“It’s about our survival”

Keeping the Food and Water Safe in the Sahtú Region

Research Results Workshop
Tulít’a, November 27-28, 2013

Hosted by:
ʔehdzo Got’ı̨nę Gots’ę́ Nákedı (Sahtú Renewable Resources Board)
Northern Contaminants Program (NCP - Aboriginal Affairs and Northern Development Canada)
Cumulative Impact Monitoring Program (CIMP - Aboriginal Affairs and Northern Development Canada)

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Summary

People in the Sahtú Region are concerned that the health and safety of their food and water sources on the land could be threatened by contaminants, climate change, and cumulative impacts of industrial development. Sahtú communities have asked researchers to investigate and monitor the caribou, moose, fish, and water. Many of those research and monitoring projects have been ongoing for several years. Sahtú community members requested an update on the results of those projects so far, and an opportunity to give input on where the research should go next.

The good news is that researchers have found so far that, generally, the fish and wild game in the Sahtú Region are safe to eat and the water is safe to drink. Community members can feel confident that eating and drinking off the land is one of their best ways to stay healthy. It is up to community members, researchers, health officials, government agencies and co-management boards to work together to make sure things stay that way.

It is important that community members are involved at every step of the way in research. The workshop report describes two examples of Sahtú communities being involved: monitoring of mercury levels in fish, and monitoring of caribou and moose health.

At the end of the report are 1- to 2-page summaries of research projects that have been going on in the Sahtú Region, with pictures and diagrams to help explain:

- Diversity of Sahba (Trout) in Great Bear Lake (Louise Chavarie)
- Long term monitoring of Great Bear Lake fisheries and the aquatic ecosystem (Kim Howland/ Deanna Leonard)
- Loche (burbot) contaminant research with Fort Good Hope (Gary Stern / Jesse Carrie)
- Watershed framework for assessing cumulative impacts of development (Krista Chin/ Julian Kanigan)
- Water quality monitoring on Mackenzie River (GNWT-ENR)
- Caribou genetics study (Jean Polfus)
- Sahtú wildlife health project (Susan Kutz / Anja Carlsson)
- Dene mapping project and wildlife study (Ɂehdzo Got'ı̨nę Gots'ę́ Nákedı)

The workshop group

Contents

"It's about our survival"

> "We inherited the land, the water, and the animals from our ancestors who took care of this land forever. The water we can drink, the animals we can eat, and the plants are all protected so the future generation can have the same opportunities."
>
> — Cindy Gilday

People in the Sahtú Region are concerned that the health and safety of their food and water sources on the land could be threatened by contaminants, climate change, and cumulative impacts of industrial development. Sahtú communities have asked researchers to investigate and monitor the health and contaminant levels in the caribou, moose, fish, and water. Many of those research and monitoring projects have been ongoing for several years. Sahtú community members requested an update on the results of those projects so far, and an opportunity to give input on where the research should go next.

The basic objectives of the Research Results Workshop held in Tulít'a on November 27-28, 2013 were:

1. To learn about:
   a. what research and monitoring has been done in the Sahtu so far,
   b. How communities have been involved
   c. How it helps us manage risk
2. To identify good research questions
3. To move forward with well-coordinated and community-supported research projects.

The good news is that researchers have found so far that, generally, the fish and wild game in the Sahtú Region are safe to eat and the water is safe to drink. Community members can feel confident that eating and drinking off the land is one of their best ways to stay healthy. It is up to community members, researchers, health officials, government agencies and co-management boards to work together to make sure things stay that way.

The risk of being contaminated or getting sick from the food you eat or the water you drink is a very scary thing. People in the Sahtú Region need to feel more in control of their health and their future. This means gaining more control over the management of cumulative impacts from industrial development and climate change. It also means gaining more control and playing a bigger part in the research and monitoring of wildlife health and contaminant levels.

Managing cumulative impacts involves looking at the bigger picture – connecting all the different activities and changes affecting the land at the same time, and understanding the long-term effects. It also involves identifying thresholds so we know 'how much is too much' and making rules that keep activities within safe limits.

> "These programs are opportunities for you guys to say, "Where's my entry? Where's my part?" Don't wait for anybody to invite you. It's your right. The programs are there for you to participate in. We live in challenging times, but we have to remember who we are. Your contribution is important. The traditional knowledge needs to get out there so we can help the scientists who are doing good work."
>
> — Cindy Gilday

Managing the risks of long-range contaminants also involves identifying safe limits. For example, what levels of mercury are safe in fish that people eat? Researchers and community members have a role in identifying what contaminant levels are 'normal' in the region and what are the safe limits, and then monitoring contaminant levels in animals and in people.

> "Why are we collecting data? Is collecting data on piecemeal basis enough? No, it's not good enough. We have to have a broader strategy to be able to answer some of these questions. But what for? Like Frederick Andrew said, it's to know what's happening with the animals that we eat. It's about our survival."
>
> — Cindy Gilday

Sahtú community involvement in the research process

Communities want to be involved in more than just data collection; they want to be involved in all the different stages of the research and monitoring process, from deciding on the research question, to analyzing the data, to improving the research program for next time.

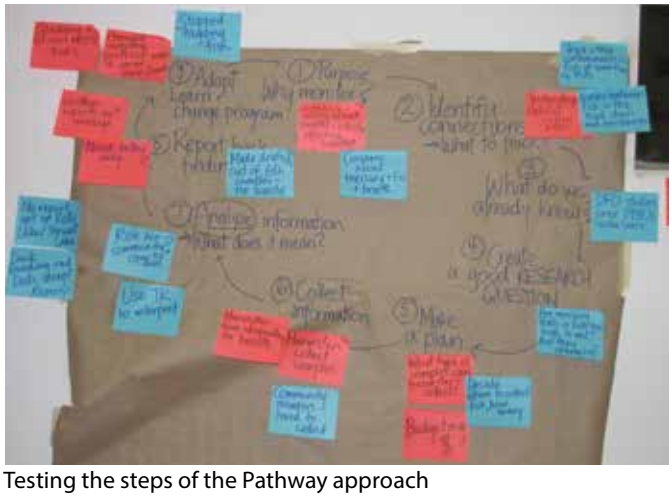
> "Community-based monitoring means monitoring that answers questions that communities have and meets the needs of the community."
>
> — Julian Kanigan

The Cumulative Impact Monitoring Program has developed something called the Pathway Approach to help communities and their monitoring partners design better monitoring programs that meaningfully involve communities at every step of the way.

We tested out the nine steps of the Pathway Approach using two examples of research programs happening in the Sahtú Region:

- Monitoring of mercury levels in fish (blue sticky notes in the diagram)
- Monitoring of caribou and moose health (orange sticky notes in the diagram)

We documented how Sahtú communities have been involved at each step of the way in these two programs.



Testing the steps of the Pathway approach

Caribou and moose health

1. Purpose — why monitor?
   - community concerns about caribou health, effects of industry on caribou and habitat
2. Identify connections — what to track?
   - caribou habitat, what they eat (eg. lichen), water
3. What do we already know?
   - interviews with elders about caribou health in the past
4. Create a good research question
   - What is the baseline health of caribou?
5. Make a plan
   - figure out what types of samples harvesters can collect, innovative ways of getting samples like filter paper for blood
   - budgeting, how much money to be distributed per kit collected
6. Collect information
   - harvesters collect samples and provide health observations
7. Analyze information — what does it mean?
   - community members have their own chance to interpret the findings
   - communities helped to name the new parasite discovered
8. Report back findings
   - We need a better mechanism for reporting back. It doesn't seem like information is getting back to people that need it. Written reports are not enough.
9. Adapt – learn from experience, change program
   - focus a lot more on moose ticks
   - have changed sampling protocol to make it easier and more clear

Mercury levels in fish

1. Purpose – why monitor?
   - community concerns about mercury in fish and health effects
2. Identify connections – what to track?
   - links within the food chain between fish and invertebrates (bugs)
   - could track other contaminants in fish at the same time – like persistent organic pollutants (POPs)
3. What do we already know?
   - DFO studies since 1980s on mercury in loche livers
4. Create a good research question
   - Are mercury levels in fish too high to eat? Are they changing?
5. Make a plan
   - Decide where to collect fish, how many, what kinds
6. Collect information
   - community members hired to help collect fish
7. Analyze information – what does it mean?
   - what is the role for the community? Researchers are open to ideas
   - could use TK to help interpret data
8. Report back findings
   - challenges
9. Adapt – learn from experience, change program
   - stopped tagging fish
   - learned to make dryfish out of the samples so no waste

The workshop group

The Northern Contaminants Program – what does it do for the Sahtú Region?

