Northwest Territories Cumulative Impact Monitoring Program

NWT Environmental Research and Monitoring Results Workshop: Wek'èezhìı Region

Summary Report
Behchokǫ̀, NT
December 13-14th, 2022

Government of Northwest Territories

Tłı̨chǫ Ndek'awoo
Tłı̨chǫ Government

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Executive Summary

The NWT Regional Environmental Monitoring Results Workshop: Wek'èezhìı Region was held in Behchokǫ̀, NT, December 13-14th, 2022. The event was co-hosted by the Government of the Northwest Territories' NWT Cumulative Impact Monitoring Program (NWT CIMP) and the Tłı̨chǫ Government (TG).

The objectives of the workshop were to:

- Bring together researchers, northern decision-makers and communities to share results of environmental research and monitoring related to wildlife, fish and water in the Wek'èezhìı region; and
- Provide a forum for discussion between researchers, communities and northern decision-makers. Feedback from these discussions will be used to improve related projects and programs.

The workshop examined research and monitoring conducted in the Wek'èezhìı Region and focused primarily on NWT CIMP-supported projects centered on caribou, water, and fish, along with permafrost. Ten presentations were given by researchers and resource staff. Small, interactive break-out groups (Talking Circles) were held to generate discussion on how to include traditional knowledge and to better share research and monitoring results as well as to gather feedback on presented projects.

Fifty-eight people participated either fully or partially in the workshop. NWT CIMP provided funding for Tłı̨chǫ community representatives to attend the workshop, promoting information sharing with communities and decision-makers. The Tłı̨chǫ Government identified attendees and administered their travel arrangements.

The quality and relevance of the workshop and its presenters were evaluated by participants using a short survey. The majority of the feedback was positive and expectations for the workshop were met. Quality and relevance scores for presenters ranged from 66% to 84%. This information is shared with presenters to help improve their future communications with communities and decision-makers.

Key themes from the Talking Circles included:

- Communities want to be more involved in monitoring (identifying local questions, training of local monitors, helping analyze data, communication etc.) and building capacity;
- Communities want to be involved from the beginning of a project, providing input in the planning.
- It is important for project leads to communicate with community members in plain-language before, during, and after a project. It was noted that this approach is occurring in the Wek'èezhìı region, but more work needs to be done.

Chief Daniel Clifford welcomed everyone with opening remarks following an opening prayer and singing of O Canada by students from Elizabeth Mackenzie Elementary School.

I hope everyone will listen and learn from each other at this workshop.

Chief Clifford Daniels

1. Background

The NWT Environmental Research and Monitoring Results Workshop: Wek'èezhìı Region was held in Behchokǫ̀, NT on December 13-24th, 2022. The event was co-hosted by the Government of the Northwest Territories' NWT Cumulative Impact Monitoring Program (NWT CIMP) and Tłı̨chǫ Government (TG). This was the tenth annual and seventh regional results workshop supported by NWT CIMP.

NWT CIMP-funded results workshops are held annually in the NWT to provide environmental monitoring results to key audiences (Indigenous governments, community members, co-management boards, government departments and academia) and to provide information for informed decision-making. These workshops provide opportunities to network, strengthen ties between communities, monitoring and decision-making, and to understand cumulative impacts in regions of the NWT. Regional workshops are supported to encourage participants to share information about NWT CIMP and the projects it supports back into their communities.

The 2022 workshop examined research conducted in the Wek'èezhìı Region and focused primarily on past and current NWT CIMP-supported projects centered on caribou, water, and fish, and one on permafrost. Ten presentations were given by researchers and resource staff. Due to timing and a community tragedy, an eleventh presentation titled *"Making Use of Research and Monitoring Results Information"* was not given but aspects were highlighted in the first presentation and is provided later in this report. Small, interactive break-out groups (Talking Circles) were held to generate discussion on how to better share research and monitoring results and how to include traditional knowledge.

The objectives of the workshop were to:

- Bring together researchers, northern decision-makers and communities to share results of environmental research and monitoring related to wildlife, fish and water in the Wek'èezhìı region; and
- Provide a forum for discussion between researchers, communities and northern decision-makers. Feedback from these discussions will be used to improve related projects and programs.

Fifty-eight people (Appendix B) participated either fully or partially in the workshop. NWT CIMP provided funding for Tłı̨chǫ community representatives to attend the workshop promoting information sharing with communities and decision-makers. The Tłı̨chǫ Government identified attendees and administered their travel arrangements.

A questionnaire was given to each participant daily to obtain feedback on the presenters, usefulness of the material, the balance between presentations, questions and discussion, and how well the objectives were fulfilled.

During the evening of Day 1, workshop participants and the general public had the opportunity to gather and listen to a special keynote address by **John B. Zoe**. There was the opportunity for everyone to mix and mingle and discuss various environmental research and monitoring projects in an informal setting while enjoying chili and bannock.

2. Presentations

A total of nine (9) presentations were given over the two-day workshop. A tenth presentation by NWT CIMP on making use of results was not presented due to time restraints, however, is included below. Each workshop participant was provided with an abstract volume (Appendix C) for each presentation. The presentations are available by searching the NWT Discovery Portal at http://nwtdiscoveryportal.enr.gov.nt.ca and the direct link has been included beneath the title of each presentation, followed by a summary of discussion.

The following section provides the title of the presentation, a link to its location on the NWT Discovery Portal, and a summary of the discussion that followed the presentation.

