



## **NWT Regional Environmental Monitoring Results Workshop:**

Gwich'in Settlement Area and Inuvialuit Settlement Region



Summary Report

Inuvik, NT

November 18 & 19 2014

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## Executive Summary

The NWT Regional Environmental Monitoring Results Workshop was held in Inuvik on November 18<sup>th</sup> and 19<sup>th</sup> 2014. The event was co-hosted by the Northwest Territories Cumulative Impact Monitoring Program (NWT CIMP), Environment and Natural Resources, Government of the Northwest Territories, the Inuvialuit Game Council, the Gwich'in Tribal Council, and the Gwich'in Renewable Resources Board.

The objectives of the workshop were to:

1. Bring together investigators, decision-makers and communities to share results of NWT CIMP-funded environmental monitoring in the Gwich'in and Inuvialuit regions; and
2. Provide a forum for discussion between investigators, communities and regional decision-makers.

The workshop examined research conducted from 2010-2014 in the Inuvialuit Settlement Region (ISR) and the Gwich'in Settlement Area (GSA) and it focused primarily on NWT CIMP-supported projects centered on caribou, water, and fish. Fourteen presentations were given by scientists and traditional-knowledge practitioners. Interactive discussions were held to generate understanding of monitoring concepts and gather feedback on presented projects.

Thirty-seven people participated in the workshop. NWT CIMP provided funding for Gwich'in and Inuvialuit representatives to attend the workshop to promote information sharing with communities and decision-makers. The Inuvialuit Joint Secretariat and Gwich'in Tribal Council identified attendees and administered their travel arrangements. Local decision-makers and government scientists from Inuvik also attended. **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 the monitoring results, several key points were discussed during the workshop: Communities want to be more involved in monitoring (identifying local questions, helping analyze data), which could lead to capacity building. Communities want to be informed throughout the monitoring process, for example finding out about who the investigators are and what they have done in the past. It is important for investigators to communicate with community members in plain language before, during, and after their work is done. It was noted that many investigators in the ISR and GSA are already taking this approach.

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. All but one participant felt that there was a good balance between presentations and discussion. Several participants mentioned that they would like to see even more community representatives at future workshops. Quality and relevance scores for presenters ranged from 78% to 97%. This information is shared with presenters to help improve their future communications with communities and decision-makers.

## 1. Background

The NWT Regional Annual Results Workshop was held in Inuvik, NT on November 18<sup>th</sup> and 19<sup>th</sup> 2014. The event was co-hosted by the Northwest Territories Cumulative Impact Monitoring Program (NWT CIMP), Environment and Natural Resources, Government of the Northwest Territories, the Inuvialuit Game Council, the Gwich'in Tribal Council, and the Gwich'in Renewable Resource Board. This was the third annual NWT environmental monitoring results workshop and the second 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 2014 workshop examined research conducted from 2010-2014 in the Inuvialuit Settlement Region (ISR) and the Gwich'in Settlement Area (GSA) and it focused primarily on NWT CIMP-supported projects centered on caribou, water, and fish. Fourteen presentations were given by scientists and traditional-knowledge practitioners. Interactive discussions were held to generate understanding of monitoring concepts and gather feedback on presented projects.

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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 B for the sample evaluation forms.

## 2. Presentations

A total of 14 presentations were given over the two-day workshop. Each workshop participant was provided with the presentations on a USB stick. They can also be found 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.

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 November 18, 2014

##### **The NWT Cumulative Impact Monitoring Program: Impact on Resource Decision-Making**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Kanigan.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Kanigan.pdf)

Julian Kanigan, NWT CIMP

- Key messages: 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
- Mapping is a really important tool since it can identify trends, answer questions, provide information on migration etc.
- CIMP is not only a funding agency; it has in-house capacity to address monitoring questions.
- It is nice to learn more about CIMP and that it is not solely a funding agency

##### **Presentation #1- Inuvialuit Settlement Region Community-based Monitoring Program – Pilot Program**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Knopp%20CIMP157.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Knopp%20CIMP157.pdf)

Jennie Knopp and Kendra Tingmiak, ISR Community-Based Monitoring Program

- Do you want the data management software to talk to other programs?
  - Don't want the software to be a data dump, want to focus on priorities and then grow from there
- Water Quality in Aklavik – the Hunters and Trappers Committee (HTC) hasn't seen results from data collected from the YSI (equipment used to measure various water parameters) deployed near Aklavik
  - GNWT Water Stewardship Strategy (WSS) has the data and will share it with the community
- Question in priorities – is there a difference in priorities and key gaps?
  - Communities identified gaps and common needs

## **Presentation #2 – A Multi-scale Assessment of Cumulative Impacts in the Northern Mackenzie Basin**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Marchildon%20CIMP109.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Marchildon%20CIMP109.pdf)

Claire Marchildon, NWT CIMP

- Are there plans to continue studying the Inuvik to Tuktoyaktuk Highway (ITH/Dempster)?
  - Yes, we are developing a Letter of Intent (LOI) (for NWT CIMP funding) for the ITH project
  - The Dempster Highway work is continuing with grad students
- With our knowledge of the Dempster, how does that change how we build the ITH?
  - The experiments on the Dempster Highway regarding shrub cutting allow us to stop/slow down some of these processes (feedback cycles of increased snow depth and warming ground temperatures)
  - With the ITH, the terrain is different, so there are different variables that need to be looked at
  - The Yukon Government has been brushing the side of highways, for years, and it has helped, the ITH can learn a lot of what's been done in the Yukon
  - Experiments with cutting shrubs on the coast saw a decrease in ground temperature, after 2 years, they grew back so quickly, that the effects of cutting may be ineffective
  - Identifying the critical areas (areas that need to be cut to maintain the road) is important
  - Some have used chemicals to suppress shrub growth

## **Presentation #3 – Monitoring Environmental Change in the Mackenzie Delta Region: Local Observations and Participatory-Multimedia Mapping**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Lantz%20CIMP110.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Lantz%20CIMP110.pdf)

Trevor Lantz, University of Victoria

- How does your program fit with other decision makers?
  - Projects work directly with community members
- How did you do the disturbance scoring – is it a snapshot in time? How often does it need to be updated?
  - It is a snapshot approach, it will need to be updated every ~50 years
  - The type of disturbance is taken into account when allocating a disturbance score (i.e. a seismic line doesn't have the same score as a megaslump therefore they are given different scores)
- It was discussed at a Renewable Resource Council meeting, that in the 70's an individual could make a living off trapping. Lakes that used to have 60-70 muskrat push-ups, now only have maybe 2-3
- Changes to landscape, impacts to muskrat populations, disturbances, etc. needs to be taught in the schools

- There is a Letter of Intent through NWT CIMP to do a muskrat study

**Presentation #4 - Monitoring Pacific Salmon to Understand Cumulative Impacts of Climate Change in the Arctic**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Dunmall%20CIMP142.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Dunmall%20CIMP142.pdf)

Karen Dunmall, University of Manitoba

- Finding salmon in some of these rivers is like a needle in the haystack
  - There is a new type of technology that can detect the fish species in a body of water by using fine particulates collected from water samples
  - A lab test will be developed to see if we can detect fish in samples
  - Figure out how close we need to be to the fish to detect it
- Do you also write down if you see other animals in site (e.g. fox, wolves and bears)
  - Yes, notes are taken on wildlife and activity near sample sites
- From Inuvik to Tuktoyaktuk in January, there are open springs where people have seen foxes catching fish. In the fall you see grizzlies. In May, the creeks flow out into the Mackenzie; the fish know which areas to use and predators have learned to go where the fish are.
- Is Traditional Knowledge used in the project?
  - Yes it is. Community members are asked while filling out information at the Hunters and Trappers Committee if they have seen more or less salmon in the area

**Presentation #5 – Phase II Gwich'in Traditional Knowledge Monitoring: Stewardship of Gwich'in Land through Management of Oral History/Traditional Knowledge Data**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Snowshoe%20CIMP55.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Snowshoe%20CIMP55.pdf)

Sharon Snowshoe, Gwich'in Social and Cultural Institute

- The Gwich'in Social and Cultural Institute (GSCI) data is transcripts and interviews
- GSCI puts the information they have on their database – that's how they respond to the applications
- In the future will the GSCI do a lessons learned (how they did the work over the years, challenges and successes) document? The big picture story is important to tell
  - Haven't done that to date, but potentially in the future
- When there's a research agreement that goes through the GSCI, for research conducted in the Gwich'in Settlement Area (GSA), and it touches on Traditional Knowledge (TK), Alestine Andre will ask the researcher to read the TK policy
- Is there a similar policy within the IRC?
  - Yes there is
- Have elders been honored for the work with the GSCI?
  - There was a 20 year celebration with the Gwich'in Tribal Council (GTC) in 2012, all of the project posters were displayed with a list of all of the elders that were interviewed – this is how they were acknowledged
- TK making it to the regulatory stage is quite unique; do you have an example of when /how this was done?