Carole Mills of the Northern Contaminants Program told the following story about how and why the program was started, and what it does in the Sahtú Region:

"In the late 1980s, some scientists came up to the Arctic to take samples because they thought the Arctic would be so clean that it would be a baseline to measure the rest of the world against. They thought that because we didn't have any industry up here. But, they found we had contaminant levels higher than they'd seen in other parts of the world, especially in the marine mammals like the beluga whales and the seals. They were extremely surprised. The big question was, where do these contaminants come from?

Metals exist in our world naturally. Our rocks in this whole region are full of mercury. Some metals are released by local activities such as mining, or oil and gas. But a lot of contaminants come from a long distance away, and those are what the Northern Contaminants Program is focusing on.

The contaminants are used down in the warmer regions. They go into the air and they make their way up to the Arctic. In the cold, they sink and they go into our environment. They like to hang out in the fat of animals.

We found out that the Inuit women and their babies had really high levels of contaminants. The Dene and Métis women and their babies had very low levels of contaminants. That is why, ten years ago, all the funding for contaminants work shifted over to the Eastern Arctic.

We went to United Nations. We got the world to stop producing 12 of the worst contaminants. It was a major success.

The focus now is with mercury. A new convention has just been signed by the world to reduce levels of mercury. Mercury has been identified as a priority in the NWT (including the Sahtú Region). Trout has been identified as a priority species.

Fort Good Hope has been picked as one of the four major areas where they're going to do long-term studies on fish. That's because there was already lots of data from Fort Good Hope because of the oil and gas operation at Norman Wells.

We have Aboriginal people sitting at all levels of management of the Northern Contaminants Program. Cindy Gilday sits on the NCP secretariat on behalf of Sahtu Secretariat. They said, 'unless you bring the results back to us in a way that's understandable, it's useless to us.' The program was the first to say that at least a third of its funding has to go to communicating and capacity building. The focus is on making sure the key people in the community understand - the decision makers and frontline trainers."

Confusion about the word 'contaminant'

We have to be careful how we talk about contaminants. Sometimes 'contaminant' is translated into Dene languages as 'poison', but this may make people think that eating the tiniest amount will kill you. People may avoid eating any wild meat or fish, or avoid drinking tap water, because they think it will kill them, and that is not true.

Many of the things we call 'contaminants', like metals, are natural. Animals, fish, and people in this region have always had some of those metals in their bodies and stayed healthy. The problem is when the levels of those things get too high in our bodies.

> "Each term has its own definition. For example, mercury has its own term. We should have a discussion about it. When we say contamination in Dene, it means poison, which means that it will kill anything. But if we explain it in a way to show it is not so bad, then we know when it is harmless. When we see fish flesh with little white things, we think it is poison and wouldn't eat it. We could instead say that it is 'unusual' so that people won't fear it."
>
> — Leon Modeste (interpreted by Jane Modeste)

Fish and wild game are often people's best source of nutrition. It also keeps people healthy to be going out and practising their culture and traditional lifestyles. A lot of store-bought food and fast food contain their own contaminants, such as hormones, that will harm people who eat too much of them. Bottled water not only costs much more than tap water, but it can contain harmful things.

Community members are working together with researchers to keep an eye on how high are the levels of contaminants in country foods and in drinking water sources. Community members can then make good choices about the amounts and kinds of country foods they should eat to keep them healthy.

The Northern Contaminants Program has done a lot of work in Délı̨nę with elders and translators to come up with the right terminologies for the different kinds of contaminants.

What kinds of contaminants are people concerned about in the Sahtú Region?

Most of the research on contaminants in the Sahtú Region is focused on mercury. Carole Mills from the Northern Contaminants Program explained:

"Mercury is natural. It's been here forever. Dene people have always had high levels of mercury. However, mercury is increasing in our environment. It is increasing in some birds and some fish. 95 percent of our manmade mercury is coming from China.

There's this other metal called selenium. It turns out the fish that have mercury also have selenium in them. Selenium takes away the effects of mercury. So, it's a balancing thing. That's why we haven't ever gotten sick like people in other parts of the world have from mercury.

All of this information is important when you're making decisions. When scientists come up with a limit for what is safe, like, below 0.5 is okay to eat, but above 0.5 is not okay, they have to consider lots of things. They build in lots of safety. That number is based on people eating only trout pretty much every day of your life. And nobody eats like that. So, as soon as you know that you're not eating trout from that lake every day of your life, you know you can look at the numbers a little differently. We know that small trout have lower levels of mercury than bigger trout. It is safer to eat fish that don't eat other fish, like whitefish and char. But, even the big trout, if you only ate them once in a while, there's just no impact, and especially not on grownups. Pregnant women might be worried more than someone else. The impacts tend to

Camilla Rabisca speaking with Jean Polfus and Susan Kutz

Mercury and health

GNWT Health and Social Services has supported research examining the possible impacts on people's health from contaminants such as mercury. For example, the department supported research studying human hair samples from people in Tulít'a. If contaminants research shows that human health may be at risk, then the GNWT asks the Northern Contaminants Program to ask Health Canada to conduct a health risk assessment. That may result in a Health Advisory being issued.

Since 2007, there have been 12 consumption advisories issued in the Northwest Territories due to mercury levels in the muscle of predatory fish measuring above Health Canada recommendations for commericial fish.

One problem is that in order to issue a Health Advisory, the Chief Public Health Officer requires a toxicology assessment, for which the department puts the responsibility on researchers. Researchers may not have the funding to complete a toxicology assessment, and they may not be qualified to say what a toxicity level means for public health, even if they understand what it means for an animal such as a moose.

In humans, mercury can cause developmental problems with children and with unborn children. If it gets serious enough, there can be nervous disorders and other specific health issues. It may take several years for mercury to leave a person's system.

happen on babies or on little kids as they're growing.

So, the message I want to leave you with is that our food in the NWT, our traditional foods, are really, really, really safe to eat. They're really healthy. They're really important to us. And our water is safe to drink right now. But, we have to make sure it stays that way."

How does research help us manage risk?

Managing risk is not a new thing for Sahtú people. Traditionally, harvesters are always assessing and managing risk when they are out on the land. Staying safe does not mean avoiding any kind of risky activity, it means investigating and understanding the risks and making wise choices.

The risks Sahtú communities are dealing with today include cumulative effects on the land and wildlife from industry and climate change, and rising levels of some contaminants such as mercury. There is no way to avoid all of those things entirely. Instead, people need to understand how high the risks are, for each of the different choices they make. Both scientific research and traditional knowledge can help people understand the risks and make wise choices.

During the workshop, the group split up to consider the risks associated with four different issues people are facing in the Sahtú Region, and how research could help:

1. Fears of water contamination in the Mackenzie River
2. Risks of land-based programming for youth
3. Transport of toxic wastewater from hydraulic fracturing operations
4. Mercury levels in fish from Kelly Lake

Fears of water contamination in the Mackenzie River

- Research is playing a key role in helping Sahtú community members understand the risks of drinking water from the Mackenzie River through continuous water quality sampling at several sites along the River and at the Fort Good Hope water intake.
- Community members would like more information about water quality at all times of the year (including under ice) and in many different places.
- Traditional knowledge can contribute to better understanding about good water sources and help trace the movement of water down from the mountains.

Leon Modeste and Eugene Boulanger

Risks of land-based programming for youth

- Students are asking for more land-based programming, but there is often concern and resistance from parents and teachers, given potential safety risks.
- Youth participants at the workshop compared the risks of land-based programming vs. the risks associated with youth not having opportunities to learn bush skills.
- Risks associated with land-based programming include travel and safety hazards. Some of these hazards are increasing due to climate change. The Ɂehdzo Got'ı̨nę Gots'ę́ Nákedı and the Pembina Institute are involved in ongoing research with the community of Tulít'a and Sahtú youth to assess health risks associated with climate change.
- Risks associated with NO land-based programming include: youth becoming less and less capable in the bush; loss of Dene language, worldview, and cultural identity; unhealthy pop culture and store-bought food; land getting used by outsiders, including industry, if Dene people do not continue to use it ('use it or lose it').
- Youth participants estimated that the risks associated with NOT using the land are both of higher danger and higher likelihood than the risks of land-based programming.
- Key research questions include:
  - How does traditional knowledge transmission and cultural and language fluency inform student success and professional enhancement and development? In other words, how does being grounded in one's cultural identity affect one's development as a student or as a professional?