Day 1

Tuesday December 13th, 2022

Presentation #1 - *About the NWT Cumulative Impact Monitoring Program (NWT CIMP)* - Lorraine Brekke, NWT CIMP (GNWT-ENR)

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/1%20-%20Brekke%20-%20CIMP%20overview.pdf

Summary of Discussion

- NWT CIMP defines cumulative impacts as the combined effects that human activities and natural processes have on our environment.
- Where does NWT CIMP's funding come from and how is inflation factored in?
    - Since Devolution in 2014, program funding comes from the federal government on a ten-year cycle and is static (doesn't change). Negotiations are underway for a new funding cycle. These conversations should consider incremental costs of inflation.

Presentation #2- *Changes in vegetation productivity and phenology across the Bathurst caribou range (CIMP187)* - Ryan Danby, Queen's University

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/2%20-%20Danby%20Presentation.pdf

Summary of Discussion

- Has an increase in methane release from permafrost thaw been considered in the results of plant growth and greening?
    - Not methane, but carbon dioxide is also released from permafrost thaw. So, plants could benefit from the increases in carbon dioxide.

- Are you seeing a difference in shrubbery from the effects of trampling vs forage?
    - This may be rebounding and perhaps, we are seeing more combined effects of trampling vs forage.
    - Caribou will eat birch if they have to, but not a lot.
- Why are the seasonal caribou cycles (calving) changing and why is there early activity?
    - We think spring migration is shorter because they are not moving as much as they don't have to cover as far of a distance. With less time for them to travel, they arrive sooner. It could also be because of earlier springs.
- Why are caribou staying on islands instead of the bush and not coming south?
    - Not known but may be fire history related which is a natural part of the boreal forest. We are now seeing more fires as climate is warming and the climate is drying.
    - Another researcher is looking at lichen regrowth, so perhaps there is not enough winter forage in the bush.
- Why isn't the GNWT fighting fires more if the fires are affecting the caribou?
    - Researcher cannot speak to government's fire strategy.
    - Fires are a natural occurrence and are becoming more severe, intense and larger in scale.
- It is important to work with the animals, Elders and youth. Elders have the knowledge for the future. Caribou meat is different now and migration patterns are different because of the mines. When monitoring caribou, there should be cameras on the collars.

Ryan Danby explaining his project results.

We must work together. The animals are trying to communicate with us.

Lisa Marie Smith

Presentation #3 – *Bridging traditional and scientific knowledge through a novel predictive approach to understanding the role of pathogens in the decline of a key Arctic species (CIMP214)* - Ben Padilla, University of Calgary

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/3%20-%20Padilla%20presentation.pdf

Summary of Discussion

- In Wekweètì, caribou are in a poor stage, yet we need them to survive. Fire has huge impacts to caribou and we don't see as many now as we did before. It is important not to take too many bulls.
- How will modelling help the future when traditional knowledge is used to tweak the model versus just having people on the land?
    - Models are only as good as the information going into them.
    - Models can help identify what mechanisms within individuals or ecosystems that are driving the changes (helps identify the cause). They can identify what mechanisms are maybe the most important and help prioritize efforts to focus on these aspects for management response.

Ben Padilla sharing his knowledge.

Presentation #4 – *Cumulative effects assessment of four barren-ground caribou herds in the NWT (CIMP207)* - Melanie Routh – Department of Environment and Natural Resources, GNWT

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/4%20-%20Routh%20-%20presentation.pdf

Summary of Discussion

- Clarified that there are uncertainties with model projections, particularly due to weather. It is difficult to determine if future forest fires will be like they've been modeled in the scenarios.

Presentation #5 - *Ekwǫ̀ Nàxoèhdee K'è – 'Boots on the Ground' (CIMP94)*

Petter Jacobsen, Tyanna Steinwand - Tłı̨chǫ Government
Roy Judas, Louis Zoe, Ete Zoe – community members

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/5%20-%20Jacobsen%20-%20ENK%20presentation.pdf

Summary of Discussion

- Are the calves increasing because of the wolf harvesting camps? What is the number of camps and will there be more camps like it?
    - Similar number of wolves at Contwoyto; no wolves at mines. Wolf carcasses are sent to ENR – would be helpful to examine stomach contents.
    - A third camp was started this year.
    - Saw a small increase in the number of calves which is a positive sign, but numbers are still low. Better vegetation was also seen.
    - Eskers are melting and there is a disappearance of summer snow.
    - Saw new movement patterns to avoid the heat and insects.
    - New species are there including bald eagles and moose.
    - Evidence of mining 'garbage' left on the land.
    - Low-flying helicopters around mine made the caribou run which was a concern. Monitors were in contact with the mine who stopped flying at that time to avoid wildlife harassment.
- The Boards must listen to the elders and traditional knowledge when they are reviewing applications. We must work as a team and include the youth who are our future decision-makers.
- How did you collect and remember all the information in the field?
    - Recorded information in daily journals, took pictures and videos.

Tyanna Steinwand, Louis Zoe, Ete Zoe, Roy Judas and Petter Jacobsen sharing project results and experiences.

EVENING FEAST and OPEN HOUSE:

From 5:00-6:30 pm, workshop participants and the general public had the opportunity to gather and listen to a special keynote address by **John B. Zoe**. There was the opportunity for everyone to mix and mingle and discuss various environmental research and monitoring projects in an informal setting while enjoying some chili and bannock.

Illustration by John B. Zoe (below left) during his keynote address.

