Government of Northwest Territories

Northwest Territories
Cumulative Impact Monitoring Program

Tłı̨chǫ Ndek'awoo
Tłı̨chǫ Government

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

Summary Report

Behchokǫ̀, NT

January 31st - February 1st, 2017

Contents

Executive Summary

The NWT Regional Environmental Monitoring Results Workshop: Wek'èezhìı Region was held in Behchokǫ̀, NT on January 31st and February 1st, 2017. 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:

1. 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
2. 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.

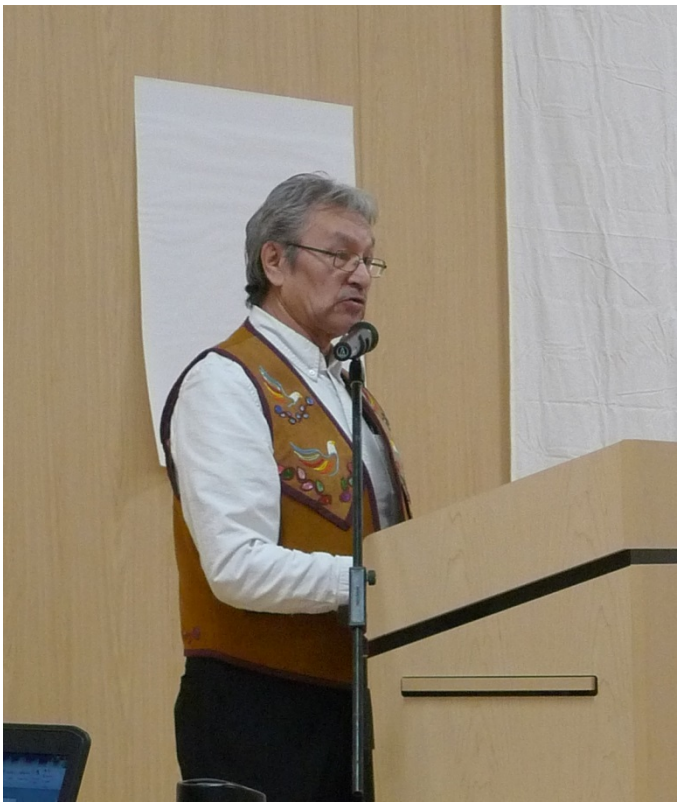
The workshop examined research and monitoring conducted in the Wek'èezhìı Region and focused primarily on NWT CIMP-supported projects centered on caribou, water, and fish. Eleven presentations were given by researchers and resource staff. Small, interactive break-out groups (Talking Circles) were held to generate discussion on how to include Traditional Knowledge and make research, monitoring and reporting more useful as well as to gather feedback on presented projects.

Eighty-three people participated in the workshop with many additional individuals who partially attended. NWT CIMP provided funding for Tłı̨chǫ community representatives to attend the workshop to promote information sharing with communities and decision-makers. The Tłı̨chǫ Government identified attendees and administered their travel arrangements. **The main purpose of this Summary Report is to provide a tool for community members and decision-makers who attended the workshop to communicate its results and discussions.**

In addition to results presentations, discussions throughout the workshop were held on ways to make research, monitoring and reporting more useful as well as ways to better include Traditional Knowledge. Communities want to be more involved in monitoring (identifying local questions, training of local monitors, helping analyze data, communication etc.), which would build capacity. Communities want to be involved from the beginning planning of a project. It is important for these relationships to communicate with community members in plain language before, during, and after a project. It was noted that this approach is already occurring in the Wek'èezhìı region but more work needs to be done.

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 76% to 85%. This information is shared with presenters to help improve their future communications with communities and decision-makers.



Grand Chief Eddie Erasmus welcomes with opening remarks

> ***I hope everyone will listen and learn from each other at this workshop.***
>
> Grand Chief Eddie Erasmus

1. Background

The NWT Environmental Research and Monitoring Results Workshop: Wek'èezhìı Region was held in Behchokǫ̀, NT on January 31st – February 1st 2017. 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 sixth annual NWT environmental monitoring results workshop and the forth 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 (industry, government, Aboriginal governments, community members, regulatory authorities and non-governmental organizations) 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 transmit information about NWT CIMP and the projects it supports back into their communities.

The 2017 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. Eleven presentations were given by researchers and resource staff. Due to timing and a community tragedy, a twelfth presentation titled *"Making Use of Research and Monitoring Results Information"* was not given but aspects were highlighted in the first presentation. Small, interactive break-out groups (Talking Circles) were held to generate discussion on how to include Traditional Knowledge and make research, monitoring and reporting more useful.

The objectives of the workshop were to:

1. 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
2. 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.

Eighty-two people (Appendix B) participated in the workshop with many additional individuals who partially attended. NWT CIMP provided funding for Tłı̨chǫ community representatives to attend the workshop to promote 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. Please see Appendix C for the sample evaluation forms.

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 **Ted Blondin** (see Appendix C for the full speech). There was the opportunity for everyone to mix and mingle and discuss various environmental research and monitoring projects in an informal setting while enjoying a delicious local feast hosted by the Tłı̨chǫ Government. Over 100 people attended the event!

2. Presentations

A total of 11 presentations were given over the two-day workshop. Each workshop participant was provided with an abstract volume (see Appendix E) 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 (if available).

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 January 31st, 2017

Presentation #1 - *About the NWT Cumulative Impact Monitoring Program (NWT CIMP): Regional Results in the Wek'eezhii Region*
http://sdw.enr.gov.nt.ca/nwtdp_upload/1%20-%20Julian%20Kanigan.pdf
Julian Kanigan, NWT CIMP (GNWT-ENR)

Summary of Discussion

- CIMP supports monitoring that is directly relevant to environmental decision making, key activities and encourages all to engage with the program through priority-setting and project collaboration
- As directed by its Steering Committee, NWT CIMP currently focuses on caribou, fish and water. The program funding process includes separate Traditional Knowledge and Scientific proposal guides.
- 10 projects funded in Wek'èezhìı since 2002 mostly related to 3 themes: self-reliance and capacity training, Traditional Knowledge, caribou/fish/water

Presentation #2- *Place, Tǫdzı and Forest Fires*
http://sdw.enr.gov.nt.ca/nwtdp_upload/Allice%20Legat%20and%20Camilla%20Nitsiza.pdf
Allice Legat, consultant
Camilla Nitsiza, Tłı̨chǫ Government

Summary of Discussion

- Concern expressed over forest fires that are both man-made and natural. Fires are more frequent.
- Elders are helping where they can to help protect the land for the youth

- Elders are concerned because large parts of important land has burned off; would like to preserve historical and spiritual sites from future damage.

Presentation #3 – *Impacts of wildfire extent and severity on caribou habitat: from woodland to barren ground*
http://sdw.enr.gov.nt.ca/nwtdp_upload/3%20-%20Jennifer%20Baltzer%20(1).pdf
Jennifer Baltzer, Wilfrid Laurier University

Summary of Discussion
Q: How does regrowth happen in rocky areas like that North of Marian River?

A: Like other parts of the boreal, the dominant tree species in those rocky areas are conifers, often jack pine. For these species, the cone open up after being heated by the fire as it moves through and deposit their seeds on the freshly burned surface. Boreal tree species are very hearty and are able to establish in pretty poor conditions, even cracks in the rock where a little bit of debris has been deposited. So, in short, the process is the same as elsewhere. Similar to other parts of the boreal, broad leaved species seeds may also be dispersed into these areas by the wind. In these very rocky places, ground vegetation cover tends to be much less but the lichen that would have covered the rocks will take a fairly long time to fully recover. We do not have these particular data for the NWT but are working on that through our CIMP-funded program.