Transport of toxic wastewater from hydraulic fracturing operations

- Risks associated with various options were considered: transport via trucks down the winter road to Alberta/BC; barging wastewater up the Mackenzie River during the summer season; deep-well injection within the Sahtú Region; tailings ponds built within the Sahtú Region; or not doing any hydraulic fracturing to begin with.
- All options, including the 'do nothing' option, carries some degree of risk (doing no hydraulic fracturing

could threaten jobs and the economy). The general feeling was that, if wastewater is to be produced, tailings ponds would be the most risky option.

- There are a lot of unknowns that would need to be researched and monitored in order to better understand risk. From a scientific perspective, key research questions include:
  - What are the health effects of fracking chemicals, both on humans and on animals? How long would it take for people to get sick? How sick would they get? How much would have to be spilled in order for the people and animals to get sick?
  - Where are key water monitoring sites where the risks are greater, like creek crossings or steep sections of the road? How will sources of contamination be identified?
  - How does climate change affect transportation risks, such as how fast the winter road deterioriates, or the severity of storms in the summer?
- The health and experience of the drivers should be monitored – how much training do they have? Are they under the influence of alcohol or drugs?
- Traditional knowledge would be important in understanding the connections between things, such as how a spill of toxic chemicals could contaminate the entire food chain or travel over or under the ground.

Mercury levels in fish from Kelly Lake

- Research on mercury in Kelly Lake was discontinued a few years ago – who has that previous data? Where is it? Has it been analyzed?
- Community members need access to that data and need to understand what it means so they can make informed decisions.
- People can make safer choices by eating smaller fish, not eating stomach fat, eating lower on the food chain. Eating store-bought food carries its own risks of cancer and heart disease.
- From a scientific perspective, key research questions for the future include:
  - What are the long-term trends for mercury levels in Kelly Lake?
  - When can we predict mercury levels will begin to drop?
- Traditional knowledge can contribute stories about runoff from certain mountains that are high in mercury.

Break-out group on risk of wastewater transport

Recommendations

Various kinds of recommendations were made by workshop participants:

a) What should be studied;
b) How research should be done; and
c) Resources needed to support good research.

What should be studied

- Questions related to human health:
  - Are diabetes and high blood pressure related to contaminants in any way?
  - What are the health effects of fracking chemicals, both on humans and on animals? How long would it take for people to get sick? How sick would they get? How much would have to be spilled in order for the people and animals to get sick?
- Questions related to long-range contaminants:
  - Use fish samples collected from Great Bear Lake over the past 13 years and test them for contaminants such as mercury.
  - What levels of mercury do fish eggs have?
  - What are the long-term trends for mercury levels in Kelly Lake?
  - When can we predict mercury levels will begin to drop?
  - Analyze data that has already been collected and figure out what it means for people and health.
  - Are there any 'emerging contaminants' in the Sahtú Region?
- Questions related to industrial development such as oil and gas operations:
  - How does noise disturbance from helicopters and heavy machinery (such as drills) affect animals such as birds, moose, caribou, beavers, and wolverine?
  - How could contamination from oil and gas operations affect wetlands, habitat, and water sources?
  - Companies should investigate how they can do their operations without using harmful chemicals.
  - Identify key water monitoring sites where the risks are greater, like creek crossings or steep sections of the road. How will sources of contamination be identified?
  - How does climate change affect transportation risks, such as how fast the winter road deterioriates, or the severity of storms in the summer?
  - Monitor the total amount of disturbance on the land (such as roads, seismic lines).
  - How are oil and gas operations affecting the movements and migration patterns of caribou? There have been new sightings of caribou at Three Day Lake.
  - How is industry activity affecting the health of caribou?
- Health of caribou and moose should continue to be monitored - especially puss on caribou meat, moose ticks
- Water quality monitoring:
  - Water quality in the Mackenzie River should be monitored at all times of the year, including

> "Science often comes for two or three years and then goes away. The project is done. You do answer some questions but they are really short, 'fast-food' type questions. When you have long-term data over many years, then you can have good baseline data. You can have a relationship with the community and build a team effort on things. If you come year after year after year, you build good data, and then you can answer good questions. "
>
> - Louise Chavarie

under ice and during spring break-up
- Water quantity thresholds:
  - What are thresholds for sustainable water use (considering cumulative effects by both industry and communities)?
  - How do cumulative water withdrawals affect fish in small lakes being used by industry?
- Hydrogeology:
  - What are the interactions between surface water and groundwater in the Sahtú Region?
  - How does karst affect water flow in the region and possible pathways of contamination?
- What are the migratory routes of fish, including grayling, in the Mackenzie River system?
  - How are interactions between muskox and caribou changing?
  - Use 'biodiversity kits' to assess the overall biodiversity in the region.
- Study the 'language of the land' – how to reclaim a tradition of stewardship for future generations.
  - Monitoring wastage of meat.
  - How does traditional knowledge transmission and cultural and language fluency inform student success and professional enhancement and development? In other words, how does being grounded in one's cultural identity affect one's development as a student or as a professional?

How research should be done

- Hire more students and young people to help with sampling and monitoring projects. Ideally, research should engage both young people and experienced land users so there is intergenerational learning.

> "We have a beautiful land. If we damage it, what will the future hold? On our land we need to learn where all the good fishing and hunting is. When the industry comes, we need to make sure that they don't destroy those areas. Dene people are supposed to care for each other and work with non-Dene people."
>
> -- Leon Modeste

- Harvesters need to take more responsibility for giving organs from the animals they harvest to researchers, so they can be tested for contaminants and health issues.
- Research could be better coordinated – for example, researchers collecting fish in Great Bear Lake could coordinate with those monitoring contaminants and ensure samples are tested for mercury levels.
- Do a better job documenting and communicating results of community meetings, so people do not have to repeat themselves.
- Information about mercury levels needs to be better communicated to community members who are eating fish.
- Information about the results of water quality testing needs to be better communicated to community members (even the regular testing done at the water treatment plant). People want to understand what causes the shiny film on the water.
- Researchers can make better use of Facebook and websites to communicate with community members.
- Researchers could communicate results during community annual general meetings (AGMs) and Board meetings.

Resources needed to support good research

- Government agencies such as Health and Social Services, Health Canada, and the Northern Contaminants Program need to work with researchers and communities to ensure that toxicology assessments are done, Health Advisories are issued when necessary, and the results are communicated well to communities.
  - A staff person in the Northwest Territories should be tasked with ensuring toxicology assessments are done, so the process does not have to go through Ottawa.
  - While researchers may be taking samples and testing for some contaminants, they may not have the funds to test for the full range of contaminants relevant to human health. Government agencies could take advantage of sampling already being done, and contribute money to complete the testing and conduct a toxicology assessment.
  - Toxicology information should be shared with Public Health and local health centre staff, who can help people make good choices about what to eat.
- A helper or coordinator could be hired in each community to support research projects, to provide continuity and to be a "knowledge translator".
- There should be a Research Advisor for the Sahtú Region, like the Inuit have.
- A research coordination group would be helpful for contaminants issues.
- Research data in the region needs to be better organized – a library could help, and/or a staff person hired to do data management.
- Traditional Knowledge research could be included within the GNWT-CIMP's Discovery Portal (an online database for NWT environmental knowledge; see nwtdiscoveryportal.enr.gov.nt.ca), and within the Polar Data Catalogue (an online database maintained by Canadian researchers; see www.polardata.ca).
- Research protocols help to ensure researchers are collecting data in a common way that makes the data high-quality and comparable.
- More resources are needed to support community-based monitoring of industry operations.
- A terminology workshop about contaminants would be useful. We need better ways to interpret 'contaminant' to reflect the fact that many of these substances are natural and are only harmful in higher doses.

Back row: Todd Ellton, Frederick Andrew, Leon Modeste, Roderick Yallee
Front row: Anja Carlsson, Stephanie Behrens

Conclusion

Keeping the food and water on the land safe

> "It seems like each of these workshops that we're having is building on the other ones that came before. We're gaining a lot of momentum, especially with the youth presence here."
>
> – Deborah Simmons

Sahtú communities are moving forward in gaining more control over their health and playing a bigger role in research and monitoring of contaminants in their region.

The Research Results Workshop was an important opportunity for representatives from Sahtú communities and organizations to meet face-to-face with researchers and with representatives of the Northern Contaminants Program and the Cumulative Impacts Monitoring Program. Participants got up to speed on the results so far of research and monitoring programs related to wildlife health, fish and water quality, and gave input on where this kind of research should go in the future. It was also an important chance for researchers to hear about each other's projects and find opportunities for better coordination.