Day 2

Wednesday December 14th, 2022

Presentation #6 – *NWT Permafrost Mapping Collective (CIMP186)* - Ashley Rudy - NWT Geological Survey, GNWT

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/6%20-%20Rudy%20%20presentation.pdf

Summary of Discussion

- Permafrost melts differently in different areas.
- Did you collect TK while doing this study?
    - Project started during COVID so had little interactions and was more a desktop exercise– as we move forward there are more interactions and input.

Presentation #7 – *Tłı̨chǫ Aquatic Ecosystem Monitoring Program* - Paul Vecsei and Terrell Knapton-Pain, Tłı̨chǫ Government

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/7%20-%20Vecsei%20-%20TAEMP.pdf

Terrell (left) and Paul explain their findings.

> ***You can find out a lot of things from mucky goodness.***
>
> Paul Vecsei

Summary of Discussion

- Why is the testing done every four years instead of each year in each community?
    - Frequency of testing fish and water is determined by budgetary constraints and practicality. In other words, what makes sense. In our case, we monitor one community every year and once all 4 communities have been visited, we start over. Thus, the 4-year monitoring cycle. Since these water bodies are relatively pristine and in undisturbed areas, current impacts come from far away external sources and considered minor. Under such circumstances, a 4-year monitoring cycle is considered acceptable.

- What are the 'lesions' in the tissue?
    - They are not lesions, they are encased cysts which are undergoing part of their life-cycle in the muscle tissue prior to migrating to the body cavity and feeding within the intestinal tract. So please do not mention lesions since it has no bearing on periodicity of the study/testing. Furthermore, the testing is done to determine metal concentrations in the muscle tissue and would not be used to detect parasitic organisms or wounds.
    - The white pea-sized infestation in the muscle tissue is an early life stage of the tape worm (*Diphyllobothrium spp*). It is difficult to attribute a reason for their abundance or scarcity within a lake or area. Our experience shows shallow warmer northern lakes to have higher levels of infestation in both Whitefish and Lake Trout. The presence/absence of cysts or any parasite species is not related to pollution or current mining activities throughout the NWT.

Presentation #8 – *Tłı̨chǫ Highway Wildlife Monitoring Program*
Tyanna Steinwand, Tłı̨chǫ Government (others)

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/8%20-%20Steinwand%20-%20Presentation%20(1).pdf

Summary of Discussion

- The data being collected is important as we are learning about the animals.
- Concern with the high number of wood-cutters on the highway.
- Important to have a washroom along the highway and garbage cans (don't litter!)
- Good to hear of the working exchange with local monitors along the Tuktoyaktuk highway and reporting information to the Department of Infrastructure and Department of ENR. Is the dust study looking at the impact on water?
    - The dust study is more about the air but doing a dust study related to the water can be a potential study for future years. There have been dust studies on the mine roads at Ekati for example, but not on Highway #9.
- Are you monitoring vehicles, including how many and the types?
    - Yes, just started tracking this in the field-books, including the direction they are travelling.

Frank Camsell, Albert Nitsiza, Lisa Marie Smith, Jody Ann Zoe, and Tyanna Steinwand share their results and observations.

> ***I am learning a lot from working on the highway, especially Tłı̨chǫ knowledge. We must work together.***
>
> Jody Zoe

Presentation #9 – *Marian Watershed Stewardship Program* **-** Paul Vecsei, Terrell Knapton-Pain, Tłı̨chǫ Government

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/9%20-%20Vecsei%20-%20Marian%20River%20(MWSP).pdf

Summary of Discussion

- It's important to have youth involved in the sampling but there are challenges in recruiting them and having them not show up.
    - The field program is community-based and we try to have a balanced representation of all age groups within the community. However, elder presence is critical since they teach the youths by passing down information that is of historic and environmental value. Youth recruitment poses some challenges.
- Is mercury high in some fish? Why?
    - Our lab results show Lake Whitefish mercury levels in muscle tissue as being well below Canada Health Guideline levels but some of the predatory, long-lived fishes such as Lake Trout show levels of mercury that are sometimes at or slightly above the Guideline. Why is this? Because like the Polar Bear, Lake Trout are examples of bio-accumulation. They are a top predator and consume large amounts of smaller fish while Lake Whitefish feed primarily on snails and insects (prey items with extremely low levels of mercury).
- Where is mercury coming from?
    - It is a naturally occurring metal and has always been present at the levels currently being encountered.
    - Due to global warming, a general trend in the north is for watershed productivity to increase. Our monitoring programs are a useful tool to observe and these changes as they occur. Fish growth rates will increase however, some species may be negatively impacted by having less of their preferred prey items available in abundance and less cold-water habitat.
- Have you studied fish stomach contents?

- Yes, as we process fish, we look at stomach content which reveals much about how each species lives and feeds. Whitefish are primarily benthic feeders and have very small mouths so their prey items are invertebrates like snails. Lake trout are open water (pelagic) feeders, are fast and have a very large mouth so they typically eat other fishes.

Presentation #10 – *Making Use of Research and Monitoring Results Information* (due to time restraints, this was not presented, but the link is below)

Lorraine Brekke, NWT CIMP (GNWT-ENR)

Available at: https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/10%20-%20Brekke%20-%20Making%20use%20of%20Results%20(not%20presented).pdf

3. Break out Group Discussions

Throughout the workshop, interactive discussions (Talking Circles) were held to generate understanding of monitoring concepts and gather feedback based on presented projects. The following section summarizes these discussions. The ideas of all workshop participants are represented, and do not necessarily reflect the opinions of NWT CIMP. Feedback on projects was taken by researchers who were present at the workshop and will be used to inform their future monitoring efforts.