- In Tsiigehtchic, every fall a winter access road is built that goes across the Arctic Red River and links to the Dempster Highway near Fort McPherson
- Last year they were going to change the location of the ice road crossing but the area where they were going to start the road, (the flats below Tsiigehtchic) , was a site of archaeological work that had been done in the 80s and 90s. That information was used to alter the route of the road to avoid the archaeological site

### **Presentation #6 – Gwich’in Harvest Study**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Boxwell%20CIMP96.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Boxwell%20CIMP96.pdf)

Janet Boxwell, Gwich’in Renewable Resource Board

- Have to be really careful about putting TK on Facebook
  - Postings on Facebook are cleared with Amy Amos the Executive Director of the Gwich’in Renewable Resources Board
  - It’s clear that what’s posted is not sensitive
- Elders always want to know where the information will go and if it can be used against them
- Traditional Knowledge is meant for the next generation
- It is a tricky balance of how information is shared and how it’s used to help the environment

## **Day 2**

### **Wednesday November 19, 2014**

#### **Presentation #7 – Video - The Permafrost of the Peel Plateau**

**\*Video not available online. Please contact Ecology North.**

The video was produced by Ecology North, introduced by Sheena Adams, Ecology North

- This is a great communication tool. Are there plans to make more movies?
  - Possibly we are waiting for feedback
- Speak with Jeremy Flatt of Ecology North for more information

#### **Presentation #8 – Mapping Permafrost Disturbance and Impacts to Aquatic Systems in the Western Arctic**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Lantz%20CIMP164.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Lantz%20CIMP164.pdf)

Trevor Lantz, University of Victoria on behalf of Steve Kokelj, GNWT NWT Geoscience Office

- Parks Canada is not listed as a project partner, but they are working on mapping also; they might be a good partner to add to the project
  - Parks hasn’t been directly involved in the project, but they will be interested in the data. Trevor will be able to share data in an open file as well as through other types of formats for access
- Most of the slumps in the presentation were in a hilly and mountainous terrain, but for us living in the Delta, we see this through erosion of the riverbanks, it’s just part of nature; it has a lot to do with precipitation. We’ve seen a lot less water in the summer and fall in the Delta which

makes navigation tough. There hasn't been anyone in the Delta that hasn't had to move their cabin away from the bank of the river to avoid erosion

- It is difficult in the Delta to understand what is normal and what is not normal. The slumps Trevor talked about are much larger and growing quite a bit faster than in the past
- It was good to see time-lapse photos of the slump. There has been a push for this type of thing for the proposed pipeline. It could be disastrous if the ground failed with a pipeline on it. We've been seeing a lot of changes. We know that it's warming, there more mosquitoes

### **Presentation #9 – A Watershed Approach to Monitoring Cumulative Impacts of Landscape Change**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Chin%20CIMP108.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Chin%20CIMP108.pdf)

Krista Chin, NWT CIMP on behalf of Steve Kokelj, GNWT NWT Geoscience Office

- There is concern about sumps in the Yukon by erosion and collapse into the watersheds. There were 18 sump sites identified in the Yukon, they are all adjacent to creeks in the Arctic Red River watershed.
  - These sites were not examined by this research

### **Presentation #10 – Understanding Impacts of Environmental Change on Char in the ISR: Science and the Inuit Knowledge for Community Monitoring**

**\*Presentation not available online. Please contact investigator.**

Jennie Knopp, ISR Community-Based Monitoring Program on behalf of Chris Furgal, Trent University

- Ice cover on the lakes differed by 20 days from one year to the next in lakes outside Ulukhaktok.
  - The fish have 6 weeks to feed in open water, thus 20 days could impact the duration of feeding quite a lot

### **Presentation #11 – Community Coastal Based Monitoring: A Regional Approach for in the Inuvialuit Settlement Region**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Loseto%20CIMP143.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Loseto%20CIMP143.pdf)

Lisa Loseto, Fisheries and Oceans Canada

- How many people are in your team currently?
  - There are 60 people on the team including lab technicians, researchers and community members
- How are the Fisheries and Oceans (DFO) cuts affecting marine mammal research priorities? Where this is heading in the future?
  - There is interest in economic gain and, growth in the management sector. There have been cuts to science; the ecosystem assessment group took a big hit

- This research has been going on since 2011, but the beluga research has continued since the late 1980s

**Presentation #12 – Developing Community-Based Monitoring for Key Winter Ecosystem Components in the Nearshore Beaufort Sea  
(Smallest voices – Shouts of change: Marine productivity in the coastal Beaufort Sea)**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Loseto%20CIMP144.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Loseto%20CIMP144.pdf)

Lisa Loseto, Fisheries and Oceans Canada on behalf of Christine Michel, Fisheries and Oceans Canada

- The work is very interesting and helpful in the Inuvialuit Settlement Region. The research is always welcome in our communities (Tuktoyaktuk)
- There was high productivity in 2014 which was unexpected
- Beluga whales seem to be smaller in the past few years. The whales in Sachs Harbor in early June seemed to be really yellow colour. They might have wintered in that area in the leads. Whales we saw in Husky Lakes that were trapped were the same colour. Throughout the 13 years of harvesting and sampling, the beluga, we found always had empty stomachs
- There is good work being done and it will be good information if oil and gas ever picks up
- We have been able to learn so much about the different areas for example the clear water found in Paulatuk vs. the cloudy water in the Mackenzie River

**Presentation #13 – Arctic Borderlands Ecological Knowledge Co-op: A Platform for Community-Based Cumulative Impact Monitoring in the North**

[http://sdw.enr.gov.nt.ca/nwtdp\\_upload/Svoboda%20CIMP61.pdf](http://sdw.enr.gov.nt.ca/nwtdp_upload/Svoboda%20CIMP61.pdf)

Amy Amos, Gwich'in Renewable Resource Council on behalf of Michael Svoboda, Arctic Borderlands Ecological Knowledge Co-op

- Salmon were included as an indicator species, were they added to the survey?
  - Not sure, best to ask Michael Svoboda
- There has been good support from community members and the HTC in Aklavik, accurate information
- Aklavik has requested data and is wondering if it will be sent? A follow up with Michael is needed to make sure that he will provide the data
- There is a lot of data, but most of it is not processed or catalogued and it is difficult to use

### 3. Break out Group Discussions

Throughout the workshop, interactive discussions 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 investigators who were present at the workshop and will be used to inform their future monitoring efforts.