Many of the researchers have already built long-term relationships with people in the Sahtú Region and are building long-term baseline data sets. This commitment is inspiring, especially to those researchers who are newer to the region. Workshop participants shared a common goal of improving communication methods and producing meaningful research that would address the needs of Sahtú communities.

This workshop built successfully upon the Sahtú Environmental Research and Monitoring Coordination Workshop, held earlier in November 2013 in Tulít'a. The objectives of the earlier workshop were to ensure environmental research and monitoring would be done in a more coordinated way, better address community concerns, strike a better balance between emphasizing science and traditional knowledge, and inform decision-making. A Sahtú Working Group was formed to carry that work forward on an ongoing basis. The Group may be able to help address some of the recommendations that have come out of this Research Results Workshop.

Some of the recommendations may also be addressed by applying for funding from the Northern Contaminants Program, which supports both contaminants research and communication and capacity-building within communities. Recommendations related to cumulative impacts, including industry-related concerns, may be addressed by applying for funding from the Cumulative Impact Monitoring Program.

Pathway in Norman Wells

Diversity of Sahba (Trout) in Great Bear Lake

About the project

Researcher Louise Chavarie explained: "Great Bear Lake is the biggest lake in Canada, and the ninth largest lake in the world. It is important for Canada to protect that lake. It has a special value.

The scientists thought that there was not a lot of diversity in Great Bear Lake, but that's not true. While there are less species than in the south, there's a lot of variation within the species that are there — they have adapted to use all of the habitat and the food.

We discovered there are four different types of lake trout living in Great Bear Lake. One has red fins; another we call the 'butterfly' because its fins are so long that it looks like it's flying through the water, and it's really colourful as well. Another we call the 'bulldog' because of its big jaw. The elders were saying that they only started to see this 'bulldog' one twenty years ago. It's a newcomer. Two of them live closer to shore, the others live in deeper water. You can also tell them apart by the colour of their flesh — some are really red, others are orange."

According to elder Leon Modeste, the four different types are from different families, and they live in different areas of the lake. They also taste different. Researchers found that each type of trout has favourite parts of the lake — for example, the trout in the Keith Arm (where Délı̨nę is) are mostly the butterfly type.

Louise explained: "We focus on one arm of the lake per summer. And then, we move on to the next one the year after, so we rotate our sampling. This project started in 2000, which gives us 13 years of data, which for the north is a good long-term dataset."

Information about these different types of trout could affect how you decide to manage the fish, since they eat different things and use different habitat. Resource managers need to ensure each of these types is reproducing fine and none are threatened by factors such as sport fishing and climate change.

The researcher: Louise Chavarie

"I'm the fish lady who has been working on Great Bear Lake for six years now. I'm from a really small fishing town on the east coast of Quebec. One of my best memories when I was a youth was to go cod fishing with my dad. I remember getting tubs full of cod, and having a lot of fun. The last time I went fishing for cod, I was 12 years old. We caught only one cod for the entire day. So, I lived through the collapse of the cod fishery. It was really a big deal for us. It's one of the reasons why I became a biologist. I've been coming to the Arctic for eight years. I fell in love with the area. Great Bear Lake is a magical place for me. I'm aiming to keep coming every year as much as I can."

Community involvement

The research team hires people from Délı̨nę, between two to four technicians, as well as one cook.

The project has done traditional knowledge research with elders from Délı̨nę, including Leon Modeste.

Two of the types of trout already had Dene names — Dárélı̨ GoSahba (named for the outflow of Great Bear Lake) and Sahba k'áht'a (named for the fin). Work is being done to create Dene names for the other two types.

According to Louise: "There's huge appreciation from our part. We have had huge support from the community of Délı̨nę ."

How the research is done

Louise described what she does every day when she is out at her research camp:

"What we do is, we start by taking the length and the weight of the fish. We know if they're in good health when you compare the weight and the length. And then, we cut the head and take out the ear bones – we use them to age the fish. When you cut them, it's like a tree. There are rings. And each ring represents one year of their life.

The meat and fat gives us a lot of information, most importantly about the diet. You are what you eat. The gill rakers also change depending on what they are eating. Then we take the fins for genetics.

Then, we open the belly. If the stomach is full, we keep it and characterize every item they're eating. And the last information that we get, it's from the gonad — if it's a male or a female and what stage. Are they juvenile? Are they mature? Are they spawning? We weigh the gonad or count the eggs because it gives us a lot of information about reproduction, about how many babies they will produce.

We use that fish at the end of our day to make dry fish. We don't waste the fish ever. And I'm learning how to do it. I learned there are many ways to do dry fish depending on who's teaching. We give it back to the community at the end of our field work season."

Questions

Could the fish you collect also be tested for contaminants?

Yes — it would not be too expensive to get samples tested in a lab for contaminants. We also have frozen samples going back to the year 2000, so we could get long-term data on contaminants. We have not only lake trout, but herring (cisco), burbot and whitefish samples frozen.

Did you see any scars on the fish close to the lodge (from catch and release fishing)?

No, we didn't see any signs on the fish, but we couldn't get too close to the lodge because they didn't like us being there. In a big lake like that, it would be hard to catch the same fish they are catching.

Next steps for the research

- The research team has already started to expand their study to lake herring (cisco), which are a favourite food for lake trout.
- The team wants to better understand lake trout at the juvenile stage.
- The team is planning one big combined results workshop, with other scientists studying fish and mercury in the Sahtú Region.
- Louise is interested in doing a follow up study on whitefish in Great Bear Lake.

Long term monitoring of Great Bear Lake fisheries and the aquatic ecosystem

About the project

Deanna Leonard (Fisheries and Oceans Canada) presented this project on behalf of Kim Howland, who has been doing monitoring work on Great Bear Lake since 2000. Kim also began the work on 'Diversity of Sahba (Lake Trout)', described above, before Louise joined the team.

Deanna explained how the project came to be: "We need to look more at ecosystems. We can't just look at fish alone. In fact, all of it together needs to be understood. And so, after 13 years of study, Kim has partnered with the Cumulative Impact Monitoring Program to start looking at the lake as a whole."

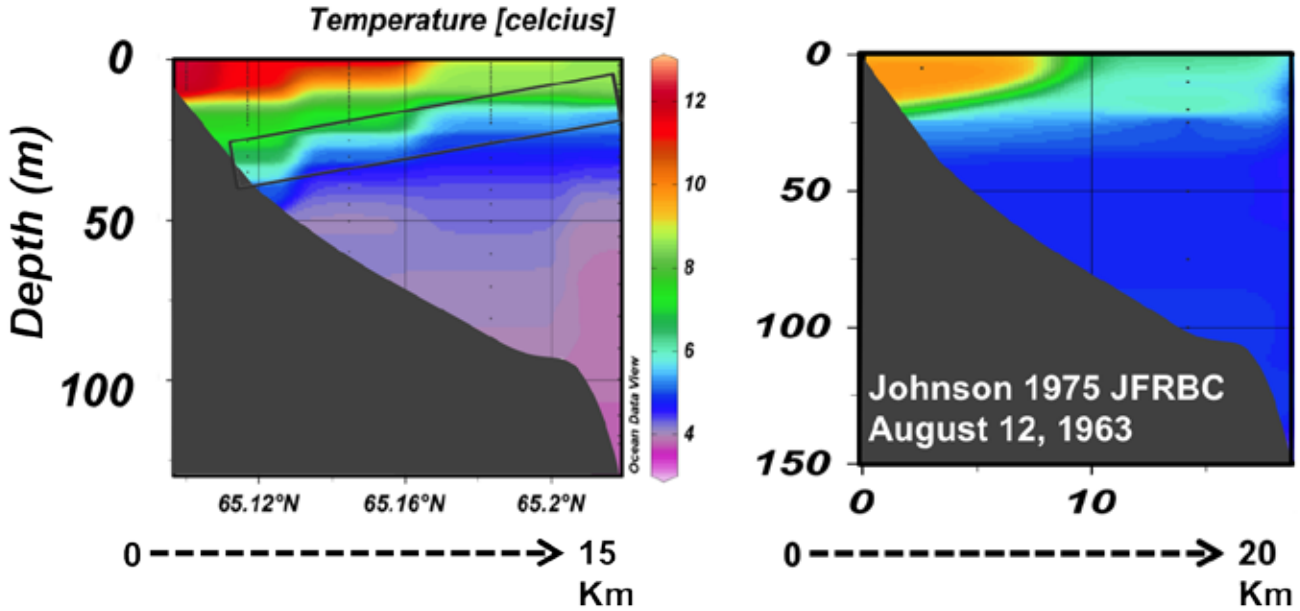
The study looks at water temperature, water quality, the land environment, and the food chain, including the benthic invertebrates — the bugs that live in the mud at the bottom of the lake. They are important because fish eat them.