1. What are other ways you would like to see these monitoring and research results shared?

- TG's website
- Indigenous language programs
- Radio (interviews with researchers/project leads/community members including Elders and youth)
- Videos and docu-series, including community concerns, Elders perspectives, environmental and wildlife concerns (tell a story with short messages)
- Social media (Facebook, Tik Toc, YouTube) – includes meeting information and project results including photos and videos
- Highlight job opportunities for youth (job fair?)
- Look at other similar programs such as Watershed Strategy and how they involve Elders and youth
- Host Elder story-telling nights
- Picture books (in Tłı̨chǫ and English)
- Posters
- Newspapers and newsletters
- Community tour (presentations in Tłı̨chǫ language)
- Sharing of workshop topics (e.g. Caribou and wolves)
- Increasing opportunities to share and exchange information to learn and build
- Need to look at what to do if results between programs are different

2. What information is missing about caribou to help make decisions?

- Advice from Elders in the south (e.g. How do those animals deal with the heat?)
- How migration routes are changing
- Impacts of climate change on the future for Tłı̨chǫ region and the caribou
- Predator behaviour (more brave than before)
- Impacts from wolves - population and movement information
- Regional Elders Advisory Group
- Impacts from aircraft (noise & smell)
- Impact from blasting (noise & smell) as this prevents caribou from coming into the treeline. Need to ensure that the terms and conditions of permits and water licences when caribou are in the area are honoured.
- Impact of collars
- Impact of diamond mines on caribou abundance
- Independent monitoring program for caribou around each mine
- Mines should be hiring Tłı̨chǫ/Indigenous groups members to monitor the caribou
- How species interact with caribou
- Control the contaminants
- Forest fires

- New information on new technologies
- Next steps and actions on management decisions
- Better mine clean-up and monitoring
    - Garbage left on land from mining
    - Reclamation
    - Monitoring by Indigenous people
    - Enforcement
- Lake and water clean-up and monitoring
- Snow/ice/weather conditions and the impact on caribou movement
- How helicopters and drones (new technologies) affect/disturb caribou (this may affect study results)
- Winter observations/monitoring (observe and share stories). Monitors could upload photos and information
- Caribou behaviours, number of calves
- Documenting traditions and cultural practices
- Impacts on caribou from mining roads (crossings, road maintenance and snow highwalls). Noted that Angus Smith of UNBC has written a paper on this
- Enforcement of wildlife management plans
- Location on wasterock piles and pits. Ensure monitoring, enforcement and follow-up
- Need more long-terms TK research instead of science on caribou (will take time and money)

3.a) What does traditional knowledge (TK) mean to you?

- EVERYTHING! Very important to Tłı̨chǫ people
- Way of life and knowing the land by heart through experience
- Respect, listen, passing on and watching actions
- Each community or region uses their own term, but not English

- Knowing how to live on land, spiritually, air, wildlife, language, traditional games, working together, helping each other, traditional medicine.
- Guidance -connects Elders in all directions
- Oral history and language - very important to document
- Surviving on the land – everyone participates and should never stop
- TK can change for the times we are in now but we need baseline data from generations before
- Hands-on learning (not in classroom)
- 'Look and listen'
- How you honour the land and animal and keeping it sacred

3.b) What traditional knowledge (TK) approaches have worked well?

- Using TG's Department of Culture and Lands
- Having prayers and interpretation
- Tłı̨chǫ audio recordings
- Family connections and knowing each other in the community to help feel comfortable sharing
- Repetition of language
- If young people know the language, it connects them to Elders and TK
- Elders story-telling in schools and more integration
- Parents must explain why TK is important – have to learn to take care of yourself
- Must think about TK and carry it with you at all times
- Experiences – must live it and speak the language
- Archiving all material
- Strong connections – on the land learning
- The outsider leaves the experience knowing more (but must happen in Tłı̨chǫ language)
- Integrate with scientific sampling (wildlife)
- Elders must be the teachers

3.c) What traditional knowledge (TK) approaches have <u>not</u> worked well?

- Not going on the land enough
- When white people/academics assume they are smarter and know more than Elders, harvesters etc.
- Cannot force youth or anyone – must invite and encourage
- Pay the youth? Need respect from youth (must talk to the youth's parents)
- Language barriers
- Internet/Wi-fi, computer screens are a challenge

3.d) What methods are appropriate for collecting and verifying traditional knowledge?

- Important to collect information by humbling yourself and being open to learn
- Talk to youth about what is working and what is not working, and what they want/need for the future.
- Teach the youth on the land
- Need Elders to verify information and confirm with each other
- Films/videos and other recordings
- Need improvement on approaching TK keepers
- Integrate connection between technical/scientific information and TK
- Traditional medicine should be a priority

Masi Cho!

Appendix A: Agenda

Government of Northwest Territories

Northwest Territories
Cumulative Impact Monitoring Program

Tłı̨chǫ Ndek'awoo
Tłı̨chǫ Government

FINAL AGENDA

NWT Environmental Research and Monitoring Results Workshop: Wek'èezhìı Region

December 13-14th, 2022

Kǫ̀ Gocho Centre ("Sportsplex"), Behchokǫ̀, *NT*

600 Nihti Eko Tili – map https://goo.gl/maps/oebwcXraGCC2

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*The Government of the Northwest Territories (GNWT)'s **NWT Cumulative Impact Monitoring Program** (NWT CIMP) and the **Tłı̨chǫ Government** (TG) are partnering to host a regional Environmental Research and Monitoring Results workshop.*

OBJECTIVES:

The workshop objectives are to:

- Bring together researchers, communities and northern decision-makers to **share results** of environmental research and monitoring related to caribou, water and fish in the Wek'èezhìı region.
- Provide a **forum for discussion** between researchers, communities and northern decision-makers. Feedback from these discussions to be used to **improve related projects and programs**.