Q: Forest fires like that in Fort McMurray burn everything in its path, including different species like berries that are used by caribou, bears, humans, and birds. [During a fire in the NWT] we were in a tent and there was a fire all around us and we were trying to get into a boat. How will this research be used to help communities and the habitats in order to keep them safe?

A: The long term vision of our program is the development of predictive tools that will use the field-based measurements that we have been making throughout the southern part of the Territory to provide forestry and wildlife managers and communities with NWT-specific tools that allow for prediction of available caribou habitat (or that of other wildlife) under future climate change, altered fire regime, and other scenarios of change. This information will help managers make more informed decisions about land use. This is important so that we can ensure that appropriate amounts of habitat are available under alternative future scenarios to support wildlife populations.

Presentation #4 – *"We Watch Everything" a Boots-on-the-Ground Approach to Caribou Monitoring*

http://sdw.enr.gov.nt.ca/nwtdp_upload/4%20-20Petter%20Jacobsen%20(less%20videoclip).pdf
Petter Jacobsen, Tłı̨chǫ Government
Elders Joseph Judas, Michel Louis Rabesca

Summary of Discussion

- Many changes are noticed: taste, smell and texture of the meat, bone marrow is more watery, lungs attaching to the ribs, liver is discolored, the hide texture and migration routes
- Must adopt the indigenous way of looking at the Collaring information is important
- Suggestion to talk with Manitoba and Saskatchewan about where their caribou are from and their health

Elder Michel Louis Rabesca shares his on-the-land experience

Presentation #5 - *Wolf Abundance and Predation on Bathurst Caribou Winter Range*
http://sdw.enr.gov.nt.ca/nwtdp_upload/5%20-%20Dean%20Cluff-compressed.pdf
Dean Cluff, Department of Environment and Natural Resources, GNWT

Dean Cluff presenting wolf abundance and predation

Presentation #6 – How Far Can Mining Disturbances Reach Inside the Bathurst Caribou Range?
http://sdw.enr.gov.nt.ca/nwtdp_upload/6%20-%20Wenjun%20Chen.pdf
Wenjun Chen, Natural Resources Canada

EVENING FEAST and OPEN HOUSE:

From 5:00-7:30 pm, workshop participants and the general public had the opportunity to gather and listen to a special keynote address by **Ted Blondin** (see Appendix C for the full speech). There was the opportunity for everyone to mix and mingle and discuss various environmental research and monitoring projects in an informal setting while enjoying a delicious local feast hosted by the Tłı̨chǫ Government. Over 100 people attended the event!

Chief Clifford Daniel providing welcoming remarks to the public

Keynote address by Ted Blondin (left), translated by James Rabesca.

Tłı̨chǫ Government staff ready to serve a tasty feast!

> ***"…we have to continue to protect what is most important to our Elders – the land, water and the wildlife".***
>
> Elder Ted Blondin

Day 2

Wednesday February 1st, 2017

Presentation #7 – *Bathurst Caribou Range Planning: An Approach to Managing Cumulative Disturbance*
http://sdw.enr.gov.nt.ca/nwtdp_upload/7%20-%20Karin%20Clark.pdf
Karin Clark, Department of Environment and Natural Resources – GNWT

Summary of Discussion

- Range Plans can be an important decision support tool for cumulative impact management; building on all sources of knowledge is critical; thinking toward the future to plan for today
- When caribou migrate, the noise from all of the cars along the highway impact the caribou. Management of corridors needs to be better.
- Climate change is acknowledged/considered in the Plan but is too large of an issue to manage
- We must be cautious of what development we allow as the caribou are affected by the mines.

Karin Clark sharing the Bathurst Caribou Range Plan

Presentation #8 – *Shifting Winter Home Range of the Bathurst Caribou Herd*
http://sdw.enr.gov.nt.ca/nwtdp_upload/8%20-%20Mike%20English.pdf
Mike English, Wilfrid Laurier University

Summary of Discussion

- Decline of caribou has a significant relation to the snowpack
- Bathurst herd winter home range has shifted northward after 2005; appears to be a relationship between the arctic oscillation or pattern and the Bathurst herd decline

Presentation #9 – *Tłı̨chǫ Aquatic Ecosystem Monitoring Program (TAEMP): Overview and Update*
http://sdw.enr.gov.nt.ca/nwtdp_upload/WRRB_TAEMP_Presentation_Feb_1_2017_final_for_posting.pdf
Boyan Tracz, Wek'èezhìı Renewable Resources Board

Summary of Discussion

- Elders are concerned about the traditional food - whitefish are sluggish due to low water levels and warm temperatures. Does this affect our own health after we eat them? Temperature and acidity can change the water and impact the fish. Hopefully research can inform us as to what kind of fish to eat, i.e., old, young, big, or small.
- Mercury in water can come from sources like the atmosphere and from down South; what do baseline mercury levels look like? Next steps will include comparisons of data with community to determine how much mercury is naturally occurring vs. contaminants.
- Traditional Knowledge could be more included by TK experts commenting on fish tissue texture, etc. Research is science-based but very informed by TK. Next steps will include comparisons to results.

Presentation #10 – *Marian Watershed Community-Based Aquatic Effects Monitoring Program*
http://sdw.enr.gov.nt.ca/nwtdp_upload/10%20-%20Michael%20Birlea%20-%20compressed.pdf
http://sdw.enr.gov.nt.ca/nwtdp_upload/10%20-%20James%20Telford.pdf
Michael Birlea, Tłı̨chǫ Government
James Telford, Wilfrid Laurier University

Summary of Discussion

- This research could be expanded to other NWT regions -results are similar to other findings surrounding Giant Mine, there are elevated levels of metals that eventually return to normal.
- Deeper lakes provide better core samples for long-term changes. It takes about 10 minutes to collect a sample and is much easier in the winter than summer
- How do you date core sections? Gamma ray mass spectrometry is used to measure types of isotopes. Also, accumulation can be measured in millimeters per year. The study cores were measured 1cm at a time.
- Cores from deep water are the most reflective of long term history because small and fine particles settle there. Accumulation is slow and steady. This is a difference in areas with shallow water where there is more organic material. Seasonal changes and oxygen levels also affect results. Consistency is very important in sampling

James Telford answers questions after his presentation.

Presentation #11 –*Rayrock (Kwetı̨ı̨ʔaà) Watershed Tour: Community Engagement*

http://sdw.enr.gov.nt.ca/nwtdp_upload/11%20-%20Jessica%20Hum%20(Rayrock).pdf
Jessica Hum, Lisa Marie Zoe,
Andrew Richardson & George Lafferty, Indigenous and Northern Affairs – CARD
Regan Fielding, consultant

Summary of Discussion

- Focus was on water, not fish. Unaware of the abundance of freshwater clams in the Rayrock area but could be used to assess changes
- The water has been contaminated from years past. Water quality was meeting discharge objectives in 2008, tested again, and still maintaining.

3. Break out Group Discussions

Throughout the workshop, interactive discussions (Talking Circles) were held to generate understanding of monitoring concepts and gather feedback 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 could be done to make research, monitoring and reporting more useful?

