time	Activity
8:30 am	Light breakfast, coffee, mingling and music
9:00 am	**Opening** • Welcoming remarks, introductions • Overview of workshop agenda
	Exercise: What are the big questions? • Write down one question in the Sahtú region that most concerns you, and flag the area(s) on the map that you're most interested in. • Cluster questions and discuss.
11:00 am	**Research, Monitoring and Learning for Decisions in the Sahtú and NWT** • Introduction to the Nę K'ə Dene Ts'ı̨lı̨ Forum • Introduction to the NWT Cumulative Impact Monitoring Program (NWT CIMP) • Research in the Sahtú – past, present and future
Noon	**CATERED LUNCH**
1:00 pm	**Poster Gallery Walk** • Visiting presenters will have posters – a chance to connect, discuss, and share ideas! • Add your name to Working Group list for one of the core themes: Water and Fish; Caribou; Changes (Land and People)
	Trivia contest 1

	Concurrent Focus Group Sessions Intro: All in Arena
	Focus Group Talking Circle: Introductions, key research questions, and discussion of key Focus Group objectives related to: 1. Knowledge Sharing; 2. Gaps analysis; 3. Strategy for future research. Groups select scribe/reporter.
	• Water and Fish
	  ○ Walter Bezha and Alexa Scully
	• Caribou and Harvesting
	  ○ Facilitators: Leon Andrew and Kirsten Jensen
	• Changes (Land and People)
	  ○ Facilitator: Deborah Simmons and Thom Stubbs

3:45 pm	**Closing for the day** • Big themes of the day and next day objectives
5:30pm	**FEAST and drumming!**

Wednesday, December 11 – Sharing Knowledge

Location: VARIOUS! Cultural Centre, Arena, Hotel Boardroom

Time	Activity
8:30 am	Light breakfast, coffee, mingling and music – at **the Arena**
9:00 am	**Opening for the day** • Check-in and agenda for the day

	Focus Groups: Knowledge sharing presentations and discussion
	• Water and Fish (*Hotel Boardroom)*
	  ○ Facilitators: Walter Bezha and Alexa Scully; Translator: Stella Bayha
	  ○ Presenters: Délı̨nę delegate TBA, Kirsty Gurney, Kimberly Howland, Candice Dimock, Lindsday Day
	• Caribou and Harvesting *(Arena)*
	  ○ Facilitators: Leon Andrew and Kirsten Jensen; Translator: Dora Duncan
	  ○ Presenters: Leon Andrew/Deborah Simmons
	• Changes (Land and People) *(Cultural Centre)*
	  ○ Facilitators: Thom Stubbs; Translator: Michael Neyelle
	  ○ Presenters: Steve Kokelj, Kelly Skinner/Mylène Ratelle, Colin Macdonald, Thom Lakusta and Shawn Maxwell
	• Summary of key messages

	Focus Group presentations and discussion
Noon	**CATERED LUNCH – Arena**

1:00pm	**Focus Groups – charting paths forward targets, questions/problems, how we're going to address them (workplannings)**
	• Water and Fish (*Hotel Boardroom)*
	  ○ Facilitators: Walter Bezha and Alexa Scully; Translator: Stella Bayha
	  ○ Presenters: Délı̨nę delegate TBA, Kirsty Gurney, Kimberly Howland, Candice Dimock, Lindsay Day
	• Caribou and Harvesting *(Arena)*
	  ○ Facilitators: Leon Andrew and Kirsten Jensen; Translator: Dora Duncan
	  ○ Presenters: Leon Andrew/Deborah Simmons, Johanna Robson/Sheena Parsons (Parks), Kevin Chan, Kimberleigh Schultz
	• Changes (Land and People) *(Cultural Centre)*
	  ○ Facilitators: Thom Stubbs; Translator: Michael Neyelle
	  ○ Presenters: Steve Kokelj, Kelly Skinner/Mylène Ratelle, Colin Macdonald, Thom Lakusta and Shawn Maxwell

3:00pm 3:15pm	**ARENA for snacks**
	Trivia Contest #2
	Focus Group presentations and discussion
3:45 pm	Big themes of the day and next day objectives
5:30pm	**CATERED SUPPER – Arena**
6pm	**CHRISTMAS MARKET – Arena!**

Thursday, December 12 – Building a Strategy

Location: Arena.