AGENDA

NWT Environmental Research and Monitoring Results Workshop: Wek'èezhìı Region

Tuesday, December 13th - DAY 1

Bus Transportation: Departure from front entrance of Explorer Hotel, Yellowknife to Behchokǫ̀ (departing at **8:00am.** Look for Aurora Wonderland bus with the Beck's Kennel logo)

Time	Activity	Lead
9:00 am	Arrival, Coffee and Mingling Registration	
9:30	Welcome, Opening Prayer and Introductions • Opening comments by Chief Clifford Daniels • Agenda review • Talking Circles	Shauna Morgan (Facilitator)
9:45-10:15	• Presentation #1 - *About the NWT Cumulative Impact Monitoring Program (NWT CIMP)*	Lorraine Brekke (GNWT-ENR, NWT CIMP) Tyanna Steinwand (TG NWT CIMP SC member)
10:15 - 10:45	**Caribou-Related Projects:** • Presentation #2 - *Changes in vegetation productivity and phenology across the Bathurst caribou range (CIMP187)*	Ryan Danby (Queen's University)
10:45 – 11:00	**BREAK**	
11:00 – 11:30	• Presentation #3 - *Bridging traditional and scientific knowledge through a novel predictive approach to understanding the role of pathogens in the decline of a key Arctic species (CIMP214)*	Ben Padilla (University of Calgary)
11:30 – 12:00	**Talking Circle #1:** • Any thoughts you would like to share on what you've heard so far? • What are other ways you'd like to see these results shared?	Facilitator
12-1:00	**LUNCH** (provided)	

1:00-1:30	**Talking Circle (continued)**	
1:30 -2:45	• Presentation #4 - *Cumulative effects assessment of four barren-ground caribou herds in the NWT (CIMP207)* • Presentation #5 - *Ekwǫ̀ Nàxoèhdee K'è – 'Boots on the Ground' (CIMP94)*	Melanie Routh (GNWT ENR) Petter Jacobsen, Tyanna Steinwand (Tłı̨chǫ Government), Louis Zoe & Roy Judas
2:45 - 3:00	**BREAK**	
3:00 – 4:00 pm	**Talking Circle #2** • What information is missing about caribou to help make decisions? • What is the order of importance of these gaps?	Facilitator
4:00 – 4:15	Summary of Talking Circles as a Full Group • 3 key points from each group	
4:15 – 4:30 pm	**Wrap up and Closing Prayer**	Facilitator

Evening Community Feast & Open House

(5:00 – 6:30 pm)

Keynote Address by John B. Zoe: – 'Environmental Monitoring in the Wek'èezhìI Region'

Please join us for some traditional food, a keynote address, informal 'Meet & Greet', Q & A discussion, and poster session with community members.

ALL PUBLIC WELCOME!

AGENDA
NWT Environmental Research and Monitoring Results Workshop: Wek'èezhìı Region

Wednesday, December 14th - DAY 2

Bus Transportation: Departure from front entrance of Explorer Hotel, Yellowknife to Behchokǫ̀ (departing at **7:45am**)

8:45 am	Arrival, Coffee and Mingling Registration	
9:15 am	Welcome and Opening Prayer	Shauna Morgan (Facilitator)
9:30 – 10:30	**Related Projects*:*** • Presentation #6 – *NWT Permafrost Mapping Collective (CIMP186)* • Presentation #7 - *Tłı̨chǫ Aquatic Ecosystem Monitoring Program*	Ashley Rudy (GNWT – NWT Geological Survey) Paul Vecsei, Terrell Knapton-Pain (Tłı̨chǫ Government)
10:30 - 10:45	**BREAK**	
10:45 – 12:00	• Presentation #8 - *Tłı̨chǫ Highway Wildlife Monitoring Program* • Presentation #9 - *Marian Watershed Stewardship Program*	Tyanna Steinwand (Tłı̨chǫ Government) Paul Vecsei, Terrell Knapton-Pain (Tłı̨chǫ Government)
12:00 – 1:00	**LUNCH** (provided)	
1:00 – 2:15	**Talking Circle #3:** • What does traditional knowledge (TK) mean to you*? Is 'Tłı̨chǫ Nàowoò' the right Tłı̨chǫ Yatıì term for TK?* ○ When you think about work with **TK that has already been happening** - what approaches have worked really well? What has not worked so	Facilitator

	well? ○ What methods are appropriate for collecting and verifying TK?	
2:15 – 2:30	**BREAK**	
2:30 -2:50	• Presentation #10 – *Making Use of Research and Monitoring Results Information* Highlighting*: NWT Discovery Portal, Inventory of Landscape Change Webviewer, Mackenzie Datastream, 2025 NWT Environmental Audit*	Lorraine Brekke (GNWT-NWT CIMP)
2:50	Wrap-Up, Closing Comments and Closing Prayer	Facilitator
3:30 pm	**Adjourn**	

Bus Transportation: Departure from Behchokǫ̀ to Explorer Hotel, Yellowknife (departing by **3:45pm**)

Masi Cho

Thank you for participating!