Research and Monitoring

- Research is needed that addresses concerns of Elders and can be used to better protect fish/water/animals
- Put research into action!
- More funding needed to monitor environmental concerns (#1 priority is environmental health since Elders stress that more people are now dying of cancer)
- Investigate the cause, is it related to climate change or what is it?
- More involvement needed with youth, Elders and local government when it comes to decision-making
- Impacts of forest fires is important to culturally/ ecologically important areas (breeding grounds, trapping areas, way of life)
    - Could these areas be a priority when fighting wildfires?
- Use the results of these studies to change policies
- Include Traditional Knowledge in all studies as a policy (for government and developers, increasing community capacity and involvement, training/employment)

- There should be more incentive to hunt wolves
- Long-term funding is important for finding trends
- Monitoring is important even if no scientific question
- "Tlicho-ize' successful projects from elsewhere
- Get CIMP more involved in EA/regulatory process (bring information directly to Boards)
    - If receiving CIMP funding, make a requirement to provide a paragraph describing your work (compile into a document)
    - Not just CIMP but all research maybe from research licensing
- Use new technology to collect data and communicate results quickly

Reporting

- More communication with youth, Elders, community members, organizations etc.
    - Announcements, advertisements, websites, radio, newsletter, inform by verbally communicating
- More accessible, plain-language/translated scientific papers for average person
- Report often and use different communication tools (ex. technology, newsletters etc.)
- Need to better interpret and explain graphs
- Need a central repository for information that is accessible
- Following up on completed research (explain what's next and how will the information be used for management?)
- Always report to the communities first
- Decision support tools to help decision-makers use the research/monitoring (ex. Mini State of Knowledge report updated annually for caribou – also include contact information)
    - Answer the 'so what'
    - Linking studies
    - Can be inclusive, collaborate, include multiple values

2. Are there different ways to better include Traditional Knowledge (TK) in research/monitoring?

- Provide more training (Monitors and Elders)
- Explain scientific method to Elders
- TK study in co-management boards
- Youth involvement in monitoring and remediation process

- On-the-land TK ground-truthing
- More TK involvement in mine process
- Youth should participate in meetings/training
- Need equal consideration of TK and scientific knowledge
- Traditional ways of observing land everyday combine monitoring and research questions
- TK research is often based in scientific method – no service to science or TK
- More resources ($)
- More hands-on and on-the-land
- Use local knowledge
- Should have TK legislation
- Reach out to more communities
- Be open to ideas/new research
- Involve TK in schools
- Inter-generational opportunities between Elders & youth
- Keep it basic, low cost, accessible
- Know who to contact in the communities (leadership, interpreters, community directors)
- Protocols, budgeting
- Make use of Tlicho newsletter, website, radio, gatherings
- Track and use the different knowledge from different times of year
- Be respectful
- Coordinate different camps
- Maintain a current database
- Feedback loops and permissions
- Start with TK holders at the beginning, plan the research together (not start with Western research concepts) Ex. On-the-land, caribou underground
- TK holders & monitors = complimentary roles
- Elders' knowledge often through stories
- Use diverse media to communicate BACK (media, workshops, drawing, FOOD)

3. What are opportunities for better coordination?

- Community visits/meetings
- Technology – more video-conferencing
- Translations – researchers to meet in advance with translators to better understand terminology

- New ways to engage youth (social media etc.)
- Local radio involvement with research projects
- More on-the-land experiences and sharing information
- Coordinate with other programs (like Northern Contaminants Program)
- Common research themes allow for better coordination
- Involve Tlicho Government (and other governments) to better communicate and collaborate
- Look at older studies and research that already exists!
- Document everything (written and audio) as we need access to this information/knowledge
- TK/local knowledge/science must be equally used in research studies
- Need to consider broad definition of environment (not just the land and water – people/wellbeing too)
- Collect all information, then examine what it means
- Researchers must work with the communities to help understand the language – what is the story telling us? What is the TK saying?
- Need to work at the communities' pace
- More funding, projects and resources
- More translators (to involve different language speakers)
- Workshops, open houses
- Open up meetings/workshop to whole community for more/different ideas
- Use TK, especially when working with youth (ie. plan medicine)
- Find common-ground between community, decision-makers and researchers to identify best objectives

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

January 31st – February 1st, 2017

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

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

Wi-Fi Name: Sportsnet-Public Password: Letsgointernet!

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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 the a regional Environmental Research and Monitoring Results workshop.*

OBJECTIVES:

The objectives of the workshop are 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
- 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**.

INFORMATION:

Copies of abstracts and presentations will be provided and made available on the NWT Discovery Portal:http://nwtdiscoveryportal.enr.gov.nt.ca:8080/geoportal/catalog/main/home.page
For additional details, contact Meredith Seabrook at 867-767-9233 ext. 53086 or nwtcimp@gov.nt.ca

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

Tuesday, January 31st - DAY 1

Bus Transportation: Departure from Yellowknife (Days Inn & Suites) at 7:45 am.

Time	Activity	Lead
8:30 am	Coffee and Mingling Registration	
9:00	Welcome, Opening Prayer and Introductions	Facilitator – Shauna Morgan
9:15	Talking Circles • What is the difference between **monitoring** and **research**? • What monitoring exists in the Wek'èezhìı Region?	Facilitator
10:00 - 10:20	Presentation #1 - *About the NWT Cumulative Impact Monitoring Program (NWT CIMP): Impact on Resource Decision-Making*	Julian Kanigan (GNWT-CIMP) Jessica Hum (TG CIMP SC member)
10:20 – 10:30	**BREAK**	
10:30 - 12:00	**Caribou-Related Projects:** • Presentation #2 - *When do caribou return?: Impacts of wildfires on Tǫdzı and ʔekwǫ̀* • Presentation #3 - *Impacts of wildfire extent and severity on caribou habitat: from woodland to barren ground*	Allice Legat (WRRB) & Camilla Nitsiza Jennifer Baltzer (Wilfrid Laurier University)
12:00-12:45 pm	**LUNCH** (provided)	
12:45 pm	• Presentation #4 - *"We Watch Everything":* a Boots-on-the-Ground Approach to Caribou Monitoring • Presentation #5 - *Wolf abundance and predation on*	Petter Jacobsen (TG), Joseph Judas, Michel Louis Rabesca, Moise Rabesca

	Bathurst caribou winter range • Presentation #6 - *Satellite Monitoring for Assessing Resource Development's Impact on Bathurst Caribou (SMART)*	Dean Cluff (GNWT ENR) Wenjun Chen (NRCan)
2:50 - 3:00 pm	**BREAK**	
3:00 – 4:00 pm	Talking Circles • Is this information useful to you? What could be done to make the research and reporting more useful? • Are there opportunities for better coordination? • Are there ways to better involve TK holders and/or community monitors? Is there a different way to do this research starting from a TK perspective?	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 – 7:30 pm)

Keynote Address: Ted Blondin – 'Environmental Monitoring in the Wek'èezhìl 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!

(hosted by the Tłı̨chǫ Government)

Bus Transportation: Departure from Behchoko at 7:45 pm (drop-off at Days Inn & Suites, YK)

AGENDA

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

Wednesday, February 1st - DAY 2

Bus Transportation: Departure from Yellowknife (Days Inn & Suites) at 7:45 am.

8:30 am	Coffee and Mingling Registration	
9:15 am	Welcome and Opening Prayer	Facilitator – Shauna Morgan
9:30 – 10:20 am	**Caribou-Related Projects Con't:** • Presentation #7 - *Bathurst Caribou Range Plan: Cumulative Effects Assessment* • Presentation #8 – *Shifting home range of the Bathurst Caribou herd*	Karin Clark (GNWT ENR) Mike English (Wilfrid Laurier University)
10:20 - 10:30 am	**BREAK**	
10:30 am	**Water & Fish Related Projects*:*** • Presentation #9 - *Tłı̨chǫ Aquatic Ecosystem Monitoring Program* • Presentation #10 – *Marian watershed community-based aquatic effects monitoring program*	Boyan Tracz (WRRB) Michael Birlea (TG) James Telford (Wilfrid Laurier University)
12:00 - 12:45 pm	**LUNCH** (provided)	
12:45 – 1:30 pm	Talking Circles • Making the research and reporting more useful • Opportunities for better coordination • TK perspectives	Facilitator

1:30 – 2:15 pm	• Presentation #11 - *Rayrock (Kwetį̨ı̨ɂaà) Watershed Tour*	Jessica Hum (TG) / Lisa Marie Zoe /George Lafferty (INAC-CARD) / Andrew Richardson (INAC-CARD) / Regan Fielding
2:15 – 2:30 pm	**BREAK**	
2:30 -2:50 pm	• Presentation #12 – *Making Use of Research and Monitoring Results Information* (NWT Discovery Portal, Inventory of Landscape Change Webviewer, 2015 NWT Environmental Audit)	Julian Kanigan (GNWT-CIMP)
2:50 pm	**Wrap-Up, Closing Comments and Closing Prayer**	Facilitator
3:45 pm	**Adjourn**	

Bus Transportation: Departure from Behchoko at 4:00 pm (drop-off at Days Inn & Suites, YK)

Masi Cho

Thank you for participating!