Time	Activity
8:30 am	Light breakfast, coffee, mingling and music
9:00 am	**Opening for the day** • Check-in and agenda for the day
	Toward a Sahtú Research and Monitoring Strategy • Review of draft strategy • Considering research and monitoring gaps and strategies for addressing them. • The role of Nę K'ǝ́dí Ke and youth • Regional and community planning
	Community/Youth/Researcher Focus Groups • Community/youth research targets, strategies and workplans • How can researchers support these? Building strong networks
Noon	**CATERED LUNCH**
1:00 pm	Trivia contest 3
	Youth Presentation: Research from a Youth Perspective
	Highlights from community plans
	Concluding Remarks: A path forward for the Nę K'ǝ Dene Ts'ı̨lı̨ Forum
3:30 pm	Closing remarks, prayer, handshake
	TRAVEL HOME – NO SUPPER PROVIDED

APPENDIX B - Posters

Visiting researchers were asked to bring a poster or posters with them and a Poster Gallery Walk was held during the first afternoon in which participants had a chance for one-on-one conversations with researchers about their projects. Below is a sampling of the posters.

UNIVERSITY OF WATERLOO
FACULTY OF APPLIED HEALTH SCIENCES
School of Public Health and Health Systems

Arsenic levels from a human biomonitoring project in the Northwest Territories

Mylène Ratelle, Brian Laird
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Background

Small amounts of arsenic are found naturally in water. However, gold mining activities from the Giant Mine (1948-2004) have resulted in elevated levels of arsenic being released around the City of Yellowknife[1], Northwest Territories (NWT), located near the Great Slave Lake. Particular forms of arsenic are classified as carcinogenic and elevated exposure can be a challenge for population health[2].

A human contaminant biomonitoring project funded by the Northern Contaminants Program was implemented in the Dehcho and Sahtú regions of the NWT to **investigate the current levels of contaminant exposure (including arsenic) in participating Indigenous communities**[3].

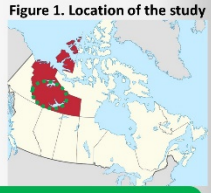
Methodology

Participants: First Nations, Metis and others, ≥6 years old, from 9 Indigenous communities in the Northwest Territories, Canada

Components: 1) **hair, blood, and urine** collection
2) **dietary questionnaires**: FFQ and 24h recall
3) analysis of **contaminants** and **nutrients**
4) return of the results

The results herein are for arsenic in biological samples.
The total arsenic was quantified at University of Montréal (Michèle Bouchard) using an inductively coupled plasma mass spectrometry (ICP-MS), while the speciation was done at the Centre de Toxicologie du Québec using ion exchange chromatography and ICP-MS

Figure 1. Location of the study



Results

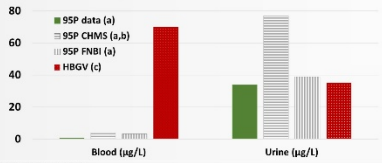
Table 1. Participants

Sample provided	Age average (y.o.)	Sex (%)	Region (%)
Blood (n=276)	43.3	Male: 48.6 Female: 51.4	Dehcho: 50.7 Sahtu: 49.3
Urine (n=198)	46.7	Male: 48.5 Female: 51.5	Dehcho: 57.1 Sahtu: 42.9
Hair (n=19)	43.4	Male: 57.9 Female: 42.1	Dehcho: 100 Sahtu: 0

Table 2. Arsenic species (n=26)

Compound in urine (µg/L)	Detection rate (%)	Median	GM	95P
Dimethylarsinic acid (DMA)	100	4.6	4.8	10
Monomethylarsonic acid (MMA)	100	0.66	0.53	1.2
Arsenite (AsIII)	81	0.42	0.37	2.0
Arsenate (AsV)	35	<LOD	0.089	0.33