#### 1. Why is long-term monitoring important?

- Long term monitoring is key
- Consistent methods
- Longer term view of trends
- Shifting baselines through generations
  - Long term helps to combat this
  - New normals may not be normal
- Scientific records to back up TK
- Community-based monitoring can be more sustainable
- Community-based monitoring allows for buy-in and decision-making in the community
- Continuation of protocols and standardization
- Determining natural cycles and patterns
  - Compare to human disturbance variations
  - Baseline helps determine how to react
  - Changes over time
  - Allows for decisions on mitigation measures
  - Learn from past actions
- Without providing long term information to the Environmental Impact Screening Committee, information is variable
  - Monitoring helps focus research
- Long term monitoring helps determine how quickly we need to respond to an event, development etc.
- We will not be able to go back to our elders for information
- Regional variation
  - What are the thresholds?
  - Need long-term data to identify regional variations
- Provides job security
- Provides a broader context of change

#### 2. What is the difference between monitoring and research?

##### Monitoring

- Is a way of tracking change long term data and it generates new research questions
- Is a way to build capacity between local people and researchers

- Is more local (elders have a wealth of knowledge)
- Gain information on what they should monitor in the future
- Is a good platform for involving youth (getting out on the land)
- All knowledge holders can do monitoring (not necessarily only researchers/scientists)
- Part of Traditional Knowledge is monitoring the land over time
- Unsure of how to catalogue monitoring observations
- Monitoring is more static, look at same thing over time
- A lot of surveys monitor men hunters, but do not involve women hunters – community based monitoring and TK are often focused on traditional male activities
- People on the land witness and observe changes over time (monitoring), then ask a question about something specific of what is going on (research)
- The calendar at the HTC logs peoples' trips on the land – monitoring any observations
- There are different programs that collect information from hunters (i.e. Aklavik HTC, GRRB Hunter survey, University of Victoria photo monitoring program)

#### Research

- Is more “Western”
- Once you answer the question in research you move on
- Research can be flexible, changing questions

#### Tips for Investigators

- Engage the community and get to the process of change that is observed
- Listen to the communities, don't just write down what you want to hear which happens a lot
- Do scientists build training into their budget?
  - For some it is part of the project as a whole
- Both methods are a good way at engaging the community
  - Stronger partnerships
  - Communication is important
    - Bring the information back to the people
    - Communicate with communities before the work is conducted to get buy-in
  - Need to be adaptable to address changing priorities/issues

#### Summary

- The methodology of how data is collected can change at the community level
- Monitoring is seeing what is going on and research is doing something about it (asking a specific question – why is what we are observing happening?)
- Needs to be adaptable
- The names of science and TK should be changed to researcher and monitor

### **3. What are examples of cumulative impacts that people have experienced in the Gwich'in and Inuvialuit regions?**

- The Inuvik to Tuktoyaktuk highway has caused sedimentation in lakes
- There are contaminants coming from drilling of the mud sumps in the Delta

- We are not finding trout when we would normally expect them in Husky Lakes
- There are more mudslides along the Mackenzie River
- Climate change is affecting the fish, they are coming at different times of the year and there are more fish at a time when you wouldn't expect it. Also there are new species in the area (i.e. Walleye)
- Beluga are seen in October which is unusual
- Fish taste much softer than before
- There are higher winds coming off the ocean in the fall
- River levels are at an all-time low and barges are not making into Aklavik
- Peel River
  - There are slumps/landslides related to climate change that are causing muddy water throughout the summer. There are small bears in fall
  - The water temperatures are higher
- The headwaters of the Arctic Red River
  - It is a heritage river and should be protected
  - There are outfitters that operate here
  - There is no monitoring about the harvest in this area
  - There is concern related to the headwaters of the Arctic Red River. Once there used to be a caribou harvest area long ago; really close to the Yukon.
  - There has been limited research in that area for a long time
- There are muskox way north of the Mackenzie River where they were never seen before
- There are not just cumulative impacts on the land; there are also impacts to humans (i.e. lifestyle, etc.)
- It's good to hear and learn about how each impact relates to each other (i.e. Highway, traffic, animals – how are they related, confounding each impact)
- The University of Victoria has been mapping disturbances. There are data layers that show what is happening and where. Most of the impacts which are overlapping in the Inuvialuit Settlement Region are in the south

#### **4. What could be done to make the research and reporting more useful to you, your community and decision-makers?**

##### Meetings and Materials

- More community presentations with good examples
  - Use better visuals (video, pictures, not graphs)
  - Annual General Meetings, radio stations, regional meetings are good opportunities to present information
- Each meeting, forum, or conference should have time devoted to figuring out how and when we should share information among each other. There should be immediate reporting of research. Summaries should be provided and all information should be in plain language
- Interpreters should be used when reporting back to the communities and when doing the research
- It is important to use language that is understood by everyone

- Ask communities how they want to see the data (i.e. all data, video, report, pamphlet, newsletter)
- There should be larger NWT CIMP workshops where more community representatives, Inuvialuit Game Council (IGC) members and HTC members can attend
- Is there any back and forth or help from community members when preparing your presentations?
  - Lisa Loseto has done that with youth or community members, which is really helpful.
  - Trevor is typically still working on the presentation on the plane. The feedback gained from individuals at meetings like this help to shape each additional presentation.; joint talks with community members seem to help
- If you can learn some of the key words for your presentation in the language of your audience, it's helpful; start presentation off with disclaimer that if you don't understand anything, stop me and we'll work on that term or idea together
- More community representatives should attend these NWT CIMP meetings, or similar meetings, HTC resource persons would be good to attend these meetings

### Relationship Building

- Biographies should be provided to communities and there should be meetings with the researchers
- Community-based monitoring should be assisted by local knowledge holders (guides, TK holders, land and sea users)
- There should be more transparency between researchers and the community
- There needs to be a way of communicating community questions to the appropriate people (i.e. Mackenzie water levels are low and flow is very slow)
- There is a lack of understanding of who to contact when
- Orientation for new members of council and staff
  - Direction to who the relevant agencies are and who the contact people are
  - Communication protocols
- Researchers should come back to community and explain how their work has answered a community question or concern
- There should be better follow up after research has been done
- It would be good to have various ways of sharing information among each other (i.e. if there was one place to come and share, perhaps a forum that would provide the opportunity for two way sharing and dialogue. It would be good to build on research days or other events that are well established)
- Communities want to review proposals at the beginning of the process to find out who the researchers are and what type of work they've done in the past
- The research process should be more transparent and make sure the community is involved right from the beginning and up until the end
- Researchers should come back to the community to let us know how our concern was addressed

- There is a lag between data collection and the ability to report especially on multi-year projects. Therefore it makes it difficult to provide results to the communities right away. Researchers could provide ongoing dialogue, updates, next steps and timeline for when to expect results
- Follow up better, use the research to create employment
- Research should be done before projects start (i.e. Highways - Dempster, ITH)
- It is important to reduce duplication and increase coordination
- DFO- needs to reinvest in the regional office. Someone should tell this to the Winnipeg office; unfortunately regional office does not house science in Inuvik
- Facebook is good forum to use for results and information
- Quick field summary report upon return, PDF with photos, and then results later once data is analyzed

## 5. What opportunities are there for better coordination?

### Communication and Relationship Building

- Communication at the outset of how information will be used and where it will end up
- Communication is important for both, before and after work is completed
- Need 2-way communication , so that researchers are answering the questions of interest
- Communities would like to hear about research and monitoring every year through ARI multi-year licensing
- Communities would like to see researchers coming back to communities, reporting and having discussions
- People are not feeling empowered in licensing approval process, come to community and talk about work before applying
- Regulators need to listen to monitors and follow what they say
- Research objectives should be coming from the communities
- Good foundations lead to better knowledge sharing
- It is important to spend the time to build the relationships with communities at the outset
- Challenge – if you aren't from the community then it may be hard to do this, one way to get around distances is to use Skype or Facebook

### Coordination

- There is a need for direct contact between local managers and research bodies (priority settings two way)
- Focal group/point of contact up here needed
  - Local level HTC's are key
  - Co-management boards are level up
- Intergovernmental coordination
  - Questions are often multidisciplinary
  - Is there a mechanism to do this more effectively?
- It would be a good idea to coordinate with existing opportunities (i.e. Brighter Futures)
- There should be a coordination hub, both from outset and for reporting
- Meeting coordination

- Larger meetings should catch all
  - Smaller meetings should focus in
- At the local scale the HTC's are important for coordination
- Coordination is needed within the government, questions are multi-disciplinary

### Capacity Building

- It is a good idea to teach others and have local people collect samples
- How can a local person get a longer term job involved with the research?
  - For post-secondary students, there are opportunities. Human Resources in IRC is coordinating these positions
- The non-returning students with the Community Based Monitoring Program became the go-to person. If you train people on several different projects, they become the go-to person
- Youth involvement is a good way of building future capacity
- Planning for capacity building
  - Long term
  - Issues with short term and academics
- There are obstacles for local involvement

### Relevance to communities

- Need to draw linkages and relevance to community questions and priorities
- Much of the research is not answering local questions
- It is important to ensure communities are benefiting from research
- ARI process
  - Don't like multi-year approvals
  - Reports need to be in plain language
  - Communities want researchers to present their results to them
  - Researchers need to come to the Renewable Resources Council first before licensing
- Needs to be better outreach about what information is being collected about water quality in the Inuvialuit Settlement Region (ISR)
- NWT CIMP Discovery Portal could work with the ISR Community Based Monitoring Program (CBMP) on new database/data management
- Share lessons learned on data management (ISR-CBMP, Gwich'in Renewable Resource Board)
- Don't come on bingo night
- On Bingo night the rolling channel is a good way to get out notices on meetings, presentations etc.
- A lot can be done at the local level to monitor
- Communities were weary of researchers from the south; HTC's want to see the scientific reports before they go public. This has been improving.