So far, there have been two years of testing — in 2012 researchers were in Keith Arm and in 2013 they studied McVicar Arm. There is also data available from a study done back in 1963, so we can see how the lake has changed since then.

One of the most interesting changes researchers have discovered so far, is the water temperature. Right now there is a sharp separation between the warmer water closer to the surface of the lake, and the colder water underneath. This happens when there is a big difference between the warmer air temperature and the colder water temperature. Back in 1963, the air wasn't as warm so there wasn't this sharp separation. There was more mixing within the water of cooler and warmer parts. The difference is likely due to climate change.

Mixing is what moves around the nutrients in the water — what the fish and the bugs need to survive. Since 1963 there has been a change in where the largest numbers of bugs and insects are found in the lake — now there are more bugs and insects further offshore, in the deeper waters.

Deanna explained what this means: "This change is going to affect the fish. How it affects them, we don't know yet. It could mean they use the lake a little differently, in the way they move around. It could affect where their food exists, or what they eat."



Louise Chavarie added: "Climate change is something new, we've never had an experiment like this before. We can start to have ideas and predictions of what's going on, but we don't know for sure."

Next steps for the research

- Further monitoring is needed to look at how the water temperature, bugs, and other parts of the aquatic ecosystem change across different parts of the lake and from year to year.

Community involvement

Lake trout are one of the most important food sources for residents of Dél̨nę.

One of the starting points for this research was traditional knowledge – elders and harvesters talking about where they are fishing on the lake and helping to map out what they understand about the fish around the lake.

Community-based monitoring sites have been established close to Dél̨nę, and local residents are hired to work on the research team.

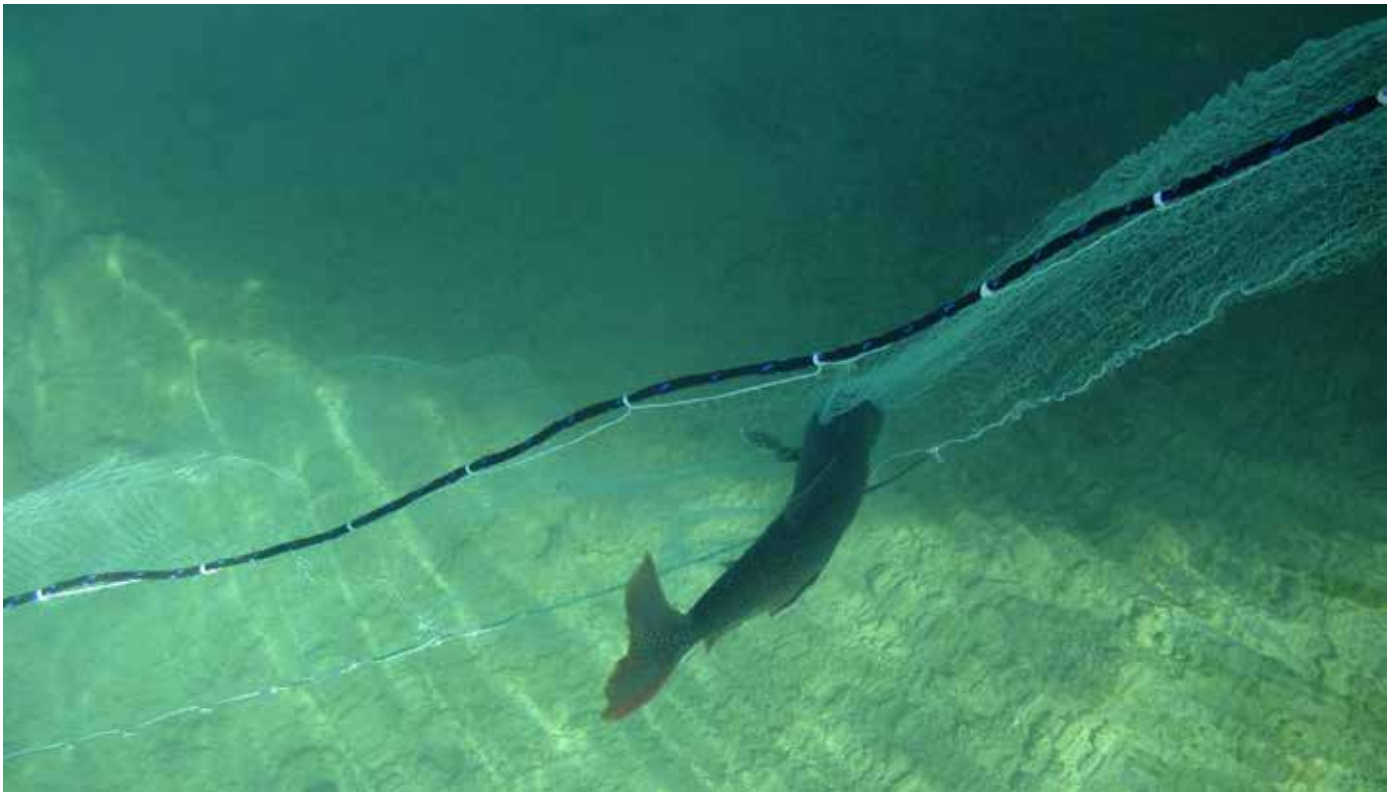
Questions

How much has the water temperature in Great Bear Lake increased since 1963?

It's not so much that the lake as a whole has increased in temperature, it's that there are bigger separations between the warmer water and the colder water, whereas the warmer and colder waters used to mix more.

Is there a point where the smaller fish in particular won't be able to take the warmer temperatures and will get irritated or just die?

That's exactly what we're trying to understand, how that's going to change. In Great Slave Lake we are already seeing shifts in fish species — there are way more of certain species than before, like walleye, yellow eye, and golden eye that prefer warmer, murkier, dirtier water.



Loche (burbot) contaminant research with Fort Good Hope

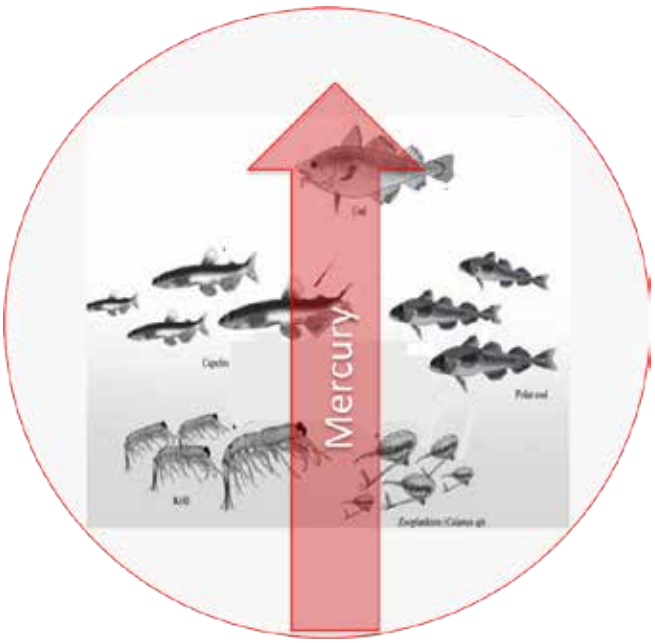
About the project

Gary Stern (Fisheries and Oceans Canada) and Jesse Carrie (University of Manitoba) have been analyzing data collected from burbot (loche) near Fort Good Hope to see whether contaminant levels are getting higher or lower.

The researchers looked at data from the past 27 years for levels of metals in loche muscle and livers, especially mercury. They found that mercury levels have been increasing over that time, however the mercury levels are still low enough that the fish are safe to eat and sell.

The researchers also looked at 24 years of data on levels of chemicals, such as pesticides, in the loche. Levels of some types of chemicals have dropped, which is good news, but other kinds of chemicals have increased.

Climate change is also having an impact on mercury levels in lakes. A longer ice free season means more metals are being broken down and taken up by small organisms. Then metals like mercury make it all the way up the food chain, accumulating in each animal that eats other animals.



Questions

Have you ever seen a lake where mercury has been high in fish but then mercury has gone away? Has that ever happened?

Yes, we're seeing that in the south, like in Alberta or parts of northern Ontario. We used to have quite high concentrations there, but because we've cleaned up coal power plants, the mercury levels are starting to decrease now in those lakes. However, when you look at Northwest Territories, the levels are still going up. They haven't really peaked yet, although it is possible they are starting to level out.