Figure 2. Total Arsenic Level



(a) 95P: 95th percentile
(b) Blood: Canadian Health Measures Survey Cycle 1; urine: Canadian Health Measures Survey cycle 2
(c) Blood: Arsenic poisoning over 70 µg/L (ATSDR); Urine: 35 µg/L for inorganic arsenic and methylated species (ACGIH, BEI)

Figure 3. Zinc status

Table 3. Total arsenic

Matrice	Detection rate (%)	Median	GM	95P
Blood (µg/L)	23	<LOD	<LOD	0.58
Urine (µg/L) (µg/g creat.)	100	5.4[a] (5.6)	5.5 (6.3)	34 (27)
Hair (µg/g)	100	0.016	0.026	0.46

[a] Level higher than the CI95% from the First Nations Biomonitoring Initiative (FNBI)

Discussion

- These results indicate that arsenic emissions from historic gold-mining activities in other parts of the territory have not translated to increased exposures in the Dehcho and Sahtú regions.
- The total arsenic concentrations and the arsenic species levels were below the national values from the Canadian Health Measure Survey cycle 2 (CHMS) [4].
- The majority of these participants (n=198, 95%) had total arsenic below the health-based guidance value of 35 µg/L of urine (sum of MMA, DMA, AsIII and AsV only)[5], and all the participants from the subset (100%, n=26) had arsenic species below the health-based guidance value.
- Zinc deficiency can increase the effects of arsenic[6]. Based on the Zn defiency cutoff for blood (700 µg/L), no participant were identified as zinc deficient[7], but 19% who provided urine were classified zinc deficient (150 µg/L)[8]. These participants didn't have higher levels of arsenic in urine. A Spearman correlation r=0.60 (p<0.001) was observed between urinary (µg/L) As and Zn.
- **Arsenic levels do not appear high enough to pose a threat to public health. Overall, these findings will increase the knowledge of the contaminant exposure levels in the north and help to prioritize environmental health issues for these regions, while supporting health risk assessment from water.**
- This information may also help contextualize results from the Health Effects Monitoring Program happening around Yellowknife.

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Thanks to all collaborators, partners and participants!

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Understanding changes in aquatic ecosystem health and water quality in the Fort Good Hope – Ramparts Area

Kirsty Gurney, Danny Masuzumi, and the Fort Good Hope ʔehdzo Got'ıne̜

Environment and Climate Change Canada | Environnement et Changement climatique Canada

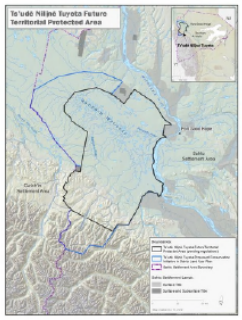
Introduction

- Wetlands help keep water clean and support hunting and other cultural activities.

- Changes are happening on the land, especially in the north.
- We do not know how changes on the land will affect wetlands and water quality.

Objectives

- To establish wetlands and water quality monitoring in Ts'ude niline Tu'eyeta so that we can better understand potential impacts of changes (including fire) on the land.



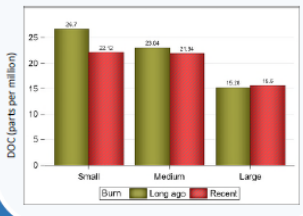
Methods

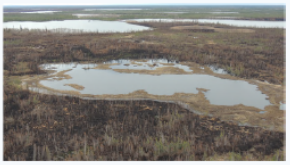
- We collected data in 6 study plots (5 km x 5 km) with different fire histories.
- The average size of the water bodies in a plot were also different.

- We analyzed the water for nutrients and heavy metals.

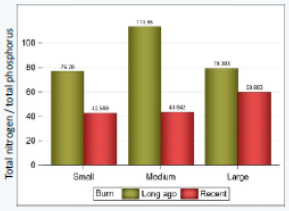
Results

- In smaller water bodies, surface water has more dissolved organic carbon (DOC), which comes from the breakdown of plants and animals.





- When the land burns, more carbon is transported to surface water and can impact levels of nutrients (like nitrogen and phosphorus).



- Levels of heavy metals were too low to be detected in any of our samples.