### **6. Are there different ways to do this research from a TK perspective?**

- ISR – use TK now
  - Community driven research

- There have been some issues with polar bear researchers
- There have been disagreements between science and TK
- TK is respectful of others and their opinions
- There are different questions being asked between science and TK
- TK and science have a different approach to analysis
  - Need more connections with social scientists
  - Develop protocols
- Views on TK from a scientists perspective
  - TK is powerful it can transform the way you think ('mind-bending')
  - How do we create the right opportunities to mind bend?
  - This will take time TK sees the ecosystem as a whole
- Polar bear TK project
  - TK expert panel interpreted the TK (unique)
- TK in the ISR has really been used effectively in projects and the research has been community driven
- People are always monitoring when they are out on land and they need to get in habit of reporting their observations
- A TK expert panel can help explain the range of different local observations
- Polar bear TK panel
  - Interviewed TK holders
  - Contractor compiled interviews
  - People from each community interpreted results, they were brought together as a group

### Research

- Canadian Wildlife Service did a study on snow geese at the Anderson River
  - Locals have linked the decline of snow geese to grizzly predation
  - Have to prove it with science? – frustrating
- During the Aklavik char surveys researchers ignored the TK that doesn't support their findings  
Scientists should work with local people to figure out the next research question
- Scientists use models – models don't work
  - i.e. Porcupine caribou model
  - Shouldn't be making management decisions based on models
- Polar bears – credibility of scientists vs. TK holders on a global scale
- Research shouldn't just focus on counting animals, although counts are used for management purposes health and other factors are important as well
- Rapid changes are occurring on the land from climate change and other processes
  - Learning with the elders
  - Longer term observations may be better equipped to understand change
- Personalities – sometimes can't change opinions/worldviews
- Politics can get in the way of science/TK
- Female activities and hunters should also be included
- Community representatives should help with interpretation of data

- The government says that there is a decline in barren ground caribou. TK says that the caribou may be somewhere else, where they haven't been counted, these are animals that move a lot
- There is the potential to see things in a broader perspective if TK is used alongside science. TK as a whole sees the world in a different way and takes into account many different aspects. It is very much a cumulative impact approach

## 4. Results from the Questionnaires

Attendees were asked each day to rate the presenters and their overall impression of the workshop. The following section provides the results of the surveys. There were more questionnaires completed on Day 2 and the overall ratings for that day were higher than Day 1.

### Presentation ratings

#### Day 1

Karen Dunmall was rated highest for her presentation on Monitoring Pacific Salmon both for quality at 94% and 97% for relevance

Trevor Lantz rated second highest for quality at 93% and 95% for relevance for his presentation on Monitoring Environmental Change in the Mackenzie Delta Region.

#### Day 2

The video on the Peel Plateau was rated highest scoring 96% for both quality and relevance.

The highest rated presenter was Trevor Lantz presenting on Mapping Permafrost Disturbance and Impacts to Aquatic Systems across Northern NWT on behalf of Steve Kokelj. He scored 95% for quality and 92% for relevance.

Lisa Loseto scored closely to that of Trevor's presentation for her work on Community coastal based monitoring: A regional approach for in the Inuvialuit Settlement Region. She scored 94% for quality and 92% for relevance.

### Overall ratings for the workshop

#### Question 1

*Were the research results presented today useful to you?*

Day 1 - 92% of participants felt that the results were useful to them and gave a score of 4 or higher

Day 2 - 90% of the respondents provided a rating of 4 or higher

#### Question 2

*How did you find the balance between presentations and time for questions and discussion today?*

Day 1 - The majority of participants, 92% found that there was a good balance between time for presentations and discussion. The other 8% (representing one participant) thought there was too much presentation time.

Day 2 - All the participants found there was a good balance between presentations, questions and discussion.

### Question 3

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

Day 1 - 85% rated 4 or higher on the quality of facilitation

Day 2 - 80% rated 4 or higher on the quality of facilitation

### Question 4

*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 caribou in the ISR and GSA.*

Day 1 - 64% of the respondents gave a rating of 4 or higher

Day 2 - 85% of the participants gave a rating of 4 or higher

Perhaps the first day scored lower because the morning focused on introducing monitoring concepts and NWT CIMP. Lower ratings may have also been related to comments from some participants who would have liked even more community members and decision-makers to participate in the workshop.

### Question 5

*Provide a forum for discussion between researchers, communities and regional decision-makers. Feedback from these discussions useful in providing information for future decision-making.*

Day 1 - 78% rated 4 or higher

Day 2 - 89% rated 4 or higher

## **Conclusion**

The positive feedback from participants at the workshop indicates that the workshop was a success, though there is certainly still room for improvement. One comment that was a concern last year and was reiterated again this year is the need to include more participants from the communities.

**Appendix A: Agenda**



## AGENDA

### CIMP Results Workshop: Gwich'in and Inuvialuit Regions November 18-19, 2014

*Midnight Sun Recreation Centre Community Lounge, Inuvik, NT*

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The Government of the Northwest Territories (GNWT)'s NWT Cumulative Impact Monitoring Program (NWT CIMP) is partnering with the Gwich'in Renewable Resources Board, Gwich'in Tribal Council and the Inuvialuit Game Council to host a regional Environmental Monitoring Results Workshop in Inuvik, November 18 -19, 2014.

#### OBJECTIVES:

The Cumulative Impact Monitoring Program is a source of cumulative impact monitoring and research information for decision-makers and communities in the NWT.

The objectives of the workshop are to:

- Bring together researchers, decision-makers and communities to **share results** of CIMP-funded environmental monitoring and research related to the Gwich'in and Inuvialuit regions
- Provide a **forum for discussion** between researchers, communities and regional decision-makers. Feedback from these discussions to be used to **improve CIMP programs**.

#### INFORMATION:

Copies of presentations, abstracts and other relevant materials will be provided and will be available on the NWT Discovery Portal:

<http://nwtDiscoveryportal.enr.gov.nt.ca:8080/geoportal/catalog/main/home.page>

For additional workshop details, please contact DonnaMarie Ouellette at 867-765-7239 or email [nwtcimp@gov.nt.ca](mailto:nwtcimp@gov.nt.ca)

**AGENDA**  
**CIMP Results Workshop:**  
**Gwich'in and Inuvialuit Regions**

***November 18<sup>th</sup> - DAY 1***

<b>Time</b>	<b>Activity</b>	<b>Lead</b>
8:30 am	Coffee and Mingling Registration	
9:00 am	Welcome and Introductions	Julian Kanigan (GNWT-CIMP)
9:30 am	Talking Circles <ul style="list-style-type: none"> <li>• Why is <b>long-term monitoring</b> important?</li> <li>• What is the difference between <b>monitoring</b> and <b>research</b>?</li> <li>• What are examples of <b>cumulative impacts</b> people have experienced in the Gwich'in and Inuvialuit Regions?</li> </ul>	Facilitator – Shauna Morgan
10:30-10:45	<b>BREAK</b>	
10:45 am	About the NWT Cumulative Impact Monitoring Program: Impact on Resource Decision-Making <ul style="list-style-type: none"> <li>• Q &amp; A</li> </ul>	Julian Kanigan (GNWT-CIMP) (IGC CIMP SC member) Tsatsiyé Catholique (GTC CIMP SC member)
11:45-1:00	<b>LUNCH</b>	
1:00 pm	CIMP Funded Projects: <ul style="list-style-type: none"> <li>• <i>Presentation #1- Inuvialuit Settlement Region community-based monitoring program – pilot program</i></li> <li>• <i>Presentation #2 – A multi-scale assessment of cumulative impacts in the Northern Mackenzie Basin</i></li> <li>• <i>Presentation #3 – Monitoring Environmental Change in the Mackenzie Delta Region: Local Observations and Participatory-Multimedia Mapping</i></li> </ul>	Jennie Knopp - ISR  Claire Marchildon – CIMP  Trevor Lantz – University of Victoria
2:15 pm	Talking Circles <ul style="list-style-type: none"> <li>• Is this information useful to you? What could be done to make the research and reporting more useful?</li> <li>• Are there opportunities for better coordination?</li> </ul>	Facilitator – Shauna Morgan