Appendix B: Attendee list

Name	Email	Organization
Adamczewski, Jan	Jan_Adamczewski@gov.nt.ca	GNWT-ENR Wildife
Apples, Charlie		Behchokǫ̀
Apples,Alphonse		Gamètì
Baltzer, Jennifer	jbaltzer@wlu.ca	Wilfrid Laurier University
Beaumont, Susan	sbeaumont@wrrb.ca	WRRB
Beaverhoe, Mason		Whatì
Birlea, Michael	MichaelBirlea@tlicho.com	Tlicho Government
Bishop, Lloyd		
Blondin, Ted	tedbondin@gmail.com	Behchokǫ̀
Boline, Barbara		Wekweètì
Camsell-Blondin, Violet	violetblondin@gmail.com	WLWB
Catholique, Tsatsiye	TCatholique@gwichin.nt.ca	Gwich'in Tribal Council
Champlain, Joe		Whatì Elder
Champlaine, Madelaine		Whatì Elder
Chen, Wenjun	wenjun.chen@canada.ca	Natural Resources Canada
Chocolate, Georgina		Behchokǫ̀
Clark, Karin	Karin_Clark@gov.nt.ca	GNWT ENR - Wildlife
Cluff, Dean	Dean_Cluff@gov.nt.ca	GNWT ENR - North Slave
Croft, Bruno	Bruno_Croft@gov.nt.ca	GNWT ENR - North Slave

Daniels, Clifford	clifforddaniels@tlicho.com	TG - Behchokǫ̀ Chief
Dion, Nicole	Nicole_Dion@gov.nt.ca	GNWT Water Resources
English, Mike	menglish@wlu.ca	Wilfrid Laurier University
Erasmus, Eddie	grandchiefediiwa@tlicho.com	TG - Grand Chief
Erutse, Dakota(FGH)	erutse@sdmclca.org	Sahtu Secretariat Inc.
Fairbairn, Catherine	cfairbairn@reviewboard.ca	MVEIRB
Fielding, Regan	fieldingenvironmental@gmail.com	co-presenter (Rayrock)
Gilday, Cindy	cindygilday@hotmail.com	CIMP SC - SSI
Gonet, Jared	jared.gonet@gmail.com	WLU student
Gregory, Ryan	Ryan_Gregory@gov.nt.ca	GNWT Waters
Heron, Tim	rcc.nwtmn@northwestel.net	CIMP SC - NWTMN
Holder, Joel	Joel_Holder@gov.nt.ca	GNWT CAM
Hubert, Chuck	chubert@reviewboard.ca	MVEIRB
Hum, Jessica	JessicaHum@tlicho.com	Tlicho Government
Huskey, Michael		
Jacobsen, Petter	petterfjacobsen@gmail.com	Tlicho Government
Jokela, Anneli	ajokela@wlwb.ca	WLWB
Judas, Joseph		co-presenter (Petter)
Judas, Roy		Wekweètì
Kanigan, Julian	Julian_Kanigan@gov.nt.ca	GNWT ENR CIMP
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LEGEND

CIMP SC (Cumulative Impact Monitoring Program Steering Committee)
ECC (Environment and Climate Change Canada)
GNWT-ENR (Government of the Northwest Territories - Environment and Natural Resources)
GTC (Gwich'in Tribal Council)
IJS (Inuvialuit Game Council)
INAC (Indigenous and Northern Affairs Canada)
MVEIRB (Mackenzie Valley Environmental Impact Review Board
MVLWB (Mackenzie Valley Land and Water Board)
NSMA (North Slave Metis Alliance)
NWTMN (Northwest Territory Metis Nation)
SSI (Sahtu Secretariat Incorporated)
TG (Tlicho Government)
U of A (University of Alberta)
WLU (Wilfrid Laurier University)
WRRB (Wek'èezhìı Renewable Resources Board)
WLWB (Wek'èezhìı Land and Water Board)

Appendix C: Keynote Address by Ted Blondin

One thing in life that is constant is CHANGE, (and taxes). As leaders, we have to manage this change, but we have to build upon our success. Our success has been based on the advice of our elders. Monphwi, at the time of making Treaty, protected the Tlicho Language, Culture and Way of Life. The term, "way of life" is so important that it is mentioned six times in the Tlicho Agreement, an Agreement protected under Section 35 of the Canadian Constitution, the highest law in Canada. All laws in Canada flow from the Constitution.

Elders advise leaders and negotiators whatever meetings we go to, they want to make sure that we protect the "land, water and wildlife" so that our "way of life" is protected now and into the future.

As leaders and advocates of the environment with research and monitoring efforts, we have to continue to protect what is most important to our elders – "the land, water and the wildlife".

In the Tlicho Agreement we identify three areas of land most important to Tlicho. We have "Community Lands" – land where we live with our family and friends. It is so important for our future that we put the management of these "Community Lands" in the control of "Chief and Council".

This control allows the Tlicho to better manage our "Community Lands" for the future – where houses are built and needed infrastructure is planned. One area to consider is the setting up of a Land Registry, similar to what other governments have established. This also is a revenue generating activity.

The other area of lands, important to our elders, were identified during the land selection process – the land surrounding our communities, now called "Tlicho Lands" which amounts to 39,400 sq. km of surface and subsurface land which gives the Tlicho full control on those lands. Nothing happens on those lands unless the Tlicho approve it – Self Government really at work. The other lands, important to the Tlicho, are the lands within the Monfwi Goga Denetti - the Tlicho Traditional Area identified for us by Monpwi in 1921.

We manage these lands by setting up Regulatory Systems that deal with various applications. These applications can be approved with "terms and conditions" that applicants have to follow. If they don't, then they are not in compliance with the approval of the license they are operating under. The "terms and conditions" could deal with matters such as not affecting the caribou and fish or maintaining the "quality, quantity and rate of flow" of our waters.

All activities on these lands must follow the Tlicho Land Use Plan. The Tlicho have been fortunate in conducting Traditional Knowledge Studies with major mining companies and

exploration companies wishing to operate in the Tlicho Area. Even Governments have come to recognize the importance of Traditional Knowledge Studies in processes such as the West Kitikmeot Slave Study. The TK aspects of each study added a greater value to the scientific studies. More is needed.

Without research and monitoring, important decisions on the land, water and wildlife are based on assumption. The GNWT Department of Renewable Resources do a caribou count every year and harvesters have always questioned the accuracy of the data. Harvesters question the data information because it is affecting the Tlicho "way of life" of the Tlicho. Tlicho have always said to get more accurate data, the data has to include activities on the ground. I cannot express enough the importance of the "Boots-on-the-Ground Approach" to monitor caribou that the Tlicho were involved with last summer. People were kept up to date from CBC radio reports periodically.

There are activities happening in other jurisdictions that are affecting the "quality, quantity and rate of flow" of our waters – areas that the Parties to the Tlicho Agreement committed to protect. The GNWT have transboundary Agreements with Provinces and Territories. The Tlicho Government should be a Party to any discussions or decisions that will affect Tlicho such as the releasing of water from the Bennet Dam or even the construction of a new dam near St. John in B.C.