Appendix B: Attendee list

Name	Email	Organization
Adamczewski, Jan	Jan_Adamczewski@gov.nt.ca	GNWT-ENR Wilidlife
Brekke, Lorraine	lorraine_brekke@gov.nt.ca	GNWT - NWT CIMP
Camsell-Blondin, Violet	violetcamsellblondin@tlicho.com	Tlicho Government
Camsell, Frank		Community member (Behchoko)
Cott, Pete	pete_cott@gov.nt.ca	GNWT- ENR Waters
Danby, Ryan	ryan.danby@queensu.ca	Queen's University
Dryneck, Garra		Community member (Whati)
Fitzgerald, Jane	jane_fitzgerald@gov.nt.ca	GNWT - NWT CIMP
Gon, Charlie		Community member (Gameti)
Heron, Tim	theron1957@gmail.com	NWTMN - SC
Jacobsen, Petter	petterfjacobsen@gmail.com	Tlicho Government
Johnson, Noah	Noah.Johnson@nsma.net	NSMA
Jokela, Anneli	ajokela@wlwb.ca	WLWB
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Appendix C: Project Abstracts

Northwest Territories Environmental Research and Monitoring Results Workshop: Wek'èezhìı Region

December 13-14th, 2022

Abstract Volume

Cover Photograph

Near K'eàgotì Field Camp, Wek'èezhìı Region, NWT;
Paul Vescei

Compiled by M. Seabrook

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NWT Cumulative Impact Monitoring Program (NWT CIMP)

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https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/1%20-%20Brekke%20-%20CIMP%20overview.pdf

https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/10%20-%20Brekke%20-%20Making%20use%20of%20Results%20(not%20presented).pdf

NWT CIMP is a monitoring and research program administered by the Government of the Northwest Territories, Department of Environment and Natural Resources.

The program supports environmental decision-making by generating baseline, cumulative impact and environmental trend information. Many other agencies share responsibility for environmental monitoring in the NWT. It is NWT CIMP's role to fill information gaps to better understand cumulative impacts.

The NWT CIMP Steering Committee made up of regional Indigenous governments and Indigenous organizations, guide the program. The Mackenzie Land and Water Board and the Mackenzie Valley Environmental Impact Review Board provide advice to this committee as observers.

NWT CIMP has three key activity areas related to monitoring and research:

1. The program works with key decision-makers, the Steering Committee and others to determine monitoring priorities;
2. NWT CIMP conducts, coordinates and funds monitoring, research and analysis.
3. NWT CIMP communicates results to decision-makers and communities.

The program currently focuses on three priority valued components: caribou, water and fish.

This presentation introduces NWT CIMP, the type of information generated, how this information can be used and where to find it.

Project results of NWT CIMP projects are available on the NWT Discovery Portal www.nwtdiscoveryportal.enr.gov.nt.ca, the Inventory of Landscape Change, the Mackenzie Datastream, our website, www.nwtcimp.ca, or by contacting nwtcimp@gov.nt.ca.

Changes in Vegetation Across the Range of the Bathurst Caribou Herd

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https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/2%20-%20Danby%20Presentation.pdf

Vegetation change in response to climate change is one hypothesis for the rapid decline of the Bathurst caribou herd. Our project examines this through (i) range-wide monitoring of vegetation changes using high frequency satellite imagery, (ii) ground-validation of satellite trends using tree ring analysis and plant community sampling, and (iii) a robust, updated analysis of herd distribution and range use. This presentation provides an overview of results obtained to date for each of these three objectives.

The satellite image analysis reveals significant changes in the seasonality and peak annual production of vegetation across portions of the Bathurst caribou herd's range since 2000. However, there is substantial spatial variability in these trends. In forested areas below treeline, the trends are heavily influenced by time since the last fire; but in the tundra areas above treeline the trends are more closely aligned with the effects of climate change. Field validation of the satellite image analysis indicates that sites on the herd's summer range where increased productivity was observed have a higher shrub canopy cover than sites that did not exhibit increased productivity. However, there is no significant differences in the age of shrubs between these sites. This suggests that increased growth of shrubs, not the establishment of new shrubs, may be responsible for the changes observed in the satellite imagery. Finally, updated analysis of caribou telemetry locations reveals substantial reductions in the extent of the Bathurst caribou herd's annual and seasonal distribution as the population declined. There have also been changes in the location of core seasonal use areas as well as in the timing of use of these seasonal ranges.

These trends suggest that climate-driven changes in vegetation could have been a contributing factor in the Bathurst herd's decline. However, it remains challenging to untangle the potential effects of these changes from the myriad of other possible factors affecting the herd. Additional work is being conducted to integrate the results from these three separate lines of inquiry to better understand the relationships between range condition and caribou dynamics.

Ekwǫ̀ Nàxoèhdee K'è – 'Boots on the Ground'

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https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/5%20-%20Jacobsen%20-%20ENK%20presentation.pdf

The *Kokètì ekwǫ̀* (Bathurst caribou) has seen one of the most dramatic herd declines, down to only 6200 animals in 2021. The Tłı̨chǫ people has relied on *Kokètì ekwǫ̀* since time immemorial, but a harvest ban since 2015 reduced peoples' interaction with the herd and the land. To advance traditional knowledge research and on-ground caribou monitoring, Tłı̨chǫ Government started up the *Ekwǫ̀ Nàxoèhdee K'è*- Boots on the Ground program. Using traditional ways of traveling the land, by boat and on foot, to key geographical features known as *ekwǫ̀ nǫʔokè* (water crossings), where elders anticipate *ekwǫ̀* herds' arrival, the monitoring team sit in position, as traditional hunters did, waiting, and watching the *ekwǫ̀* and their habitat.