Could there be any contamination in fish from coal seams in the Sahtú Region?

Mostly what you would worry about is the mercury in the coal. There are also polycylic aromatic hydrocarbons (PAHs) which are in any kind of fossil fuel (like oil), but fish cannot take them up very well because they are not water soluble.

How can you tell or predict which lake or river will have higher levels of mercury?

Bob Hanley from GNWT Health and Social Services explained that an online program is now available called the "NWT Mercury Predictors in Lakes Web Map." (http://www.geomatics.gov.nt.ca/mercury_predictors_in_fish.aspx)

Community Involvement

Many Fort Good Hope community members help in collecting the fish samples. Community members are very concerned about mercury levels and are anxious to understand more about why mercury levels are going up and what it means.

Watershed framework for assessing cumulative impacts of development

Julian Kanigan (Cumulative Impact Monitoring Program) presented this project on behalf of Krista Chin.

About the project

The research question for this project is: "What is the effect of industrial development on the health of the aquatic environment within the oil and gas lease blocks in the Central Mackenzie Valley?" Industrial development includes not only hydraulic fracturing, but all the activities that go along with it, such as road construction, seismic lines, drilling activities, roads, camps, and so on.

Not many conclusions could be reached yet, after only the first year of the project. Some of the biggest learnings were about the variety in creeks and streams throughout the area.

Julian explained: "When the area is described in applications by industry who want to do some development there, it sounds like a very homogenous place, as if everything is very similar. But in fact, there's a lot of variability as you head from the river towards the mountains." Some creeks have a lot more flow than others. Some creeks have a rocky bottom and some have more of a sandy or silty bottom.

Photo: Roger Odgaard

West side of Mackenzie River between Tulit'a and Norman Wells. Photo: K. Chin

Community involvement

Krista got involved early with communities of Tulít'a and Norman Wells in order to help her to figure out the research questions, and where she should go to sample. People in the Sahtú Region have long emphasized the importance of protecting water quality in protecting the health of the whole ecosystem. Community members were particularly interested in making recommendations as to the sampling sites, especially the areas they use when they are out on the land.

During the first season, Krista hired two local young people — Jasmine Plummer from Norman Wells and Kyle Yakeleya from Tulít'a — as field assistants. According to Julian: "there was a bit of a knowledge exchange there that was pretty cool. They were telling us about areas where their family used the land and we were learning about the land together."

Krista also visited classrooms in Norman Wells and Tulít'a and got students out doing hands-on sampling activities in local streams. Two elders in Norman Wells — Edward Oudzi and Edward Hodgson — contributed to the classroom activities by discussing their experience and observations about the changing landscape over time.

Outflow stream of Mirror Lake. Photo: K. Chin

How the research is done

Krista is using the CABIN protocol (Canadian Aquatic Biomonitoring Network), which involves testing water quality and physical aspects of each stream, as well as looking at the numbers and types of little bugs (benthic invertebrates) found at the bottom of the streams. The bugs can tell you a lot about the health of the ecosystem, including how clean the water is.

Next steps for the research

This year was a pilot year for the program, to test how well the sampling would work. Julian explained: "This is a good example of a project that's taking its time to get the question right and get the areas of interest right, so that it's positioned well next year to start doing the work and delivering results."

It will likely take at least two more field seasons to collect enough data to get some meaningful results that will start to paint a picture of the health of aquatic system in the region of intense oil and gas exploration.

Quarry off Husky Energy's all weather road. Photo: K. Chin

Water quality monitoring on Mackenzie River

About the project

GNWT Environment and Natural Resources has been working with Sahtú communities since 2012 to establish community-based water monitoring, focusing on water quality in the Mackenzie River. In the summer of 2013, the sampling program was expanded to 15 sites between Tulít'a and Fort Good Hope. Imperial Oil has been helping to fund some of the sites in and around their operations.

The results after the first summer of sampling were that the water is clean and safe to drink. A big workshop was held in Fort Good Hope to discuss this with the community.

The monitoring remains ongoing.

Community involvement

According to Laurel McDonald of GNWT-ENR, Sahtú Region:

"It's really important that the communities can do their own research and get data that they trust. When the test results are done, they are actually brought to the community first because it's the community's data. It's not anybody else's. ENR Land and Water Division are just there to help the community of Fort Good Hope get this data.

We want to train community people. We want to be able to give them a full understanding of why this program is out there, and what are the responsibilities that they have in order to do quality sample-taking.

There were quite a few problems that we had this summer in coordinating with the communities. You only have a certain window of time to retrieve and deploy these samplers. We had a really hard time getting the community members to be there, be ready.

So, that's one of the messages that I want to give to the RRCs and the bands that were involved. There's only that short little window of time — we really need you guys to be there and to be involved.

We should talk about going to the schools and explaining about the monitoring program and getting the students more involved who are in grades 10, 11, or 12."

Laurel McDonald

Caribou genetics study

About the project

Jean Polfus, a PhD student with the University of Manitoba, is working on this project in collaboration with the Ɂehdzo Got'ı̨nę Gots'ę́ Nákedı (Sahtú Renewable Resources Board). Jean explained:

"I'm working on a project where we look at caribou genetics and work with community members to collect traditional knowledge about caribou by collecting caribou poop.

We collect caribou poop, frozen on the ground. We offer hunters and trappers and anyone else on the land a $25 gift card to the local gas station for every pile of poop that they bring in."

Each caribou has its own individual DNA that is found on the outside mucus layer of the scat. By analyzing the DNA from the scat, researchers find out about how caribou are related to one another.

During the winter of 2012-13, 135 caribou samples were collected — of those, 110 were unique individuals.

Jean Polfus

Jean's initial analysis has found that caribou are more related to others on the same side of the Mackenzie River, so they do not cross the river that frequently to mate, forming relatively separate groups on either side.

The project is also looking at how woodland, barrenground and mountain caribou have related to each other over time. Right now, wildlife managers have drawn a line on a map where they think is the edge of woodland caribou range (and the beginning of mountain caribou range), and that line goes through the middle of the oil and gas lease areas. That means that caribou and habitat on one side of the line will be treated differently from caribou on the other side. Research is showing that woodland caribou use habitat outside that line. This project will help us understand better how different kinds of caribou relate to each other on either side of that line.

Community involvement

In the fall of 2012, the Sahtú Dene and Métis passed a resolution detailing their resolve to conduct respectful caribou research and management. The caribou genetics study has developed collaborations with the Ɂehdzo Got'ı̨nę Gots'ę Nákedı and the Ɂehdzo Got'ı̨nę (Renewable Resource Councils) of Fort Good Hope, Norman Wells, Tulít'a, Délı̨nę, and Colville Lake to research and monitor caribou populations.

Jean explained: "We set up our research questions together. Deb and I had a series of meetings where we went around last December and we developed a budget together. We developed a memorandum of understanding. We developed a communication plan."

A big part of the project is working with traditional knowledge experts to try to understand and interpret the results of the genetics data.