As more activities are occurring south of us, without our say, we will continue to be negatively affected, such as the Tar Sands in Fort McMurry. If our waters are affected what is the remedy and how much will it cost. If these major companies refuse to pay to rectify the negative affect than a possible court case may have to occur. Court cases consider facts presented to them – not assumptions.

This is why the collection of baseline data of our waters in the NWT is very important. The Dene Nation passed a motion to look into this matter at their meeting in Inuvik this past winter. The possibility of the Tlicho participating in this study could be very beneficial. The process could possible partner with Aurora College and other educational institutions in the south who have better access to federal funding for research and monitoring studies. This process could also involve local young community people trained to collect water samples and work with independent water testing facilities that will keep accurate records and trends so that correct remedies and decisions can be made for a better future for our waters in the NWT.

In conclusion, research and monitoring are important factors in better preparing the direction we take to better manage the change that is and will happen all around us. It will better prepare us to adapt and protect the Tlicho "way of life" for generations to come. This is the legacy our leaders today want to leave for future generations of Tlicho to look back on and thank us in their daily prayers as they continue to deal with these same issues and similar problems and pressure that we are encountering now.

It is an honor and privilege to be able to speak to such a knowledgeable group today and share a few ideas. I want to acknowledge the Tlicho Government for still allowing a handicapped person and recognizing that we are still needed and are still able to share useful information. We all look to the future for the best results for our people.

Masi cho.

Appendix D: Evaluation Questionnaires

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

Participant Evaluation Tool – Day 1 (Tuesday, January 31st)

The sponsoring organizations are interested in participant feedback on the format and content of this workshop. After each presentation and activity, you will be asked to take a moment to provide your feedback in real time as the workshop unfolds. At the end of the day each day, please hand in or place your evaluation sheet in the box provided.

Please identify what type of organization to represent:

___ Federal/Territorial government ___ Aboriginal government/organization

___ Co-management Board ___ Researcher/Academic

___ Other (specify): _____

1. **Please rate each of the presentations using the scale provided based on the quality of the presentation and its relevance to you as a participant in this workshop.**

Presentation #1: Julian Kanigan (GNWT-CIMP) and Jessica Hum (TG) - About the NWT Cumulative Impact Monitoring Program (NWT CIMP): Impact on Resource Decision-Making

1	2	3	4	5
Poor quality		Average quality		Excellent quality

1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

Presentation #2: Allice Legat (WRRB) & Camilla Nitsiza - When do caribou return?: Impacts of wildfires on Tǫdzı and ʔekwǫ̀

1	2	3	4	5
Poor quality		Average quality		Excellent quality

1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

<u>Presentation #3</u>: Jennifer Baltzer (WLU) - Impacts of wildfire extent and severity on caribou habitat: from woodland to barren ground

1	2	3	4	5
Poor quality		Average quality		Excellent quality
1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

***<u>Presentation #4</u>: Petter Jacobsen (TG), Joseph Judas, Michel Louis Rabesca & Moise Rabesca - "We Watch Everything":* a Boots-on-the-Ground Approach to Caribou Monitoring**

1	2	3	4	5
Poor quality		Average quality		Excellent quality
1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

<u>Presentation #5</u>: Dean Cluff (GNWT-ENR) - Wolf abundance and predation on Bathurst caribou winter range

1	2	3	4	5
Poor quality		Average quality		Excellent quality
1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

<u>Presentation #6</u>: Wenjun Chen (NRCan) - Satellite Monitoring for Assessing Resource Development's Impact on Bathurst Caribou (SMART)

1	2	3	4	5
Poor quality		Average quality		Excellent quality
1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

2. Were the research results presented today useful to you?

1	2	3	4	5
Not useful		Somewhat useful		Very useful

3. How did you find the balance between presentations and time for questions and discussion (Talking Circles) today?

Too much presentation time	Good balance	Too much discussion time

4. Please rate the quality of the meeting facilitation today.

1	2	3	4	5
Poor quality		Adequate quality		Excellent quality

5. Please rate how well the workshop fulfilled its objectives today.

Bring together researchers, decision-makers and communities to share results of current NWT environmental monitoring and research related to water, fish and wildlife in the Wek'èezhìı.

1	2	3	4	5
Did not meet		Partially met		Fully met

Provide a forum for discussion between researchers, communities and regional decision makers. Feedback to be used to improve future NWT CIMP projects and workshops.

1	2	3	4	5
Did not meet		Partially met		Fully met

We welcome any additional comments or suggestions:

Masi Cho - Thank you for your participation and input!

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

Participant Evaluation Tool – Day 2 (Wednesday, February 1st)

The sponsoring organizations are interested in participant feedback on the format and content of this workshop. After each presentation and activity, you will be asked to take a moment to provide your feedback in real time as the workshop unfolds. At the end of the day each day, please place your evaluation sheet in the box provided.

Please identify what type of organization to represent:

___ Federal/Territorial government ___ Aboriginal government/organization

___ Co-management Board ___ Researcher/Academic

___ Other (specify): _____

1. **Please rate each of the presentations using the scale provided based on the quality of the presentation and its relevance to you as a participant in this workshop.**

Presentation #7: Karin Clark GNWT-ENR) - Bathurst Caribou Range Plan: Cumulative Effects Assessment

1	2	3	4	5
Poor quality		Average quality		Excellent quality

1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

Presentation #8: Mike English (WLU) - Shifting home range of the Bathurst Caribou herd

1	2	3	4	5
Poor quality		Average quality		Excellent quality

1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

<u>Presentation #9</u>: Boyan Tracz (WRRB) - Tłı̨chǫ Aquatic Ecosystem Monitoring Project

1	2	3	4	5
Poor quality		Average quality		Excellent quality

1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

<u>Presentation #10</u>: Michael Birlea (TG) & James Telford (WLU) - Marian watershed community-based aquatic effects monitoring program

1	2	3	4	5
Poor quality		Average quality		Excellent quality

1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

<u>Presentation #11:</u> Jessica Hum (TG), Lisa Marie Zoe, George Lafferty (INAC), Andrew Richardson (INAC) & Regan Fielding - Rayrock (Kwetı̨ı̨ɔàà) Watershed Tour

1	2	3	4	5
Poor quality		Average quality		Excellent quality

1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

<u>Presentation #12:</u> Julian Kanigan (GNWT-CIMP) – Making Use of Research and Monitoring Results Information

1	2	3	4	5
Poor quality		Average quality		Excellent quality

1	2	3	4	5
Not relevant		Somewhat relevant		Highly relevant

2. Were the research results presented today useful to you?

1	2	3	4	5
Not useful		Somewhat useful		Very useful

3. How did you find the balance between presentations and time for questions and discussion (Talking Circles) today?

Too much presentation time	Good balance	Too much discussion time

4. Please rate the quality of the meeting facilitation today.

1	2	3	4	5
Poor quality		Adequate quality		Excellent quality

5. Please rate how well the workshop fulfilled its objectives today.

Bring together researchers, decision-makers and communities to share results of current NWT environmental monitoring and research related to water, fish and wildlife in the Wek'èezhìı.

1	2	3	4	5
Did not meet		Partially met		Fully met

Provide a forum for discussion between researchers, communities and regional decision makers. Feedback to be used to improve future NWT CIMP projects and workshops.

1	2	3	4	5
Did not meet		Partially met		Fully met

We welcome any additional comments or suggestions:

Mahsi Cho - Thank you for your participation and input!