Conclusions

- Wetlands in Ts'ude niline Tu'eyeta provide important resources for wildlife and people.
- Increases in forest fires could affect these wetlands; continued monitoring is important.
- For more information please contact: kirsty.gurney@canada.ca

UNIVERSITY OF WATERLOO
FACULTY OF APPLIED HEALTH SCIENCES
School of Public Health and Health Systems

Health and Risk Communication of Contaminants in the Dehcho and Sahtú Regions of the Northwest Territories, Canada

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Background

Public health strategies related to contaminant exposures in Indigenous communities in northern Canada need to balance the risks and benefits of consuming country foods. Elevated mercury concentrations in some fish species in some lakes in the Northwest Territories (NWT) resulted in a series of fish consumption notices that suggested people limit their consumption of fish species[1]. It is not known what the level of awareness is and understanding of these consumption notices, whether they resulted in altered food behaviours, or the risks perceived with country food consumption. As part of a larger human biomonitoring study in the Dehcho and Sahtú Regions of the NWT, participants were invited to respond to a Health Messages Survey on health and risk communication for contaminants, with a focus on mercury and cadmium. **The objective is to assess participants' risk perceptions and awareness of current contaminant advisories and provide clues on how to develop effective environmental health communication.**

Methodology

Participants: First Nations, Metis and others, ≥6 years old, from 6 Indigenous communities in the Northwest Territories, Canada.

Based on previous survey (Furgal et al.), the Health messages survey was refined through focus groups and the final version was installed on iPads using the QuickTap program. includes Questions included the awareness and understanding of current health messages on country foods and contaminants, questions on risk perception related to contaminants, perspectives on health and country foods, how people usually heard about consumption notices and other information on health, foods and/or contaminants, and preferences for receiving messaging.

Figure 1: Location of the study

Results

Table 1. Participants (n=87)

Age	Average (y.o.) Min-max (y.o.)	40.5 12-77
Sex	Female (%) Male (%)	56.3 43.7
Region	Dehcho (%) Sahtu (%)	50.6 49.4

Figure 2. Access to communication means at home (n=87)

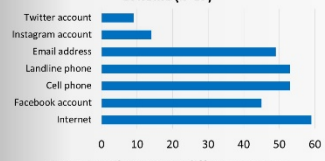


Figure 3. Daily access to different sources of information (n=87)

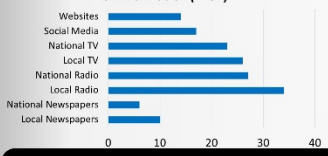


Figure 4. Awareness of Messages, Where/who Heard From, and Changing Behaviours by Sex and Region

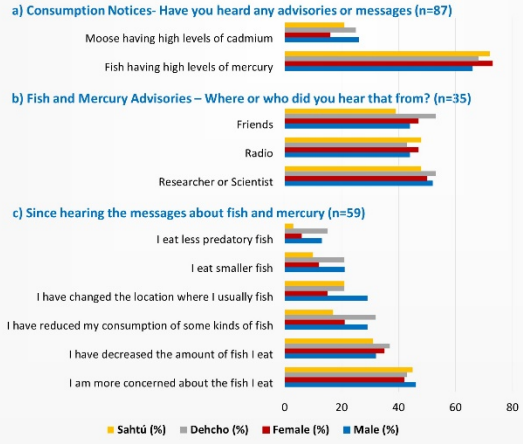
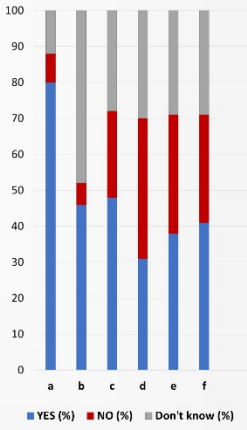


Figure 5. Perceived Risk from Contaminants from Various Sources (%) (n=87)



a. Do you think cigarette smoke (through smoking cigarettes and second-hand smoke) may impact the amount of contaminants you are exposed to?

b. Do you think eating store bought foods may impact the amount of contaminants you are exposed to?

c. Do you think eating fish may impact the amount of contaminants you are exposed to?

d. Do you think eating moose meat may impact the amount of contaminants you are exposed to?

e. Do you think eating moose organs, like liver or kidneys, may impact the amount of contaminants you are exposed to?

f. Do you think eating other country foods may impact the amount of contaminants you are exposed to?