	<ul style="list-style-type: none"> <li>• Are there ways to better involve TK holders? Is there a different way to do this research starting from a TK perspective?</li> </ul>	
2:45-3:00	<b>BREAK</b>	
3:00 pm	<p><i>CIMP Funded Projects Cont'd</i></p> <ul style="list-style-type: none"> <li>• <i>Presentation #4 - Monitoring Pacific salmon to understand cumulative impacts of climate change in the Arctic</i></li> <li>• <i>Presentation #5 – Phase II Gwich'in Traditional Knowledge Monitoring: Stewardship of Gwich'in land through management of oral history/traditional knowledge data</i></li> <li>• <i>Presentation #6 – Gwich'in Harvest Study</i></li> </ul>	<p>Karen Dunmall - DFO</p> <p>Sharon Snowshoe - GSA</p> <p>Janet Boxwell - GRRB</p>
4:15 pm	<p>Talking Circles</p> <ul style="list-style-type: none"> <li>• Making the research and reporting more useful</li> <li>• Opportunities for better coordination</li> <li>• TK perspectives</li> </ul>	Facilitator – Shauna Morgan
4:45 pm	<b>Wrap up</b>	Facilitator – Shauna Morgan

**AGENDA**  
**CIMP Results Workshop:**  
**Gwich'in and Inuvialuit Regions**

***November 19<sup>th</sup> - DAY 2***

8:30 am	Coffee and Mingling Registration	
9:00 am	Welcome	Facilitator – Shauna Morgan
9:10 am	<p><i>CIMP Funded Projects:</i></p> <ul style="list-style-type: none"> <li>• <i>Presentation #7 – Video - The Permafrost of the Peel Plateau</i></li> <li>• <i>Presentation #8 – Mapping permafrost disturbance and impacts to aquatic systems in the Western Arctic</i></li> <li>• <i>Presentation #9 – A watershed approach to monitoring cumulative impacts of landscape change</i></li> </ul>	<p>Ecology North</p> <p>Trevor Lantz – University of Victoria</p> <p>Krista Chin – CIMP</p>
10:25-10:45	<b>BREAK</b>	
10:45 am	<p>Talking Circles</p> <ul style="list-style-type: none"> <li>• Making the research and reporting more useful</li> <li>• Opportunities for better coordination</li> <li>• TK perspectives</li> </ul>	Facilitator – Shauna Morgan
11:45-1:00	<b>LUNCH</b>	
1:00 pm	<p><i>CIMP Funded Projects:</i></p> <ul style="list-style-type: none"> <li>• <i>Presentation #10 – Understanding Impacts of Environmental Change on Char in the ISR: Science and the Inuit Knowledge for Community Monitoring</i></li> <li>• <i>Presentation #11 – Community coastal based monitoring: A regional approach for in the Inuvialuit Settlement Region</i></li> <li>• <i>Presentation #12 – Developing community-based monitoring for key winter ecosystem components in the nearshore Beaufort Sea</i></li> <li>• <i>Presentation #13 – Arctic Borderlands Ecological</i></li> </ul>	<p>Jennie Knopp - ISR</p> <p>Lisa Loseto – DFO</p> <p>Lisa Loseto - DFO</p>

	<i>Knowledge Co-op: A platform for community-based cumulative impact monitoring in the north</i>	Amy Amos – GRRB
2:40-3:00	<b>BREAK</b>	
3:00 pm	Talking Circles <ul style="list-style-type: none"> <li>• Making the research and reporting more useful</li> <li>• Opportunities for better coordination</li> <li>• TK perspectives</li> </ul>	Facilitator – Shauna Morgan
3:45 pm	Sharing and Discussion as a Full Group	Shauna Morgan
4:30 pm	<b>Wrap-Up and Closing</b>	Shauna Morgan

## **Appendix B: Attendee list**

Number	Name	Present		Organization/Community	GSA	ISR	Researcher
		Nov . 18	Nov . 19				
	<b>*=presenter</b>						
1	Abraham Wilson	X		Tetlit Gwich'in Council	1		
2	Alestine Andre	X		Gwich'in Social and Cultural Institute	1		
3	Amy Amos*		X	Gwich'in Renewable Resource Board	1		
4	Bijaya Adhikari	X	X	Inuvialuit Water Board		1	
5	Billy Storr	X	X	Inuvialuit Game Council		1	
6	Charles Pokiak	X	X	Inuvialuit Game Council (WMAC)		1	
7	Claire Marchildon*	X	X	NWT CIMP			1
8	Darrell Christie	X	X	Environmental Impact Screening Committee		1	
9	Frank Pokiak	X	X	Inuvialuit Game Council		1	
10	Gerald Inglangasuk	X	X	Inuvialuit Game Council		1	
11	Janet Boxwell*	X		Gwich'in Renewable Resource Board	1		
12	Jennie Knopp*	X	X	Joint Secretariat		1	
13	Jennifer Lam	X	X	Inuvialuit Game Council		1	
14	John Norbert	X	X	Gwichya Gwich'in Council	1		
15	John Ondrack	X	X	Environmental Impact Screening Committee		1	
16	Julian Kanigan*	X	X	NWT CIMP	1		
17	Karen Dunmall*	X	X	University of Manitoba			1
18	Kendra Tingmiak	X	X	ISR Community Based Monitoring Program		1	
19	Kris Maier	X	X	Gwich'in Renewable Resource Board	1		
20	Krista Chin*	X	X	NWT CIMP			1
21	Kristen Callaghan	X		Gwich'in Renewable Resource Board	1		
22	Kristen Hynes	X	X	Fisheries Joint Management Committee		1	
23	Lisa Loseto*	X	X	DFO			1
24	Margaret Kanayok		X	Inuvialuit Game Council		1	

25	Marsha Branigan		X	ENR – Inuvik			1
26	Martha Snowshoe	X	X	Gwich'in	1		
27	Michelle Gruben	X		Aklavik HTC		1	
28	Neil Firth	X	X	Nihtat Gwich'in Council	1		
29	Raymond Ruben	X	X	Inuvialuit Game Council		1	
30	Richard Binder	X		Environmental Impact Review Board		1	
31	Sharon Snowshoe*	X		Gwich'in Social and Cultural Institute	1		
32	Shauna Morgan (facilitator)	X	X	Pembina Institute			1
33	Sheena Adams		X	Arctic Energy Alliance/Ecology North			1
34	Steve Baryluk	X	X	Inuvialuit Game Council		1	
35	Trevor Lantz*	X	X	University of Victoria			1
36	Tsatsiye Catholique	X	X	Gwich'in Tribal Council	1		
37	William Francis	X	X	Nihtat Gwich'in Council	1		

**Appendix C: Evaluation Questionnaires**

### 3rd NWT Environmental Monitoring Results Workshop – Gwich'in and Inuvialuit Regions

#### Participant Evaluation Tool – Day 1 (Tuesday, November 18)

The sponsoring departments 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       NGO/Not-for-profit  
 Industry       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: Jennie Knopp (IJS) Inuvialuit Settlement Region community-based monitoring program.***

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

***Presentation 2: Claire Marchildon (CIMP) A multi-scale assessment of cumulative impacts in the Northern Mackenzie Basin***

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

**Presentation 3: Amy Amos (GRRB) Arctic Borderlands Ecological Knowledge Co-op: A platform for community-based cumulative impact monitoring in the north**

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

**Presentation 4: Trevor Lantz (U of Vic) Monitoring Environmental Change in the Mackenzie Delta Region: Inuvialuit Observations and Participatory-Multimedia Mapping**

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

**Presentation 5: Sharon Snowshoe (GSA) Phase II Gwich'in Traditional Knowledge Monitoring: Stewardship of Gwich'in land through management of oral history/traditional knowledge data**