Appendix E: Project Abstracts

Northwest Territories Environmental Research and Monitoring Results Workshop: Wek'èezhìı Region January 31st – February 1st, 2017

Abstract Volume

Cover Photograph

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

Compiled by J. Speakman

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Impacts of wildfire extent and severity on caribou habitat: from woodland to barren ground

Baltzer*, J.[1], Cumming, S.[2], Day, N.[1], Degré-Timmons, G.[1], Johnstone, J.[3], Mack, M.[4], McIntire, E.[5], Reid, K.[1], Schmiegelow, F.[6], Spring, A.[1], Turetsky, M.[7], Walker, X.[4], and White, A.[1]

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Presentation: http://sdw.enr.gov.nt.ca/nwtdp_upload/3%20-%20Jennifer%20Baltzer%20(1).pdf

Ground-dwelling lichens are an important food source in winter for both barren ground and boreal caribou. Lichens are flammable when dry and are usually destroyed when a wildfire burns through an area. Local shortages of food following wildfires are probably why both kinds of caribou avoid recently burned areas, but lack of refuge from predators or increased abundance of moose may also be factors. Shortages of lichen forage may be temporary, because plant communities regenerate. Unfortunately, we don't know how long this takes, as we have limited information about how quickly key habitat resources, especially caribou forage, recover after fire. To make matters worse, burned areas don't necessarily come back as they were. Black spruce/lichen forest, for example, sometimes regenerates to deciduous forest where lichen does not grow, or to tundra-like vegetation. We don't know in detail how often this happens, or whether it happens in the NWT, but warmer and dryer climates may make alternate "successional trajectories" more likely, and also more frequent because of increased burning. Fires, including large fire years like 2014, are natural events in these ecosystems. In recognition of this, a priority action identified in the GNWT document "Caribou Forever" is to "manage habitat in relation to forest fires and land use activities". This remains challenging because caribou habitat arises from the interaction between fire and vegetation dynamics. Because of our incomplete knowledge, we can't predict how much caribou habitat there will be in the future, or where it might be found. Accordingly, the impact of fire on caribou habitat remains a central outstanding research question, which is the focus of this research program.

The purpose of this presentation is to provide an overview of the progress made toward closing these knowledge gaps. We will report on the 2015 field season during which a network of 230 permanent sample plots was established throughout Dehcho and Tłı̨cho lands affected by the 2014 fires. The goal of these plots was to improve our understanding of successional trajectories following the largest fire season on record. We will also report on preliminary results from sites

sampled in 2016, which vary in time since last fire. The purpose of these sites is to improve our understanding of rates of forage biomass recovery post fire. Results from both field seasons will be presented as well as an overview of plans for the coming field seasons. The results from this three-year project have direct implications for forest and wildlife management in the face of changing boreal fire regimes.

Marian watershed community-based aquatic effects monitoring program

Birlea*, M.[1] and Telford*, J.[2]

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Presentation (Michael): http://sdw.enr.gov.nt.ca/nwtdp_upload/10%20-%20Michael%20Birlea%20-%20compressed.pdf

Presentation (James): http://sdw.enr.gov.nt.ca/nwtdp_upload/10%20-%20James%20Telford.pdf

The Tłı̨chǫ Government is working together with Wek'èezhìi Land and Water Board (WLWB) and other partners to develop the Marian Watershed Community-Based Aquatic Effects Monitoring Program. This is a community-based monitoring program that is being developed based on the questions and needs of the Tłı̨chǫ people. Tłı̨chǫ Lands have been under Moratorium since the signing of the Tłı̨chǫ Agreement in 2005 and on June 1, 2013, the Moratorium was lifted as the Tłı̨chǫ Wenek'e or Land Use Plan came into force. With the potential for future development of Tłı̨chǫ Lands, the Tłı̨chǫ people have expressed concern about impacts on the water and wildlife they are so dependent upon. The objective of the Marian Watershed Monitoring Program is to begin collecting baseline information about the water and fish on Tłı̨chǫ lands and in locations the Tłı̨chǫ feel are the most important, prior to any major development pressure (such as the NICO mine by Fortune), and to continue collecting this data over time. Community members are being trained to collect samples, analyze the samples, and report findings back to the rest of the community members. A pilot project was conducted at Hislop Lake, upstream of the planned NICO Mine site, in the fall of 2013. This project included the training of eight community members and a field program where the newly trained Environmental Monitors worked with scientists to investigate the concerns of the elders and community members. A workshop was organized by the Department of Culture and Lands Protection (DCLP) in the spring of 2015 to bring back the results from the Marian Lake camp and to develop a long term monitoring plan that truly addresses the concerns of the elders.We

identified five important field sites along the Marian River from Hislop Lake to Marian Lake, which will be visited on a four-year cycle. The DCLP organized the forth field program this fall on Marian River near La Martre River. Where the Environmental Monitors worked with the scientist to investigate the concerns from the elders and communities. The ongoing program will facilitate enhanced understanding of fish health and water chemistry each year, ensure active monitoring of Tłı̨chǫ waters by Tłı̨chǫ people, and prioritize meaningful communication back to community members.

How far can mining disturbances reach inside the Bathurst caribou range?

Chen*, W.[1], Leblanc, S.G.[1], White, H.P.[1], Prevost, C.[1], Milakovic, B.[2], Rock, C.[2], Sharam, G.[2], O'Keefe, H.[3], Corey, L.[3], Croft, B.[4], Gunn, A.[5], van der Wielen, S.[6], Football, A.[6], Tracz, B.[7], Pellissey, J.S.[7], and Boulanger, J.[8]

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Presentation: http://sdw.enr.gov.nt.ca/nwtdp_upload/6%20-%20Wenjun%20Chen.pdf

Several studies across the Canadian Arctic and elsewhere have estimated the size of a Zone of Influence (ZOI) by human activities where caribou may express changes in behavior, habitat selection, and distribution relative to non-disturbed areas. Several methods have been proposed to measure a ZOI (e.g., aerial surveys or satellite collar data), but little is known about the underlying mechanisms that influence the size of the ZOI. Observations by local community members and other studies suggest that the sight of mining activities, noise, and dust originating from mining operations might influence caribou. Dust components include coarse suspended particulate matter and fine suspended particle matter < 2.5 µm (or $PM_{2.5}$). Around the Ekati Diamond Mine, other sources of $PM_{2.5}$ include diesel fuel combustion and burning of living waste. Dust deposition may subsequently influence the availability and quality of caribou forage. The main goal of our CIMP project entitled "Satellite Monitoring for Assessing Resource Development's Impact on Bathurst Caribou (SMART)," is to quantify how far these disturbances can reach.

In collaboration with Dominion Diamond Ekati Corporation (DDEC), we conducted field surveys and laboratory analyses in the summers of 2015 and 2016. We sampled the sight of mining activities, the noise level, dust on leaves, $PM_{2.5}$, soil pH, and percent vegetation cover along dozens of transects from the Ekati Diamond Mine. In this presentation, we will present the preliminary results of our project, and the action plan for next steps in this research. We look forward to comments and feedback from workshop participants and community members.

Bathurst Caribou Range Planning: An Approach to Managing Cumulative Disturbance

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Presentation: http://sdw.enr.gov.nt.ca/nwtdp_upload/7%20-%20Karin%20Clark.pdf

In the Northwest Territories (NWT) the Bathurst caribou herd has been identified as a priority for cumulative effects assessment and management in recent environmental assessments due primarily to industrial pressures on the range but also because of a small and declining herd size. A range planning process for the Bathurst caribou herd has been initiated and upon its completion will make recommendations on how cumulative land disturbances will be monitored, evaluated and managed within the herd's range. It will set landscape management objectives and outline how the objectives will be achieved to help ensure the range can sustain the Bathurst herd into the future. By doing so, it will also provide certainty and clarity to the regulatory process. The process for undertaking the development of a Range Plan is guided and influenced by a Working Group comprised of first nations, co-management partners, government, industry and ENGOs with representatives from Nunavut, NWT and Northern Saskatchewan. This group will ensure the plan is grounded in both science and traditional knowledge. An update of what we have achieved over the first two and half years as well as next steps are presented.