Using traditional hunting methods as wildlife monitoring methods, and traditional hunting area as monitoring locations, Tłı̨chǫ elders created the research methodology, "*We Watch Everything*" to study *ekwǫ̀* and cumulative impacts focusing on the key indicators: (1) habitat; (2) *ekwǫ̀* health condition; (3) predators, and (4) industrial development. The main basecamp is at Kokètì where we have monitored Kokètì ekwǫ̀ for seven years, since 2016. During summer 2020, the program established a base camp on Deèzàatì (Point Lake) to monitor the *Sahtı ekwǫ̀* (Bluenose East caribou herd), and a 3rd research camp was established during summer 2022 at Ek'atì (Lac de Gras). The program is a collaboration between the Tłı̨chǫ Government, GNWT-ENR, the Wek'èezhìi Renewable Resource Board (WRRB). Funding was provided by Tłı̨chǫ Government, Arctic Canadian Diamond Company, and the GNWT-Cumulative Impact Monitoring Program (NWT CIMP).

The monitoring detected a trend of warm/dry habitat in 2016-17, followed by windy, wet habitat from 2018-21, with overall good quality ekwǫ̀ summer and fall forage. Caribou health is observed as "good" and bulls gaining fat reserves early in season. The good habitat and health conditions provide the necessary environmental conditions for the population growth; however, we observed a low calf abundance and see herds with few or no calves. Impacts from climate changes are: earlier spring melt; permafrost melt with collapsing eskers; disappearance of summer snow changing caribou behavior; and increase of new species as bald-eagles and moose. Through *Ekwǫ̀ Nàxoèhdee K'è*, Tłı̨chǫ people are traveling back to ancestral harvesting locations and reconnect to cultural places and *ekwǫ̀*. Thus, the program allows Tłı̨chǫ to "go back to the original source to remember" the stories, language, knowledge, and cultural ways of life that connects us to *ekwǫ̀*.

The role of parasites in caribou health and population trends

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https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/3%20-%20Padilla%20presentation.pdf

Populations of barren-ground caribou have declined significantly over the past 30 years, with the Bathurst herd experiencing perhaps the most concerning and long-lasting decline. While there are many interacting factors influence caribou populations, however, parasites are often overlooked as drivers of caribou populations. We have worked with Ekwǫ̀ Nàxoèhdee K'è to bridge Traditional and scientific knowledge to understand how parasites influence the health populations of Bathurst caribou. In April 2022 we held a knowledge sharing workshop with Tłı̨chǫ̀ Elders to talk about the most important factors influencing health and populations of ekwǫ̀, and to brainstorm ideas to improve field monitoring methods for Ekwǫ̀ Nàxoèhdee K'è. We used what we learned from this workshop to develop a guide for improving observations of

caribou while out on the land, and a method for collecting fecal samples for analysis of stress and load of stomach parasites.

We also developed a computer model to describe how stomach parasites and biting insects reduce caribou body condition, reproduction, survival, and population size. Our model shows that combined costs of avoiding biting insects and growing warble fly larvae can have big impacts on caribou populations. We also used the model to understand the impacts of a stomach nematode called *Ostertagia*. When caribou are infected with *Ostertagia* they forage less. Our model showed that reduced foraging caused by stomach parasites caused lower body condition, survival, and reproductive output (calves) in caribou. These results show that small changes in parasite load, quantity and quality of caribou forage, and energy expenditure by caribou (such as running from insects) can have big impacts on caribou body condition and population dynamics.

Cumulative Effects Assessment of Four Barren-ground Caribou Herds in the Northwest Territories

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https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/4%20-%20Routh%20-%20presentation.pdf

Barren-ground caribou (*Rangifer tarandus groenlandicus*) are an ecological and cultural keystone species of the Canadian North. Recent population declines have raised concerns about caribou management and conservation and highlighted the importance of long-term monitoring. Understanding the current and future impacts of landscape change on the population dynamics of

barren-ground caribou is critical in enhancing northern decision-makers' and communities' perception of the cumulative impacts of landscape change on this important species.

We collaboratively developed a decision-support tool that simulates the cumulative effects of landscape changes (e.g., climate and wildfire), project development (e.g., all-season roads and mineral development), and management practices (e.g., harvest levels) on the habitat quality and population dynamics of the Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, and Bluenose-East herds of barren-ground caribou. This work was accomplished collaboratively with the Wek'èezhìı Renewable Resources Board, Sahtú Renewable Resources Board, Gwich'in Renewable Resources Board, and Wildlife Management Advisory Council (NWT). We used ALCES (A Landscape Cumulative Effects Simulator) Online as the simulation tool. During the first year of the project, ALCES Online was initialized with various spatial data layers (e.g., wildfire, landcover type, temperature) and seasonal barren-ground caribou habitat models for the Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, and Bluenose-East herds. In Year 2 and 3, we developed the landscape change model that simulates how caribou habitat will change as a result of climate change, wildfires, and land-use in a 50-year timeframe (2010-2060). We also developed a seasonal population dynamics model, a simulation model that estimates how migratory barren-ground caribou populations may respond to changes in caribou habitat and vital rates. In Year 3, we produced a summary of publicly available Indigenous knowledge on the key drivers of change (e.g., climate, wildfire, predation, competition, harvest) that Indigenous people have observed in the past and present affecting the habitat and population of the Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, and Bluenose-East herds.