Discussion and Conclusion

- Participants indicated a high consumption of country foods. While only one third reported a preference to eat solely country foods, the majority (90%) heard that country foods had beneficial nutrients.
- Participants were asked about trust when receiving information about contaminants in the environment and country foods: Doctors were trusted the most, followed by friends or relatives, Elders, university researchers and other health workers. Federal government and social media were the least trusted information sources. University researchers accounted for only the fourth of the source of information, despite them being one of the most trusted sources. Although reported to be less well trusted, participants also reported receiving health information via social media.
- Although mercury was the leading contaminant of concern among participants, chlorine in drinking water, lead, indoor air quality, antibiotics in meat, asbestos, uranium, radon, PCBs, pesticides, other heavy metals and water were also of concern for participants.
- **Collaboration between researchers, government, trusted sources and communities in the NWT, Canada is critical to develop cross-cultural, co-created communication strategies and build more knowledge around the complexity of risk perception and health messaging. The priority should continue to be carefully planned communication strategies, built through engagement with communities, which promote country food consumption while lowering contaminant exposures to maintain and improve health and well-being.**

References

1. Northwest Territories Health and Social Services, 2016. https://www.hss.gov.nt.ca/en/services/recommandations-sur-la-consommation-de-poisson/site-specific-fish-consumption-advice
2. Ratelle M, et al, 2018. https://doi.org/10.1186/s13690-018-0318-9

Acknowledgement

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APPENDIX C – Guidance for Visiting Presenters

Sahtú Research Workshop

8:30 am-5:00 pm, December 10-12, 2019 – Tulít'a

General Workshop Approach

- Keep in mind that the idea is to structure as much of the workshop as possible as an adapted talking circle / discussion format, and to minimize portions which are strictly one-way communication ("presentations").

- This is a cross-cultural workshop, bridging traditional knowledge and scientific modes of understanding. It may be difficult to understand the relevance of each other's points at times, which is why careful and respectful listening is important. The meaning of various contributions may become clear as discussions progress.

- This is a bilingual workshop at which both English and Dene language will be spoken, and both Dene and scientific concepts will be exchanged. It will be important to stop and discuss difficult concepts in both languages. Please be aware and signal when a pause for cross-cultural interpretation is needed.

- Your "presentation" will not be your only opportunity to engage with others at the workshop about your research. Try to integrate examples from your research into general discussion.

- If you've worked with community members, it would be ideal if they had a chance to talk about their experience with the research.

- A talking circle is always in a clockwise direction. It is built upon a non-hierarchical ethic, where each participant is expected to listen carefully, respond to and build upon what others are saying, and keep comments focused on key points. The talking circle will be adapted in that not everyone in the circle will be asked to speak in every round.

- The overall objective of the discussion through the two days is to figure out what needs to happen to improve research in the future, and to understand consequences of past research for planning future research. This will be the focus of the last day's discussions.

- If you would like to communicate more details about your research project, you are most welcome to bring posters or newsletters that we will hand out. Often these materials are much appreciated and well-received by community representatives.

Presentation length

Generally, we are requesting presentations of about 10-15 minutes in small group sessions to maximize time for discussion. There will be exceptions, depending on session objectives.

Presentation structure

Focus your presentation on addressing **4 key questions**:

1. What is your research question, and how did you develop the question?

2. How was the community involved in the research (at what points)?

3. What is a top highlight of what you learned from your research? [it is ok if you don't have results yet; state the top things you have learned so far, even if it is about process/design]

4. What question(s) needs to be answered next?

PowerPoint: OPTIONAL – you should *only* use PowerPoint if it is primarily pictures/diagrams, and if it helps you to illustrate your answers to those 4 key questions.

Additional guidance

- Try to say everything in plain language. If there are technical terms that you feel are really important to use, we need to explain/define them clearly. The facilitator (or an audience member) may ask you to stop speaking if we notice that people are not understanding the message, so time can be taken for further explanation.

- Use examples, tell stories, and use visual imagery to get your message across.