Wolf abundance and predation on Bathurst caribou winter range

Cluff*, H.D.

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Presentation: http://sdw.enr.gov.nt.ca/nwtdp_upload/5%20-%20Dean%20Cluff-compressed.pdf

Wolves are a major mortality source for barren-ground caribou, yet their role in shaping caribou populations in the north is poorly understood. Estimating the number of wolves and how they influence adult caribou survival and calf recruitment is critical to understanding their impact. Management actions to reduce wolves have been undertaken recently and managers need to know if these efforts are working. Addressing these questions is difficult and costly, but some progress has been made. From 1997 to 2012, the Department of Environment and Natural Resources and its partners (e.g., universities and industry) used aerial and ground surveys to monitor wolf den occupancy on the tundra as a way to monitor wolf population trend on the Bathurst range. This 17-year continuous time series of wolf abundance was instrumental in documenting a corresponding decline in wolf abundance when the Bathurst caribou herd experienced a 90% decline over the same period (1996-2014). Collared wolves from June 2013 confirmed this trend and our interpretation from it that wolf pup survival had declined over the study period. In this migratory predator-prey system, wolves select for areas used by caribou from autumn to late winter. Therefore, ENR also examined the number of wolves sighted during caribou composition surveys to investigate any trends between wolves sighted and caribou abundance. However, sightings of wolves fluctuated widely even though caribou herd numbers would not have changed much from one year to the next and the technique seems unreliable.

Wolves were collared in March 2012 for a winter abundance survey based on a mark-resight survey design. These collared wolves were also intended to quantify wolf predation on Bathurst caribou in winter. However, significant collar failure affected the ability to monitor enough wolves long enough. Furthermore, ground-truthing which GPS location cluster sites were predation sites required more resources than were available. Site visits needed a more timely response than given, especially when only conducted from the air. The wolf winter abundance survey was delayed to mid-April because information was needed from the Bathurst caribou composition survey and that could not happen until early April. It became apparent that some collared wolves had left the Bathurst winter range area in early April and the same pattern was inferred for those wolves not collared. Therefore, a winter wolf population estimate could not be completed. Consequently, such a survey should occur before April to avoid this scenario. Wolves can be hard on collars and no wolf project anywhere has been immune to malfunction. However, technology has progressed and collars have become more reliable such that these methods still

hold promise to address key questions about wolf predation on caribou. Nevertheless, such research remains logistically challenging and expensive.

Shifting Winter Home Range of the Bathurst Caribou Herd

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Over the past 20 years a significant number of circumpolar barren ground caribou herds have significantly declined. While caribou populations normally cycle, recent declines have put some herds at risk of extirpation. This decline is multi-causal and dynamic. Predation and hunting pressure along with mining development and associated disturbances are often cited as primary drivers of this pattern. Changes in snowpack may also be impacting how caribou, especially tundra caribou, move and use their winter ranges. The annual snowpack in the winter foraging area of the Bathurst herd covers their primary winter food source –lichen—for between 7 and 8 months of the year. This research focuses on the role of snow and changes to the annual snowpack on the decline of the Bathurst caribou herd. Many authors have cited changing winter conditions in caribou habitat in the northern hemisphere. These changes involve incursions of warmer southern air and concomitant changes in the snowpack structure related to warmer temperatures and/or rain-on-snow events. For example, widespread warming in the Wekweeti region in early March 2016 resulted in the formation of a snowcrust of 10 and 20cm in thickness and a density in the range of glacial firn ice. Changes in snowpack structure may have significant impact on food access and related energy expenditures.

Through the spatial-temporal analysis of caribou collar data, this study has identified a significant shift in Bathurst herd winter foraging grounds after 2005. Prior to 2006 the caribou spent winter months in the boreal forest across a large area generally extending south of the treeline between Great Bear and Great Slave lakes. Post 2005 the caribou began winter foraging near the treeline and northwards into the tundra. This movement to the northeast into the boreal-tundra transition and low arctic tundra may be related to changing snowpack structure due to incursions of warmer southern air during the winter period. A shift northeastward may move the caribou into areas that are not as impacted by these incursions of warm air. Tundra snow is normally much denser than the boreal snowpack and further movement north/ northeast into the low arctic tundra will pose food access challenges as well. A question relevant to addressing the issue of caribou population decline is why was the decline in over 80% of the circumpolar caribou herds more or less synchronous? The answer may be tied into changes in the frequency of winter incursions of warmer, southerly air masses into higher latitudes. To examine this we

looked at the pattern of the Arctic Oscillation atmospheric teleconnection and related it to the pattern of decline of the Bathurst Caribou herd.

Community Engagement: Rayrock (Kwetǫ̀ǫ̀ʔaà) Watershed Tour

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The Rayrock (Kwetǫ̀ǫ̀ʔaà) Mine Site is a decommissioned uranium mine located in one of the 'Donut holes'; that is, Crown Land located within Tłı̨chǫ Lands boundaries. It operated between 1957 and 1959. Eighty-thousand tonnes of ore were milled at the mine, creating 208 tonnes of uranium materials. Located approximately 75 km northwest of Behchokǫ̀, the site can only be accessed by airplane, helicopter, dog team, skidoo, or canoe.

Tłı̨chǫ Government Chief Executive Council (February 2010; Tłı̨chǫ Government Assembly in Wekweètì) has asked Indigenous and Northern Affairs Canada – Contaminants and Remediation Division (INAC-CARD) to work with Department of Culture and Lands Protection (DCLP) and the Tłı̨chǫ Elders to help develop the Remedial Action Plan. Since then, the Kwetǫ̀ǫ̀ʔaà Elders Committee was formed, comprised of Elders from Behchokǫ̀, Whati, Gamètì and Wekweètì with experience and knowledge of the site. This Committee is a forum for information exchange where Tłı̨chǫ elders and Tłı̨chǫ Government representatives can share traditional knowledge and provide input to INAC–CARD who are responsible for all contaminated sites and abandoned mines in the Northwest Territories.

The Kwetǫ̀ǫ̀ʔaà Elders Committee (KEC) has been meeting over several years to discuss site monitoring results and future plans for Rayrock. In January/February 2012, INAC-CARD met with KEC to complete a mapping exercise of the Rayrock Historical Transportation Route used during the mine operations. It was during this meeting that the Elders requested staff undertake a watershed tour – travelling by canoe to sample the water and fish downstream of the Rayrock drainage basin, where the water flows into Marian River and into the Marian Lake, near Behchokǫ̀.

In August 2015, after a reconnaissance helicopter tour of the watershed area, seven participants undertook a watershed tour by canoe along the Marian River. The Rayrock Watershed Tour provided the exchange of traditional and scientific knowledge with INAC-CARD and the TG. The group travelled from Yellowknife by floatplane and helicopter to Rayrock/Kwetǫ̀ǫ̀ʔaà. Just

downstream of Kwetį̨ɂaà, they launched their canoes in the Marian River, providing Tłı̨chǫ participants a first-hand account of the watershed's state while collecting scientific samples to determine the ecological and environmental conditions of the area. The group ate inconnu (Stenodus Leucichthys) and jackfish (Northern Pike) while camping at sites where Ancestors had travelled. After the tour, the fish and water samples were analyzed for "Contaminants of Concern". Over four days, the group of Tłı̨chǫ and INAC-CARD representatives paddled a total of 90 km to end their trip in Behchokǫ̀.