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

**Presentation 6: Janet Boxwell (GRRB) Gwich'in Harvest Study**

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 today?**

Too much presentation time	Good balance	Too much discussion time
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**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 caribou in the ISR and GSA.***

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 CIMP programs.***

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

**We welcome any additional comments or suggestions:**

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**Thank you for your input!**

### 3rd NWT Environmental Monitoring Results Workshop – Gwich'in and Inuvialuit Regions

#### Participant Evaluation Tool – Day 2 (Wednesday, November 19)

The workshop sponsors 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       NGO/Not-for-profit  
 Industry       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: Lisa Loseto (DFO) Community coastal based monitoring: A regional approach for the Inuvialuit Settlement Region***

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

***Presentation 8: Krista Chin (CIMP) A watershed approach to monitoring cumulative impacts of landscape change***

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

***Presentation 9: Karen Dunmall (DFO) Monitoring Pacific salmon to understand cumulative impacts of climate change in the arctic***

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

***Presentation 10: Video (Ecology North) Permafrost of the Peel Plateau***

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

***Presentation 11: Trevor Lantz (U of Vic) Mapping permafrost disturbance and impacts to aquatic systems across northern NWT***

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

***Presentation 12: Jennie Knopp (ISR) Understanding Impacts of Environmental Change on Char in the ISR: Science and the Inuit Knowledge for Community Monitoring***

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

***Presentation 13: Lisa Loseto (DFO) Developing community-based monitoring for key winter ecosystem components in the near-shore Beaufort Sea***

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 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 caribou in the ISR and GSA.***

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 CIMP programs.***

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

**We welcome any additional comments or suggestions:**

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**Thank you for your input!**

## **Appendix D: Project Abstracts**

Presentation #00:

**NWT CIMP Impact on Environmental Decision-making in the Inuvialuit Settlement Region and the Gwich'in Settlement Area**

Kanigan, J.

NWT Cumulative Impact Monitoring Program, Government of the Northwest Territories

[Julian.Kanigan@gov.nt.ca](mailto:Julian.Kanigan@gov.nt.ca)

The Northwest Territories Cumulative Impact Monitoring Program's (NWT CIMP) mandate 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. This abstract provides a brief description of NWT CIMP and outlines two examples of NWT CIMP-supported monitoring in the Inuvialuit Settlement Region (ISR) and the Gwich'in Settlement Area (GSA) that have directly informed current environmental decision-making processes.

Monitoring cumulative impacts is an important part of environmental regulation in the NWT. The legal mandate for NWT CIMP comes from the Gwich'in, Sahtu and Tlicho land claim agreements, and the Mackenzie Valley Resource Management Act. NWT CIMP operates in the ISR through a Memorandum of Understanding with the Inuvialuit Game Council. Aboriginal governments help to guide the program through the NWT CIMP Steering Committee.

NWT CIMP is focused on cumulative impact monitoring that informs environmental decision-making. As such, the program emphasizes the monitoring priorities of land and water boards, review boards and renewable resource boards. The program also strives to include communities in all aspects of cumulative impact monitoring.

Project-specific cumulative impact monitoring starts with good environmental baseline data. The Inuvik to Tuktoyaktuk Highway underwent regulatory review in 2013. NWT CIMP provided the developer with multiple datasets that the program has collected since 2004. These datasets included terrain hazards and ground temperatures along the highway corridor. The data directly contributed to the quality of design and mitigation plans that the developer submitted for review.

NWT CIMP also supports regional-scale cumulative impact monitoring. Since 2010, NWT CIMP has supported work led by Dr. Steve Kokelj (Northwest Territories Geoscience Office) to monitor broad-scale permafrost slumping in the Peel Plateau. Project results help the Gwich'in Renewable Resource Board make informed fish and wildlife management decisions. Results are also being used by the Government of the Northwest Territories to plan mitigations for permafrost slumping along the Dempster Highway.

Results from all NWT CIMP projects are available for download on the NWT Discovery Portal [www.nwtdiscoveryportal.enr.gov.nt.ca](http://www.nwtdiscoveryportal.enr.gov.nt.ca) or by contacting [nwtcimp@gov.nt.ca](mailto:nwtcimp@gov.nt.ca).

Presentation #01:

**INUVIALUIT SETTLEMENT REGION –  
COMMUNITY-BASED MONITORING PROGRAM (ISR-CBMP)**

Knopp\*, J.A.<sup>1</sup>, Pokiak, F.<sup>2</sup>, Staples, L.<sup>3</sup>, Gillman, V.<sup>4</sup>, Carpenter, L.<sup>5</sup>, Snow, N.<sup>6</sup>, Pierce, J.<sup>7</sup> and Tingmiak, K.<sup>1</sup>

- (1) Inuvialuit Settlement Region – Community-Based Monitoring Program,  
Joint Secretariat – ISR, Inuvik NT
- (2) Inuvialuit Game Council, Inuvik NT
- (3) Wildlife Advisory Management Committee - North Slope, Whitehorse YK
- (4) Inuvialuit-Canada Fisheries Joint Management Committee, Inuvik NT
- (5) Wildlife Advisory Management Committee – Northwest Territories, Inuvik NT
- (6) Joint Secretariat – ISR, Inuvik NT
- (7) Environmental Impact Review Board, Inuvik NT  
[cbmp@jointsec.nt.ca](mailto:cbmp@jointsec.nt.ca)

The ISR-CBMP began in January 2013 and is a partnership that includes the six ISR Hunters and Trappers Committees, the ISR wildlife co-management boards and the Inuvialuit Game Council. The program is a regionally coordinated, community-based approach to monitoring. Community interests and priorities are integral to the design and implementation of the program, along with the management needs and priorities of Inuvialuit organizations, the co-management boards created pursuant the Inuvialuit Final Agreement (IFA) and territorial and federal resource management authorities. The program also builds on, and collaborates with, existing monitoring projects and partnerships in the ISR. Researchers, industry, and other organizations conducting community-based monitoring, are encouraged to work in collaboration with the ISR-CBMP.

Community-Based Monitoring (CBM) focuses on improving resource management decision-making through the collection and application of Inuvialuit Knowledge and local environment-related information. It promotes the interests and role of local communities in:

1. the design of monitoring programs
2. execution of local monitoring programs
3. data interpretation and application.

CBM generates data and knowledge that provide insight into trends and changes in environmental and wildlife conditions over time, for management needs and priorities of resource users, co-management

boards, and government agencies.

The ISR-CBMP is building and increasing local capacity in the ISR communities to monitor current conditions and trends with respect to:

- Wildlife and Fish condition, health, abundance, distribution and harvest levels;
- Wildlife and Fish Habitat and related local environmental conditions in areas such as water quality, erosion and permafrost; and,
- Other environmental conditions in areas such as climate-related pathways, vegetation and invertebrates.

Capacity building is a critical component of the ISR-CBMP. The Program is creating a cadre of trained community Resource Technicians prepared to work on priority monitoring needs for decision-makers as well as work directly with researchers and government.

The overall goal of the ISR-CBMP is to support the Inuvialuit Final Agreement institutions mandated “to protect and preserve the Arctic wildlife, environment and biological productivity” to achieve the principles of the IFA and enhance decision-making.

This presentation will provide an overview of the governance and design of the ISR-CBMP as well as provide information on CBM projects that were initiated as part of the two-year pilot program including the Porcupine Caribou Herd Harvest Surveys and water quality CBM.

Presentation #02:

**A Multi-Scale Assessment of Cumulative Impacts in the Northern Mackenzie Basin**

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The Northern Mackenzie Basin is an area of enormous ecological and cultural significance that is changing in response to more frequent disturbances (natural and human-caused), and regional temperature increases. These changes are impacting priority valued ecosystem components (VCs), but their cumulative effects are extremely poorly understood. In this project, we combined remote sensing data with field observations to document the extent and cause of changes occurring between 1985 and 2012. Using NDVI data derived from LANDSAT, we found that 85% of the Tuktoyaktuk Coastland showed increased vegetation productivity between 1985 and 2011, making this one of the most

intensely greening regions in the Arctic. Ongoing comparisons using vertical air photos from 1980 and 2013 show that this greening was associated with increased canopy cover of erect dwarf and tall shrubs and declines in ground lichen cover. Our analyses suggest that these changes have been driven primarily by regional warming.