- Use familiar units –things related to people's everyday lives (eg. instead of cubic metres or litres – how many jerry cans or water trucks?). For distances – look around the community for comparisons. Let us know if you would like with this. The interpreter may have ideas, and/or we may ask community participants to help us all out! People appreciate being put in the driver's seat in developing cross-cultural understanding.

Additional request – trivia questions!

Lex Scully has agreed to coordinate trivia questions. We'd be grateful if you'd bring a pop quiz question related to your project – either multiple choice or with a limited number of correct answers. It should be something that both community representatives and researchers would at least be able to guess at.

→Send us your idea ASAP!

Contact us!

Please don't hesitate to contact Lex by email otl@srrb.nt.ca, or 867-588-4040 with your requirements for presenting, trivia questions, and any questions, concerns or suggestions.

APPENDIX D - Terminology

During the plenary workshop sessions, Dene language and scientific concepts used by participants were noted on flip charts to celebrate and enhance cross-cultural understanding. Below are the terms documented.

Dene Gokədə

Dene	English
ɔehba	mountain goat
ɔekwę́	barren-ground caribou (Délı̨nę dialect)
benígǫdı	?
bets'erı̨chá	respect
bets'erı̨chá	respect
chų́ę	birds
daı̨hdų́ę	sandpiper (nickname for Deborah Simmons)
Dene nę́né	Dene land
dene ts'ı̨lı̨	dene way of life
dene yahtı̨	dene language
dóxaı	winter
náhkale	morning (Tulít'a dialect)
nátse	strong
nezǫ	good
nǫhfə	giant marten
tı̨chádíı	wildlife
yáhkale	morning (K'áhsho got'ı̨nę dialect)
ɔełexé ɔeghálayeda	working together

Scientific Concepts

Science concept	Meaning
direct competition	competition for scarce resources
apparent competition	two species are prey of the same predator, and increase of one prey species may help increase of predator population and thus impact the second prey species
predation	one species kills and eats another species
baseline	ecological conditions before impacted by forces of change (eg. Indigenous knowledge often provides important baseline from before scientists came to the Sahtú)
evidence	the available body of facts or information; might include both Indigenous knowledge and science
self-regulation	to "regulate" means to control by rules; self-regulations refers to the ability of people or ecosystems to manage themselves
acceptable (contaminant levels)	governments define "acceptable" levels of contaminants based on available evidence about health impacts; people don't always agree with these definitions.
mitigate (impacts)	reduce the impacts (of development, roads, climate change etc.)

APPENDIX E - Research Timeline

The workshop concluded with an impromptu participatory exercise in outlining research, funding opportunities and other related Sahtú activities in a timeline using post-it notes. The following activities were added to the timeline. Although a number of items were specific to 2020, the list as a whole points to a very busy annual research cycle in the region! Note that the 2020 COVID-19 pandemic meant that many field activities had to be postponed – but also pointed to great community strengths in a movement back to the land, and in conducting a number of research activities with remote support from outside researchers. It will be useful to review the list as a prompt for potential updates at future Nę K'ə Dene Ts'įlį Forum meetings, or possible proposal opportunities as new research questions arise.