In this co-presentation, representatives from Tłı̨chǫ Government-DCLP and INAC-CARD will share findings from the site assessments, ongoing remediation and monitoring, and community engagement with the Kwetį̨ɂaà Elders Committee and Tłı̨chǫ communities.

"We Watch Everything" a Boots-on-the-Ground Approach to Caribou Monitoring

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The range of the Bathurst caribou, on the barrenlands of Northwest Territories, has undergone environmental changes during the last decades; the establishment of large-scale mines, increased exploration, climate change and increased human activity. These factors impact the dynamic between the hunting culture of the indigenous peoples and the barren-ground caribou herds. The direct effect is experienced by hunters in mainly two ways: the dramatic and rapid decline of the Bathurst caribou herd population, which has brought about tight hunting regulation for the indigenous hunters, and large changes to the migration routes of the herds, altering access to hunting. To investigate the cumulative impacts and current condition of the Bathurst caribou herd, the Tłı̨chǫ Government initiated the boots-on-the-ground caribou monitoring program on the summer range of the herd at Kokètì (Contwoyto Lake).

The program is based on previous three years of TK research with harvesters (men, women and elders) in Wekweètì. The TK study documented numerous abnormal health effect in the Bathurst caribou and a significant change in migration routes from the calving ground to the wintering grounds. Evolving from the community-based TK research, the pilot year of the boots-on-the-ground program was completed last summer. Based on the elder's holistic perspectives, we developed (1) the traditional knowledge framework "we watch everything" containing indicators of a healthy environment by assessing caribou and habitat conditions, impacts from predators,

climate change and industrial activities, and (2) a 'do as hunters do' field methodology for monitoring caribou based on the lifeways of hunters; by identifying and waiting at specific na'oke (water crossings) and monitoring caribou herds and their habitat by boat and on foot.

The project is an applied interdisciplinary research project that bridges the biological and the cultural, and we adopt a biocultural approach to emphasize the indigenous knowledge of the ecosystem we live in. The long term, on the ground approach attempts to be a cultural continuation of creating and learning Tłı̨chǫ traditional knowledge while on the land: a qualitative approach to understanding current dynamics between caribou, their habitat and cumulative impacts. As healthy caribou population is central in the Tłı̨chǫ harvesting economy, the program uses long-established methods of the hunters to produce answer for current issues - and thus the ability to sustain the cultural practice of travelling on the land for caribou.

NWT Cumulative Impact Monitoring Program Results in the Wek'eezhii Region

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The mandate of the Northwest Territories Cumulative Impact Monitoring Program (NWT CIMP) is to analyze scientific and traditional knowledge to monitor the cumulative environmental impacts of land and water use in the NWT. Cumulative impacts are changes to the environment caused by human actions or a combination of human actions and natural factors through time and space. This abstract provides a brief description of NWT CIMP and summarizes NWT CIMP-supported monitoring results from 1999-2016 in the Wek'eezhii region.

Monitoring cumulative impacts is an important part of environmental regulation and integrated system of environmental management in the NWT. The legal mandate for NWT CIMP comes from the Gwich'in, Sahtu and Tlicho land claim agreements, and Part 6 of the Mackenzie Valley Resource Management Act. Aboriginal governments and organizations help to guide the program through the NWT CIMP Steering Committee. The Tlicho Government is a member of the Steering Committee. Decisions are made by consensus with input from both members and observers.

NWT CIMP is focused on cumulative impact monitoring that informs environmental decision-making. As such, the program emphasizes the monitoring priorities of co-management boards. In the Wek'eezhii Region, this includes the Wek'eezhii Land and Water Board, the Mackenzie Valley Environmental Impact Review Board, and the Wek'eezhii Renewable Resources Board.

The program strives to include communities in as many aspects of cumulative impact monitoring as possible.

NWT CIMP has supported 10 individual projects specific to the Wek'eezhii region since 2002. Many other supported projects are relevant to the Wek'eezhii region and other regions of the territory. Most projects have been related to water and fish, caribou, traditional knowledge and capacity building. Generally, projects have been short-term, lasting one to two years. However, with increased, stable funding in the last five years, NWT CIMP has supported several longer-term monitoring projects, including an eight year traditional knowledge study that is currently focused on Bathurst caribou.

A theme has emerged from NWT CIMP-supported projects in the Wek'eezhii region. Each project has focused on building self-reliance and capacity within Tlicho communities. Early projects focused on building capacity in preparation for the implementation of self-government. Later aquatics-focused programs, including the Marian Watershed Aquatic Effects Monitoring Program and the Tlicho Aquatic Ecosystem Monitoring Program, were intentionally designed and implemented by Tlicho government and co-management staff, along with community members. Through its funding NWT CIMP has contributed significant baseline information in the areas of caribou, water and fish in the Wek'eezhii region. Project results for these and all NWT CIMP projects are available for download on the NWT Discovery Portal www.nwtdiscoveryportal.enr.gov.nt.ca or by contacting nwtcimp@gov.nt.ca.

Place, Tǫdzı and Forest Fires

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http://sdw.enr.gov.nt.ca/nwtdp_upload/Allice%20Legat%20and%20Camilla%20Nitsiza.pdf

Since the early 1990s, Tłı̨chǫ elders and harvesters have been concerned about the ever increasıng size and intensity of forest fires, and how these fires are impacting the habitat of the animals they depend on. They are particularly concerned with how these fires are impacting tǫdzı (boreal caribou) and łıwe (fish). In 2012, the Wek'èezhìı Renewable Resources Board began research on the relationship between tǫdzı and forest fires, first by listening to oral narratives of tǫdzı and fires, then by documenting the types of habitat tǫdzı prefer. In 2014-2015, Whatì elders selected places to monitor where harvesters expected to find tǫdzı. Several forest fires over the last 50 years have reached the shores of Tsotì (Lac La Martre), impacting tǫdzı habitat. Over the last two years, the research team has been documenting baseline information as well as noting change to places. All of which will establish a Tłı̨chǫ process to monıtor the land and water.

The purpose of this presentation is to provide an overview of activities and findings during the 2015 and 2016 research. Specifically, this presentation will address the importance of community driven monitoring by elders and harvesters, who may focus on one aspect – forest fires - but acknowledge the interaction of all beings that depend on the land and water.

Tłı̨chǫ Aquatic Ecosystem Monitoring Program (TAEMP): Overview and Update

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Community concerns and a general lack of information have highlighted the need to collect and update baseline information in Wek'èezhìı in anticipation of continuing pressures on the aquatic ecosystems. The purpose of the Tłı̨chǫ Aquatic Ecosystem Monitoring Program (TAEMP) is to maintain a successful community-based monitoring program that meaningfully involves community members in conducting contaminants-related research. Tłı̨chǫ community members are directly involved in monitoring, and both scientific and Tłı̨chǫ knowledge is exchanged among participants in appropriate community and on-the-land settings. Through the collection of fish tissue, water, and sediment samples using science-based methods, the TAEMP helps to address the question: "Are the fish safe to eat and is the water safe to drink?"

The TAEMP rotates sampling through each of the four Tłı̨chǫ communities, with sampling occurring in each community once every four years. The Program completed its initial baseline sampling phase with the conclusion of the 2014 camp near Whatì and in September 2015, the first round of comparative sampling began when the TAEMP returned to the community of Behchokǫ̀. A return to Rae Lakes near the community of Gamètì in the fall of 2017 will continue the comparative sampling phase, and continue to provide a means of addressing community concerns related to changes in the environment and allow for monitoring of trends over time, assisting informed decision-making.

The presentation will provide an overview of the TAEMP, with examples of the results from the 2011 and 2015 camps held near the Tłı̨chǫ community of Behchokǫ̀. The focus of the presentation will be on the collaborative nature of the TAEMP's implementation, and the key lessons learned since the Program's inception in 2010.