Over the last several years we have also used field studies to examine the ecological effects of disturbances including: all weather roads, degrading ice wedges, drained lakes, historic seismic lines, tundra fires, thaw slumps, and drilling mud sumps. Our plot-scale field studies show that disturbance can result in positive feedbacks among vegetation, snow pack, and soils that cause the effects of disturbance to persist for centuries. In this presentation we use the example of an all-weather road to illustrate these ecological feedbacks. By comparing plot-based sampling, airphoto disturbance mapping, and changes in vegetation indices derived from LANDSAT imagery, we also characterized the regional impact of disturbance. Our analysis shows that, despite the magnitude of their impacts, disturbances only affect a small portion of the study region. These data are especially relevant to organizations interested in understanding and managing the effects of landscape change on wildlife.

Presentation #03:

**Monitoring Environmental Change in the Mackenzie Delta Region: Local Observations and Participatory Multimedia Mapping**

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The Mackenzie Delta Region is a dynamic environment that is ecologically and culturally significant. This area is experiencing rapid environmental changes that are expected to increase in magnitude with continued climate warming and additional anthropogenic stressors. In some areas changes are occurring so rapidly that maintaining an accurate inventory presents a significant challenge. Inuvialuit and Gwich'in land users in the region are in an excellent position to assess ongoing changes in the environment and contribute to cumulative impacts monitoring.

The central objective of this research project is to document Inuvialuit and Gwich'in observations of the environment. To accomplish this, we combine participatory photography and video with semi-structured interviews that focus on participants' knowledge of the land. Participant observations, photos, videos, and interviews are organized into web-based maps maintained by the University of Victoria (<https://gwitchin.knowledgekeeper.ca> and <https://inuvialuit.knowledgekeeper.ca/>). Between 2010 and 2014, we have worked with 60 monitors to record observations across the Inuvialuit and Gwich'in territories. In 2013/14, monitoring focused on: changes in muskrat populations, hydrology in the Mackenzie Delta, and the effects of human disturbances on terrestrial ecosystems important for traditional harvesting.

In 2014, we also began work to assess the cumulative impacts of disturbance on traditional harvesting in the Inuvialuit Settlement Region (ISR). The first step in this part of the project was to develop a map layer integrating existing data on: 1) the spatial distribution of multiple disturbances in the region, and 2) the magnitude of their effects on ecosystems. The resulting map provides a visualization tool that will help communities, planners, and scientists assess the effects of disturbance at both fine and broad-scales. Preliminary analysis shows that the cumulative impacts of disturbance vary across the ISR. Our ongoing work with this data involves assessing the overlap between disturbance hotspots and important harvesting areas using spatial analysis and Marxan simulations.

Presentation #04:

**Arctic Salmon: Monitoring Changes by Local Community Involvement**

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Community members in the Northwest Territories are noticing changes in subsistence harvests of Pacific salmon, which may indicate larger changes to the Arctic ecosystem due to climate warming. Specifically, Chum Salmon and Pink Salmon are appearing in greater abundances and in more places in recent years. Increased numbers of salmon may provide future fisheries opportunities or may negatively affect the existing ecosystem and fishes. In this study, Pacific salmon are provided by the subsistence fishers, gathered on a community basis by local organizations, and sent to Fisheries and Oceans Canada for further analyses. A total of 263 salmon were collected in this passive collection program between 2000 and 2010, 229 were collected in 2011, 23 were collected in 2012, 11 were collected in 2013, and up to 50 are projected for 2014 (collections are ongoing at present).

There is concern that these Pacific salmon may compete with native fishes such as chars. Community members, in collaboration with Fisheries and Oceans Canada, monitor the water temperature in char habitat using a recently developed and tested method that monitors substrate and surface water temperatures simultaneously. This method has been used to monitor temperature in char spawning habitat in rivers draining to the Arctic Ocean, tributaries to the Mackenzie River near Ft. McPherson and Norman Wells, NT, and also in the Nahanni National Park near Ft. Simpson, NT. This information, coupled with water temperatures from groundwater springs in the North Slope, has allowed the development of a predictive model to identify watersheds vulnerable to colonization by Chum and Pink salmons along the North Slope. Although species-specific preferred water temperatures will likely limit competition for specific spawning sites, there is some overlap suggesting the possibility of competition for spawning locations close to springs with temperatures near 4°C, as occurs in the Babbage River, NT. Once temperature data are available, this predictive model may be applied to sites farther upstream in the Mackenzie River.

Combining community monitoring of key habitat variables such as water temperature and community-based sampling of fish with scientific research on samples represents a powerful approach to understanding ecosystem changes. Greater understanding regarding changes with respect to Pacific salmon in the Arctic and the development of tools to predict their presence and resulting implications will enhance cumulative impact assessment capabilities of ecosystem-level changes, contribute to ecosystem-based fisheries management in a changing Arctic, and contribute to community conservation plans and management of key fishery resources.

Presentation #05:

**Stewardship of Gwich'in lands through management of research materials: oral history and traditional knowledge**

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The Gwich'in Social and Cultural Institute is the culture and heritage arm of the Gwich'in Tribal Council. It is a non-profit society with registered charitable organization status and is governed by a seven member Board of Directors composed of representatives from the four Gwich'in communities and the Gwich'in Tribal Council. The objective of the Institute is to conduct research in the areas of culture, language and traditional knowledge so that this body of knowledge will be recorded and available for future generations and the development of programs appropriate for Gwich'in needs. We believe that this is essential in building new awareness of, and pride in, Gwich'in culture. The GSCI also participates in the review of development permits and research permits. The GSCI received CIMP funding between 2006-2012 funding in support of a series of projects to ensure previously-recorded Gwich'in traditional knowledge and oral history will be accessible to GSCI, Gwich'in communities, and researchers into the future.

This presentation will include an overview of the GSCI's tasks and outcomes to update, preserve, and ensure the sustainability of research materials. It will also contextualize the project within the GSCI's mandate and processes.

Presentation #06 (no abstract submitted):

**Gwich'in Harvest Study**

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Presentation #07:

**The Permafrost of the Peel Plateau**

*Ecology North*

Video presentation

Presentation #08:

**Mapping permafrost disturbance and impacts to aquatic ecosystems in the Western Arctic.**

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Previous research shows that changes in the size and frequency of permafrost disturbances will have a significant impact on the water quality of lakes and streams across the western Arctic. However, relatively little is known about the continental distribution of large permafrost disturbances. In this project we used a grid-based mapping technique to identify areas where retrogressive thaw slumping and catastrophic lake drainage are prevalent. In the first year of this project, we focussed on retrogressive thaw slumps, which are a form of permafrost disturbance that occur where ice-rich permafrost in hilly terrain is exposed and begins thawing.

Thaw slumps were widely distributed throughout study area, with 11% (~140,000 km<sup>2</sup>) of the grid cells overlaid on the study region containing active disturbances. Of the impacted grid cells, most (66%) had a low density of active slumps, 24 % had moderate slump density, and 10% had high slump density. The vast majority of slump-impacted terrain occurred in areas of glacial till (till blanket and till veneer) and was bounded by the maximum westward extent of the Laurentide ice sheet. Fluvial (valley-side) environments were the most common geomorphic setting impacted by slumps and often contained a high density of large slumps. To provide a first approximation of the potential impact on streams and rivers, we calculated the proportion of grid cells with fluvial slumps for 68 broad-scale watersheds. We found that the Peel, Southwestern Beaufort, and Arctic (including streams draining the eastern half of Banks Island) watersheds were the most intensively impacted by slumping. This project provides a quantitative basis for re-evaluating the distribution of ice-cored permafrost terrain and a means to assess the sensitivity of northern landscapes to climate change. Our maps also provide a useful scoping tool for communities, planners, scientists and project proponents. An open file describing our results, including the map data and metadata, is being published as an open file with the Northwest Territories Geoscience Office and will be made available on the NWT Discovery Portal.