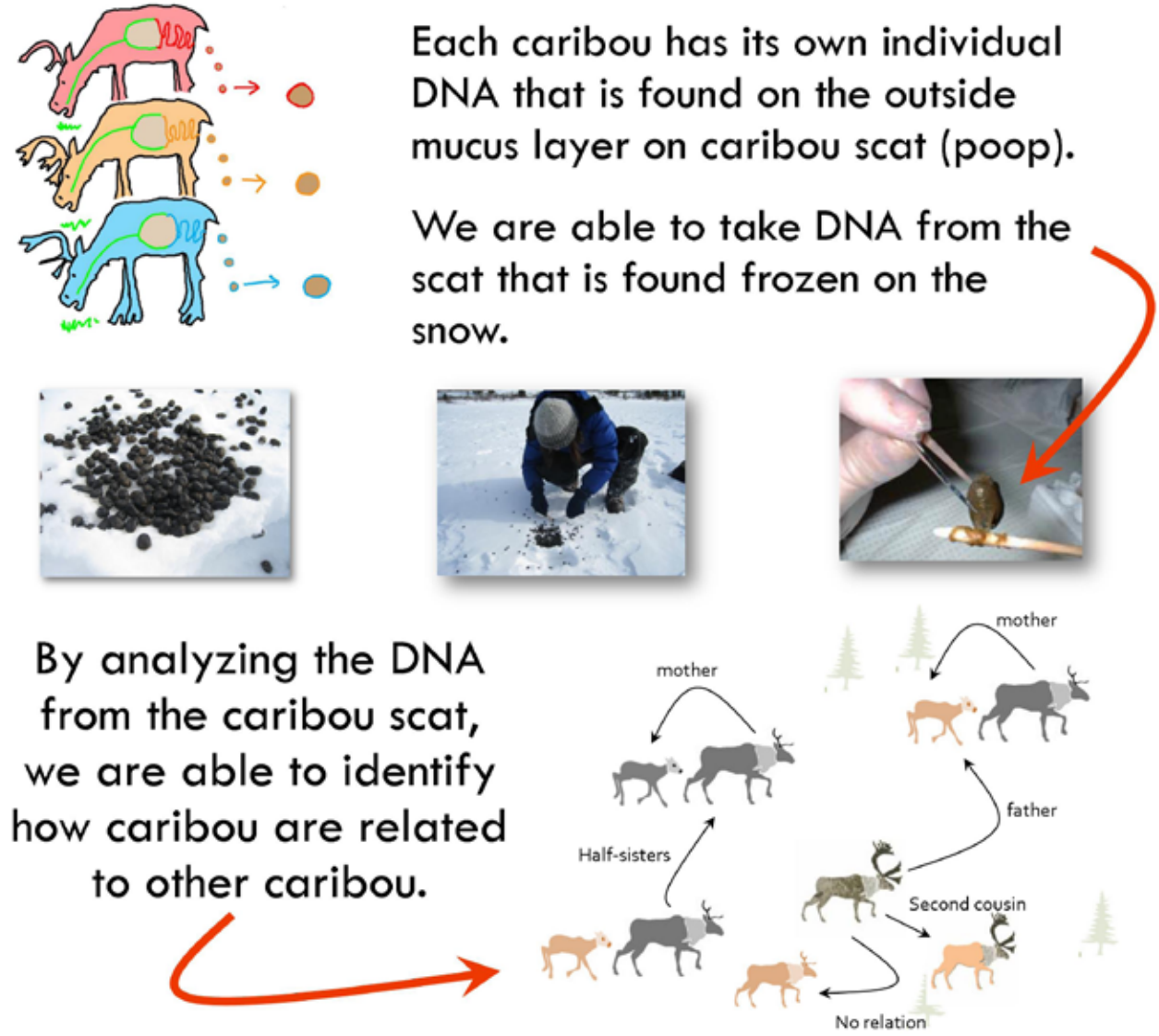
Next steps for the research

The project is ongoing. Jean explained some of the directions this study may take:

"I'm going to talk to more people about when they see caribou cross the river and where the caribou have moved in the past.

There are Dene words for all different age classes and types of caribou, from newborns to just-weaned caribou, to one year olds that are still with their moms, to a little bit older ones. And there's a lot of talk about the importance of big males in the herds in terms of maintaining the strength of the herds. I think some of the exciting work further down the road would be to find out genetically, whether those males are fathering more young. Or whether their young is surviving better, whether their calves are stronger."

From http://nricaribou.cc.umanitoba.ca/sahturesearch



Sahtú wildlife health project

Susan Kutz and Anja Carllson made this presentation on behalf of their research team.

Research questions

The project aims to establish health baselines for caribou and moose.

Susan and Anja described what they have discovered so far:

"One of the things we found is that the green slimy tea-colored stuff that hunters were reporting was caused by a tiny little parasite that lives in the skin and on the bones. And so, we've routinely monitored for that since then.

We found a new lungworm. It's a tiny little lungworm that's found in caribou, moose, and muskoxen in the Sahtú. Two years ago, we traveled through the communities to talk about this and to get ideas for a name for this parasite.

In 2008, we started some work with Fort Good Hope on winter ticks and that expanded out to Norman Wells and Tulít'a. Fort Good Hope might be the edge of the tick range right now. We can expect that they're going to continue further north, probably due to two things. One is the climate warming up. Secondly, with the forest fires the moose are increasing which means that the ticks can be spread more easily.

We also tested the Bluenose East caribou. It was only 25 caribou but none of them had ticks, which made us very happy. As these ticks move further north, if they do get into the barrenground caribou populations, they may just continue to cycle forever. We know the ticks can cause a fair bit of disease in caribou.

One of the neat things that we did with ENR-Sahtu is they sent wolf intestines to us. We looked at them for parasites. You can often tell what an animal eats by the parasites it has. One thing we found that was really surprising is these wolves had a parasite called Alaria, that they would get from eating frogs. About half of the wolves had this parasite. So that means a lot of wolves out there are eating frogs."

How the research is done

Over the years, the team has collected a total of 328 animal kits, mostly caribou.

Susan and Anja's team invented a new way of taking blood samples from caribou. It would be impossible to collect and carry blood in test tubes in the middle of winter. They invented a way of dipping filter paper into the blood. After testing the method to make sure it worked — this technology has been used as far away as Tanzania in Africa.

In order to measure stress levels of caribou, the researchers look at the teeth. When a caribou is sick, or if it cannot get enough food or if it is stressed due to bad weather, the enamel coating on the teeth (the hard outer part) does not form properly. This becomes a permanent record that the animal had a bad time one year. If researchers find that many caribou have defects in their teeth at a certain time, they may be able to predict a likelihood of herds declining over coming years.

Next steps for the research

The focus going forward is on whether industrial development is impacting the health of caribou and moose, especially stress levels. Stress levels can be measured by looking at teeth, hair, and hooves. This research will still depend on harvesters sending in samples, and it will be especially important that harvesters mark on a map where they found the animals.

The team is considering setting up a Facebook page where harvesters can post pictures of unusual things they find in animals, when they are wondering whether it is safe to eat or not. The team of researchers would be able to look at the photos and respond quickly, to ensure that meat does not get wasted unnecessarily.

It will be key to monitor both barrenground and boreal caribou for ticks.

Community involvement

Susan and Anja explained how the program came about:

"This program started in response to a big meeting that was held in Norman Wells in 2002 to discuss people's concerns. We held focus groups with the elders and hunters and really tried to find out what were their concerns for wildlife health? What kinds of wildlife diseases did they see in the past and what did they worry about for the future?

One thing people were starting to worry about is ticks. There had been a few reports in the valley of moose that were called ghost moose. They had lost their hair. Also, people were seeing this green-yellow tea-colored stuff under the skin and that was something they hadn't seen in the past.

We started a program called the Wildlife Health Monitor Program with the idea that the hunters are the people with the eyes on the land, they see everything out there. And we worked with hunters both in Colville Lake and Délı̨nę at the time. And then we expanded it to Fort Good Hope.

First, we provided some training on what samples to collect and how to do it. From then on, we've met with them annually. We were able to produce a caribou sampling video and disease training video. It's available on the web. This was filmed and narrated by Anne-Marie Jackson from Fort Good Hope. The youth drummers from Fort Good Hope play the music in the background. What's really neat about this video is that it has been used by caribou researchers right across North America from Alaska to Newfoundland. They've asked for it, because this provides the details on how to sample the caribou in a standardized manner.

Harvesters can pick up the kits at the ʔehdzo Got'ı̨nę (Renewable Resource Council) or GNWT-ENR offices. They will receive $175 in gas money in exchange for a complete kit.

We've created a webpage that we call the Branch for Anatomy Project. It's about the anatomy of caribou and reindeer — the scientific terms for a lot of the muscles and organs, and the Dene terms and terms from other indigenous languages across northern North America.

From 2003 until last year, we've had a program where every year, we've gone in and talked to kids from kindergarten to grade 12 about wildlife management and veterinary medicine. We've worked with kids on lynx carcasses, marten and chickens."

Questions

Do the ticks carry diseases like Lyme disease?

There is no evidence that these ticks spread any sorts of diseases. But they do hurt the animals — the yearlings get really badly infected and they'll scratch all their fur off. They can lose so much blood that they'll die from that.

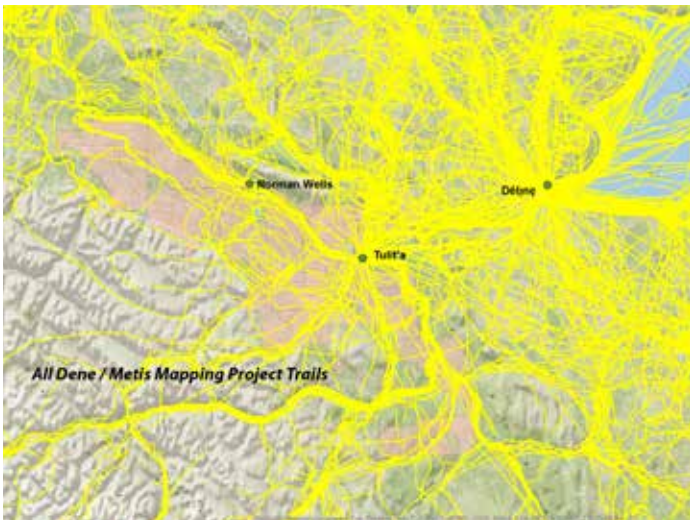
Is the meat still safe to eat if the moose has ticks?