2020				Future Years/Year-Round
Winter	**Spring**	**Summer**	**Fall**	
• Survey on food security and the role of country food (Tulít'a, led by Leon Andrew) • Trapping, hunting and fishing, living life to the fullests, ENJOY! • Sample analysis: age fish, count and identify bugs, analyse data, report and paper writing • Winter road opens • Image classification, report writing, developing protocols (Náats'įhch'oh National Park Reserve) • Finalize Water Knowledge Camp report • Focus groups in Délįnę about country food processing trailer	• Beaver, muskrat and waterfowl hunting • Fishing and hunting at Nǫǫreɔ́ (Deerpass Bay), ʔehdaɹla (Caribou Point) • Fieldwork planning: coordinate with Délįnę ʔehdzo Got'įnę; posting job advertisements and hiring community researchers/guardians (youth) • Winter road closes • Fieldwork planning for ecological integrity monitoring; seasonal hiring (Náats'įhch'oh National Park Reserve) • Bird monitoring for climate change impacts and changes to food sources (eg. berries)	• Fishing and hunting • Caribou fence research and ice patch monitoring in Mackenzie Mountains • Forestry remeasure of 10-15 sampling plots, Fort Good Hope • Fieldwork: wildlife cameras, water temperature and depth loggers, plants, climate data, bats, snow and ice (Náats'įhch'oh National Park Reserve) • Water Knowledge Camp #2 (Fort Good Hope) • Dene language summer camp! • Workshop on food security strategies in the Sahtú at University of Waterloo	• Trapping, whitefish, moose (good fat moose!), caribou harvesting • Fire season ends • Season-end data review; community event; opportunities to hold community events; come visit office; Management Meetings (Náats'įhch'oh National Park Reserve) • Community Annual General Meetings • NWT CIMP Letter of Intent due • Placename workshop in Tulít'a • DataStream data upload; support for field season (water monitoring)	• Federal Indigenous Community-Based Climate Monitoring call for proposals • NWT GHG Grant Program call for proposals • Federal Climate Change and Health Adaptation Program call for proposals • NWT GHG Grant Program call for proposals • Federal Climate Change and Health Adaptation Program call for proposals • Federal Indigenous Research Capacity and Reconciliation call for proposals

2020				Future Years/Year-Round
Winter	**Spring**	**Summer**	**Fall**	
• NWT CIMP proposals due • Délı̨nę Annual General Meeting December 19 • Project meetings with community and university collaborators: priorities, planning and proposals • Regional/Territorial monitoring and results workshop • Colville 2020 Public Listening Session – Hunting Law • NWT Environmental Audit report 2020	• NWT CIMP proposals approved and funding starts • DataStream training and stories (water) • NWT CIMP annual/final reports due • State of the Forest report due • Polar Knowledge (federal) call for proposals • Fire season starts	• Monitoring fieldwork: fish netting, water sampling, bug sampling • Placename pre-workshop meeting, Tulít'a • Spiritual Gathering, Délı̨nę • Travel to Sahyúé and ʔǫk'aıbə (Whiskeyjack Point) • DataStream training and stories (water) • Candice Dimock MSc thesis on Water Knowledge Camp, youth leadership, and Guardians	• Federal First Nation infrastructure fund call for proposals • Federal Climate Change Preparedness of the North Call for Proposals	• Federal Northern Reach call for proposals • Water Knowledge Camp #3 at UNESCO Tsá Túé Biosphere Reserve (Great Bear Lake) • 10 year State of the Park Report, 2025 (Náats'ı̨hch'oh National Park Reserve) • 2025-2026 NWT Environmental Audit report • Public Listening 2021 Predators and Competitors • Public Listening 2022 Knowledge about Caribou and Landscapes • Public Listening 2023 Wildfires and Climate Change • Public Listening 2024 Caribou and the Mixed Economy • Forestry research on how fast seismic lines are regrowing • Annual NWT CIMP results workshops

APPENDIX F - Workshop Participants

This workshop was chaired by Leon Andrew (Nę K'ə Dene Ts'įlį Forum and SRRB Research Director), and co-facilitated by Deborah Simmons and Thom Stubbs. Interpreters were Michael Neyelle (Délįnę and Tulít'a Got'įnę dialects) and Dora Duncan (K'áhsho Got'įnę and Dehlá Got'įnę dialects). Alexa Scully (SRRB) and DonnaMarie Ouellette and Lorraine Brekke (NWT CIMP) provided essential coordination and workshop design support.