Presentation #09:

**The influence of slumps on stream water quality and biota in the Peel Plateau, NT**

Chin\*, K.<sup>1</sup>, Maier, K.<sup>2</sup>, Levenstein, B.<sup>3</sup>, Lento, J.<sup>3</sup>, Culp, J.<sup>3,4</sup>, Kokelj, S.<sup>5</sup>, Vaneltsi G.<sup>6</sup>

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Permafrost degradation, leading to slope disturbances (slumps) in the ice-rich glaciogenic terrain of northwestern Canada has impacted hundreds of small streams. The disturbances have made large volumes of previously frozen, highly weatherable fine-grained sediments available for leaching and transport to adjacent streams, increasing sediment and solute loads in these systems. To test the effects of increasing sediment and solute loads on the ecology of streams, we explored the relationship between physical and chemical variables on benthic macroinvertebrate communities, organic decomposition, and the relationship between nutrient availability and algae growth in impacted and unimpacted stream reaches in the Peel Plateau in the Northwest Territories. Taxonomic composition and invertebrate abundance distinguished impacted from unimpacted stream reaches. There was evidence of a strong negative relationship between macroinvertebrate abundance and total suspended solids. Organic decomposition was not consistent among sites, further testing is required to explain this finding. Algae growth did not differ between treatments suggesting that nutrients are not limiting in this system. Slumps have a huge impact on stream systems but more research is required to determine threshold levels of disturbance on the stream biota. Lastly, impacts to fish species are being investigated through the use of dietary analysis and occupancy modeling.

Presentation #10:

**Understanding Impacts of Environmental Change on Char in the ISR:**

**Ecological and Inuvialuit Knowledge for Community Monitoring**

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Increases in climate variability in the Inuvialuit Settlement Region, and the resulting effects on local environment, flora, and fauna, have led to impacts on local freshwater fish. Inuvialuit who rely on fish as a source of food, will have to adapt to these effects including altered access to fishing locations and changes to size and quality of fish. The purpose of this research was to understand how a changing environment may affect Arctic Char and to create an Arctic Char community-based monitoring (CBM) plan for Sachs Harbour NT.

This presentation overviews the outcomes of a five-year collaborative mixed methods research project integrating local expert knowledge, and ecological and environmental knowledge. Through this approach, we learned: 1) landlocked lake parameters that affect Arctic Char growth and health; 2) local environmental parameters that affect Arctic Char growth; 3) indicators for use in community-based monitoring; and, 4) community needs to carry out effective CBM.

The mixed methods research design used in this project involved a range of data collection and analysis methods. Scoping sessions and semi-directed interviews were conducted with local fish and environment experts. Local experts provided a detailed understanding of changes in local climate and environmental conditions and how these changes affected both Arctic Char and char habitat. Three local landlocked fishing lakes were sampled for water quality, depth and temperature profiles, ice on-off dates, and zooplankton abundance and size. Arctic Char were sampled for length, weight, sex, maturity, stomach contents, parasite loads and otolith (ear bone) age and annual growth analyses. Local expert fishers were directly involved in the research design, determination of study locations and environmental and ecological parameters for scientific sampling, and results analyses.

We learned that Capron Lake had 1/20<sup>th</sup> the volume, 5X higher zooplankton productivity, and ice-on dates 10-20 days earlier (resulting in a shorter growing season) than the other two study lakes. The oldest chars captured in Capron Lake were significantly shorter than the oldest chars captured in Middle and Kuptan lakes ( $p < 0.001$ ) however Capron Lake contained the longest char captured of all three lakes. Despite these differences between the three lakes, otolith annual growth analyses on char from all lakes revealed a large increase in growth a decade prior to capture, across a range of age classes. Local experts observed and reported noticeable changes in Arctic Char within the same time frame coupled with observations of low sea-ice coverage and warmer ambient air temperatures within the same years.

Integrating local expert and environmental knowledge to determine similarities and differences in fish growth, condition and habitat among the study lakes, and interpretation of the resulting patterns, supported either lake-specific or regional climate-driven changes in Arctic Char growth. This resulted in the identification of indicators useful in CBM. Regional sea-ice coverage is an indicator relevant for consideration in Arctic Char community-based monitoring along with ambient air temperatures, number of days of lake ice coverage and zooplankton abundance.

#### Presentation #11:

##### **Community Coastal Based Monitoring: A Regional Approach for the Inuvialuit Settlement Region**

Loseto\*, L.L.<sup>1,2</sup>, Hoover\*, C.<sup>1</sup>, Ostertag\*, S.<sup>1</sup> and Hynes\*, K.<sup>3</sup>

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In efforts to prepare for cumulative impact assessments there is a need to develop a baseline understanding of the marine and coastal ecosystems of the Beaufort Sea. Our program goal is to characterize the ecosystem connectivity to better inform managers/decision makers on ecosystems and their responses to change. Specifically, we take a multi-faceted approach to establishing and developing a long term monitoring plan, and selecting key indicators needed for future decision making. We set four pillars to our approach a) define ecosystem structure, function and health (using beluga and fish as sentinel species), b) build a foundation for long term community monitoring, c) ensure inclusion of Inuvialuit values, perspectives and knowledge, and d) use a modeling approach to span from the coast to offshore and allow for future simulations.

The development of the coastal community based monitoring programs focused on valuable ecosystem components (VECs) of fish and beluga whales while building linkages to habitat. Using approaches that build on the Hendrickson Island beluga program, we expanded efforts to other communities to build capacity for the collection of either beluga and/or fish samples for

biomarker indicator analyses. While the program spans over species and space covering the Mackenzie Estuary and marine coastal areas (e.g. Darnley Bay, Paulatuk), we maintain connectivity by measuring common indicators that define predator prey interactions and ecosystem structure (i.e. food web biomarker stable isotopes, fatty acids, mercury). This provides a baseline understanding of the food web. To date, a total of 18 fish species have been collected in the Mackenzie Estuary coastal system and 13 fish species have been collected from the marine coastal system for morphometric (e.g. condition measurements), food web and biomarker analyses.

In early phases of the CIMP community monitoring program, communities requested better incorporation of their knowledge in monitoring programs. As such, we have developed a means to focus on the collection and inclusion of local observational data on beluga health and habitat as part of the monitoring program. This effort will define key local observation indicators that will be built into long term monitoring programs.

While we are largely focusing on belugas and fish as VECs in our monitoring programs, key species may be absent that may indicate changes in the ecosystem. To address this, we are using a Beaufort Sea ecosystem model (Ecosim with Ecopath) to evaluate species sensitivity, keystone and redundancy to identify new species requiring monitoring (e.g., key benthic invertebrates). This model will also support the ability to simulate changes in the ecosystem due multiple stressors. Together, these efforts support a streamlined approach to regional coastal ecosystem monitoring for the Inuvialuit settlement region.

#### Presentation #12:

##### **Smallest voices – Shouts of change: Marine productivity in the coastal Beaufort Sea**

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Unseen molecules and microscopic organisms form the foundation of marine ecosystems. The “small voices” of marine ecosystems continue to be the best indicators of a changing Arctic. Cumulative impacts of climate change and those associated with industrial development will be first observed at the lowest levels of the marine food web.

Our research focuses on the foundation of water and sea-ice ecosystems including lower-trophic organisms such as phytoplankton, ice algae and bacteria. Our work also describes the chemical components that structure the water and ice habitat, including salinity, nutrients and key tracers of food webs and water origins. Since 2010 we have worked in the coastal Beaufort to enhance baseline knowledge of lower-trophic communities and food web interactions. We have worked to build capacity for lower-trophic monitoring through community visits, consultations, training and the development of monitoring tools for future community monitoring activities.

Work conducted as part of regional assessments (e.g. Arctic Coastal Ecosystem Studies (ACES) and Beaufort Regional Environmental Assessment (BREA)) has allowed us to assess key

indicators (e.g. nutrients and chlorophyll biomass) and emerging trends within the coastal Beaufort Sea. Our results contribute to management plans for the Arctic Marine Protected Areas and provide input for monitoring programs, including winter sampling. Recent observations of high productivity in the Beaufort can be used to inform adaptive management decisions given the potential for shifts in ecosystem resources under current rates of change or under future scenarios of cumulative impacts.

Presentation #13 (no abstract submitted):

**Arctic Borderlands Ecological Knowledge Co-op: A platform for community-based cumulative impact monitoring in the north**

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