Initial results from preliminary scenarios of the Bluenose-East herd suggest population dynamics are sensitive to cow mortality; cow mortality is a key driver of population trend that warrants consideration in implementing strategies for harvest management and herd monitoring. Climate change, through changes in precipitation, temperature, and evaporation, also affected caribou habitat availability. A reduction in winter caribou habitat is projected as a result of the loss of old forest from increasing wildfires. Indigenous knowledge holders have reported a number of similar drivers affecting caribou habitat and their populations. These observations will be used in comparison to the changes simulated by ALCES Online. Further works needs to be completed to investigate the impacts of future land-use and management practices on the Bluenose-East herd, and more work is needed to simulate these scenarios for the Bluenose-West, Cape Bathurst, and

Tuktoyaktuk Peninsula herds. We hope the outcome of this project can provide meaningful evidence-based information to northern decision-makers and community members who are actively working on this species in the Northwest Territories and Kitikmeot region of Nunavut.

The Northwest Territories Thermokarst Mapping Collective: A northern-driven collaborative mapping framework for understanding the distribution and effects of permafrost thaw

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This talk overviews the development, implementation, and progress of a CIMP-funded northern-driven project called the Northwest Territories Thermokarst Mapping Collective (TMC). In this project, permafrost researchers across Canada collaborated to produce empirically-based inventories of thermokarst landforms and indicators of permafrost thaw sensitivity for the Northwest Territories (NT), Canada. The project has addressed a significant knowledge gap on the distribution of permafrost-driven geohazards and thaw-sensitive terrain and has fostered science collaboration and linkages with stakeholders. Increased NT-based permafrost science capacity enabled project development and implementation by providing project leadership and

fostering partnerships with government and academic collaborators focused on addressing project and stakeholder needs. Ongoing communications of methods and maps have informed study design and strengthened linkages with northern organizations and Indigenous partners. Theme-based inventory methods supported mapper training and implementation, and the flexible data infrastructure facilitated continued engagement of Canada-wide research partners and mapping progress without interruption by the COVID-19 pandemic. Mapping results will provide the first inventory describing the thermokarst terrain types for a 2 million km^2 region of northwestern Canada. The resulting data and analyses contribute to a more holistic understanding of thaw-driven landscape change and support novel opportunities for regional and community-based syntheses. This knowledge will refine depictions and inform the modelling of thaw-sensitive permafrost terrain, which is urgently required to understand better what permafrost thaw means for Canada's North.

Tłı̨chǫ Highway Wildlife Monitoring Program

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https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/8%20-%20Steinwand%20-%20Presentation%20(1).pdf

The Tłı̨chǫ Highway Wildlife Monitoring Program (THWMP) is a new collaborative project between the Tłı̨chǫ Government and the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT). The program's goals are to provide date on changes to harvesting and habitat including:

1. Monitor changes in harvest after the Tłı̨chǫ Highway is complete;
2. Monitor impacts of Tłı̨chǫ Highway on hozìı ɂekwǫ̀ winter habitat; and
3. Develop a Tłı̨chǫ harvest monitoring and reporting program for hozìı ɂekwo, ţǫ̀dzı,and dedıì.

Harvesters can voluntarily report the harvest of, for example, a moose or caribou to the Tłı̨cho Government and be eligible in a monthly draw for a gas drum as prize. GNWT-ENR is

conducting various studies such as the use of remote wildlife cameras and collaring programs for monitoring.

The purpose of this presentation is to discuss the program goals, Elder/harvester committee meetings, monitors working on the road, voluntary harvest reporting, ENR studies (cameras, collaring), vegetation studies, proposed dust study, stream monitoring, Inuvik/Tuktoyaktuk monitor exchange and ongoing concerns brought forward by the committee and monitors.

Marian Watershed Stewardship Program (MWSP)

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https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/9%20-%20Vecsei%20-%20Marian%20River%20(MWSP).pdf

The Marian Watershed Stewardship Program (MWSP) is a community-based monitoring programs designed to determine whether fish, water, and sediment quality are changing over time, and whether fish and water are safe to consume. The MWSP consist of science-based fish, water and sediment sampling at four sites within the Marian River corridor. The uppermost site is well upstream from proposed future mining activity. Community members undertake contaminants-related monitoring, including the collection of samples and observations using both Tłı̨chǫ and scientific knowledge. All programs use extensive laboratory analysis of samples collected. Results are annually presented to relevant communities.

Tłı̨chǫ Aquatic Ecosystem Monitoring Program (TAEMP) and Dinàgà Aquatic Ecosystem Monitoring Program (DAEMP)

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https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/7%20-%20Vecsei%20-%20TAEMP.pdf

The Tłı̨chǫ Aquatic Ecosystem Monitoring Program (TAEMP) and recently added Dinàgà Aquatic Ecosystem Monitoring Program (DAEMP) are community-based monitoring programs designed to determine whether fish, water, and sediment quality are changing over time, and whether fish and water are safe to consume. The TAEMP consist of science-based fish, water and sediment sampling through each of the four Tłı̨chǫ communities so that every community has samples collected and analysed once every four years. The DAEMP is centred within the North Arm of Great Slave Lake. As community-driven programs, both involve community members in conducting contaminants-related monitoring, including the collection of samples and observations using both Tłı̨chǫ and scientific knowledge. All programs use extensive laboratory analysis of samples collected. Results are annually presented to relevant communities.