Sahtú Community Participants

1. Name	Community	Organisation/Role
2. Fred John Barnaby	Colville Lake	ʔehdzo Got'įnę
3. Kody Orlias	Colville Lake	ʔehdzo Got'įnę/Youth
4. Shannon Oudzi	Colville Lake	Youth
5. Brenden Takazo	Délįnę	Youth
6. Camilla Tutcho	Délįnę	SRRB Board Member
7. Dolphus Baton	Délįnę	Délįnę Got'įnę Government
8. Rosanne Taneton	Délįnę	Youth
9. Walter Bezha	Délįnę	Délįnę Got'įnę Government
10. Camilla Rabisca	Fort Good Hope	SRRB Board Member
11. Daniel Jackson	Fort Good Hope	ʔehdzo Got'įnę President
12. George Barnaby	Fort Good Hope	SRRB Board Member
13. Michel Lafferty	Fort Good Hope	ʔehdzo Got'įnę
14. Mitchell Shae	Fort Good Hope	Yamoga Land Corporation
15. Ethel Blondin-Andrew	Norman Wells	Indigenous Leadership Initiative - Sahtú Region
16. Jaryd McDonald	Norman Wells	ʔehdzo Got'įnę
17. Leon Andrew	Norman Wells	SRRB Research Director
18. Lisa McDonald	Norman Wells	ʔehdzo Got'įnę
19. Roger Odgaard	Norman Wells	ʔehdzo Got'įnę and Métis Land Corporation
20. Charlotte Menacho	Tulít'a	Elder - K'áalǫ Got'įnę
21. Dawn Widow	Tulít'a	Tulít'a Land Corporation
22. Frederick Andrew	Tulít'a	Elder - Shúhtaot'įnę
23. Joe Bernarde	Tulít'a	Elder - K'áalǫ Got'įnę
24. Jonathan Ayah	Tulít'a	Youth
25. Nolan Mendo	Tulít'a	Youth
26. Teresa Etchinelle	Tulít'a	Elder - Shúhtaot'įnę
27. Trevor Niditchie	Tulít'a	Youth
28. Frederick Clement	Tulít'a	Fort Norman Métis Land Corporation
29. Gordon Yakeleya	Tulít'a	ʔehdzo Got'įnę President

Visiting participants

Name	Organisation	Topic
Thom Stubbs	ALCES	Changes
Dennis Arey	Inuvialuit Game Council	
DonnaMarie Ouellette	NWT CIMP	
Lorraine Brekke	NWT CIMP	
Lindsay Day	DataStream	
Nicolas de Pelham	Dehcho First Nation	Guardian
Nicole Hardisty	Dehcho First Nations	Resource Management, Dehcho First Nations Government
Kimberly Howland	DFO	Water and Fish
Blair Kennedy	ECCC	Caribou
Kirsty Gurney	ECCC	Water and Fish
Glen MacKay	Education, Culture and Employment - Cultural Places	Caribou
Steve Kokelj	ENR	Changes
Tom Lakusta	ENR Forestry Hay River	
Shawn Maxwell	ENR Forestry Norman Wells	
Kevin Chan	ENR-Sahtú	Research for decisions
Kimberleigh Schultz	McMaster University	Caribou
Johanna Robson	Náats'ıhch'oh National Park Reserve	Caribou
Sheena Parsons	Náats'ıhch'oh National Park Reserve	Caribou
Timothy Heron	NWT Métis Nation	Elder
Colin Macdonald	SRRB	Caribou
Candice Dimock	University of Waterloo	Water and Fish
Kelly Skinner	University of Waterloo	Water and Fish
Mylène Ratelle	University of Waterloo	Changes

APPENDIX G - Focus Group Participants

Caribou and Harvesting

Kirsten Jensen, Douglas Yallee, Michel Lafferty, Leon Andrew, Deborah Simmons, Kimberleigh Schultz, Jaryd McDonald, Shannon Oudzi, Cody Orlias, Jonathan Ayah, Dora Duncan, Dolphus Baton, Rosanne Taneton, Frederik, Kevin Chan, Soda Horasii, Ethel Blondin-Andrew, Roseann Taneton, Nicole Hardisty, DonnaMarie Ouellette

Water and Fish

Steve Kokelj, Walter Bezha, Kimberly Howland, Kirsty Gurney, Alexa Scully, Lindsay Day, George Barnaby, Candice Dimock, Roger Odgaard, Lorraine Brekke, Mitchell Shae, Brenden Takazo, Timothy Heron, Frederick Clement, Jessie Yakeleya

Changes (Land and People)

Hannah Taneton, Thom Stubbs, Dawn Widow, Nicole Hardisty, Nicolas dePelham, Camilla Tutcho, Lisa McDonald, Camilla Rabisca, Shannon Oudzi, Nolan Mendo, Colin Macdonald, Tom Lakusta, Theresa Etchinelle, Kelly Skinner, Mylène Ratelle