The ticks are only on the outside and the meat is good.

From http://nricaribou.cc.umanitoba.ca/sahturesearch

Dene mapping project and wildlife study

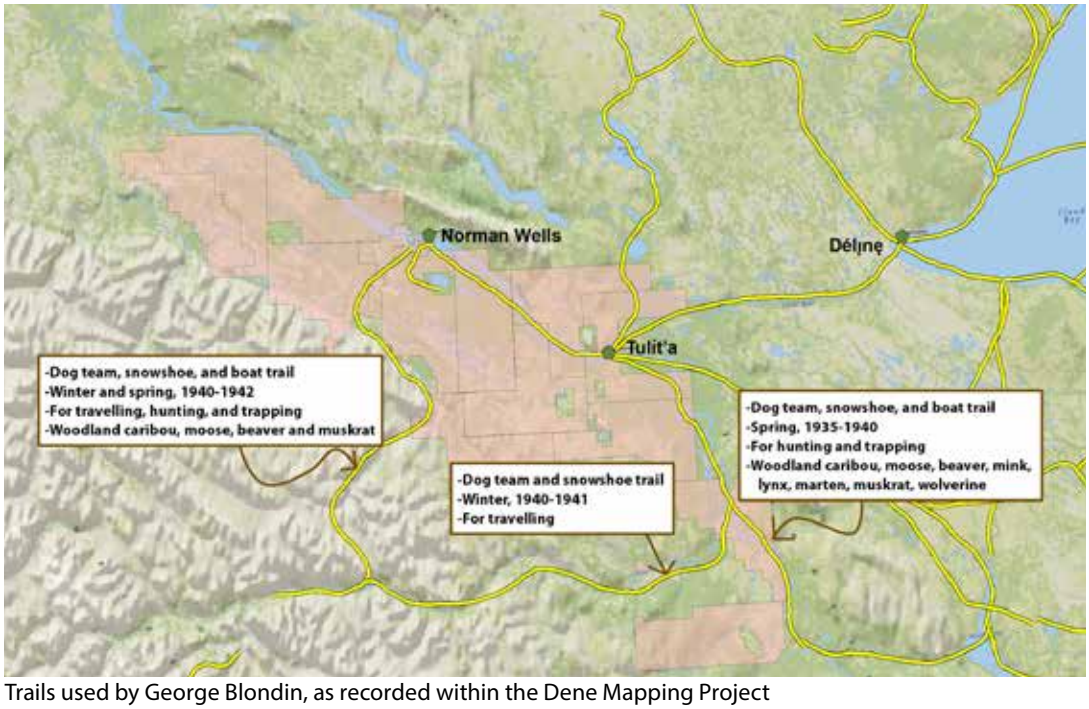
The Dene Mapping Project involved interviews done in the 1970s with Dene elders who talked about where they had travelled on the land during their lifetimes, traditional trails, campsites, place names, and details about where they had harvested animals. It includes trapper biographies.



This current project, led by the ʔehdzo Got'ı̨nę Gots'ę́ Nákedı (Sahtú Renewable Resources Board), with funding from the Cumulative Impact Monitoring Program, is an experiment, to see if those maps and recordings can be used to better understand caribou populations. The study may focus on the area where there are oil and gas lease blocks because there is a strong interest in the effects of industrial activity on caribou and their habitat.

Deborah Simmons explained: "We took a little block of the area and we checked out what the trails looked like. You can see how major the use of the trails is; there's hardly a nook or a cranny that people weren't using. And this is just the trails. It's not just the stuff on the map that's important, it's also the recordings and the trapper biographies that help to provide some context and meaning for what's on that map. The best story that we were able to find was actually written by George Blondin. He came from Great Bear Lake but he also spent lots of time up the Canol Road. He was a guide, I think. So he has lots of history around here.

If all goes well and we win the case for making this a three year project, we want to spend time in each of the communities talking about this stuff and what it all means."



Trails used by George Blondin, as recorded within the Dene Mapping Project

Appendix A. List of Participants

Name	Organisation
Anja Carlsson	University of Calgary
Bob Hanley	GNWT Health and Social Services
Cameron Bernarde	Tuɬıt'a Youth
Camilla Rabisca	Fort Good Hope ʔehdzo Got'ı̨nę
Carole Mills	Northern Contaminants Program
Cindy Gilday	Sahtu Secretariat
David Menacho	Tulit'a ʔehdzo Got'ı̨ne
Deanna Leonard	Fisheries and Oceans Canada (Yellowknife)
Edward Kenny	Dél̨ıne
Eugene Boulanger	Tulit'a Youth / Dechinta Bush University
Frederick Andrew	Tulit'a ʔehdzo Got'ı̨ne
Gerald Pierrot	Fort Good Hope youth
Gilbert Turo	Fort Good Hope youth
Jack Horassi	Tulit'a
Jean Polfus	University of Manitoba / ʔehdzo Got'ı̨nę Gots'ę́ Nákedı
Jesse Carrie	University of Manitoba
Julian Kanigan	Cumulative Impact Monitoring Program
Laurel McDonald	NWT Environment and Natural Resources
Leon Modeste	Dél̨ıne ʔehdzo Got'ı̨nę
Louise Chavarie	University of Alberta
Nancy Norn-Lennie	Aurora College
Richard Andrew	Tulit'a ʔehdzo Got'ı̨ne
Rocky Norwegian	Tulit'a ʔehdzo Got'ı̨ne
Roderick Yallee	Tulit'a ʔehdzo Got'ı̨ne
Roger Odgaard	Norman Wells Land Corporation
Ron Doctor	NWT Environment and Natural Resources
Roy Horassi	Tulit'a
Stephanie Behrens	NWT Environment and Natural Resources
Susan Kutz	University of Calgary
Tamara Bernarde	Aurora College
Todd Ellton	Dél̨ıne̹ youth
Travis Menacho	Tulit'a
Valerie Erutse	TTulit'a ʔehdzo Got'ı̨ne
Deborah Simmons	ʔehdzo Got'ı̨nę Gots'ę́ Nákedı
Shauna Morgan	Facilitator - Pembina Institute

Appendix B. Agenda

Sahtú Environmental Research Results Workshop

8:30 am-5:00 pm, November 27-28, 2013 – Tulít'a

Background

The ʔehdzo Got'ı̨nę of the Sahtú Region have made it clear that they want to participate in research in the Sahtú Region – and they want to support more involvement by community members. Through greater understanding and participation, it will be possible to play a stronger role in decision-making to support regional visions and priorities. This workshop is a gathering of ʔehdzo Got'ı̨nę, youth, researchers, government representatives and research funders to talk about past, present and future research in the Sahtú Region. The workshop is co-sponsored by the Northern Contaminants Program, ʔehdzo Got'ı̨nę Gots'ę́ Nákedı (Sahtú Renewable Resources Board), and NWT Cumulative Impact Monitoring Program.

Objectives

1. Learn about how environmental research and monitoring can help people manage risk in the Sahtú Region.
2. Discuss good ways of involving communities in research and monitoring.
3. Identify research questions, gaps and priorities – accounting for community, regional, and territorial needs and objectives.
4. Move forward with coordination of research and monitoring.

Agenda

DAY 1 - Wednesday November 27

8:30 am	Coffee and mingling
9:00 am	Opening prayer, welcome, introductions, workshop overview
	Talking circle: what is your biggest question on an environmental issue? Is this question being addressed?
	Introduction to Northern Contaminants Program (NCP) and Cumulative Impact Monitoring Program (CIMP)
	Research, monitoring and risk: small group discussions
12:00 pm	LUNCH
1:00 pm	Understanding the research cycle
3:15	Water – past and ongoing projects
4:45	Group photo, summary and wrap-up

DAY 2 - Thursday November 28

8:30 am	Coffee and mingling
9:00	Recap of Day 1, objectives for Day 2
9:15	Caribou – past and ongoing research and monitoring projects
	Fish – past and ongoing projects
12:00	LUNCH
1:00	Report from youth participants
1:30	How are research priorities decided? How can communities be more involved?
3:45	Next steps – who, what, when, how
4:30	Final go-around; meeting summary, wrap-up, closing prayer, handshake