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## 1.0 SYMPOSIUM PURPOSE AND OBJECTIVES

Understanding climate change impacts to Indigenous (First Nation, Métis, and Inuit) communities is a priority of the Government of Canada. Indigenous and Northern Affairs (INAC) has received new funding to support Indigenous communities in understanding climate change impacts to inform adaptation actions through community-based climate monitoring initiatives. Thus, upon the request, and with the financial support of the Indigenous Community-Based Climate Monitoring Program, the Centre for Indigenous Environmental Resources (CIER) hosted the National Indigenous Community-Based Climate Monitoring Symposium (November 7<sup>th</sup> – 9<sup>th</sup>, 2017, Winnipeg, MB).

This symposium brought together over 130 Indigenous participants (ranging from Elders, youth, community leaders, scientists, environmental technicians, and land managers), as well as government agency representatives (see Appendix A for a list of participants) working on, or interested in, Indigenous community-based climate monitoring.

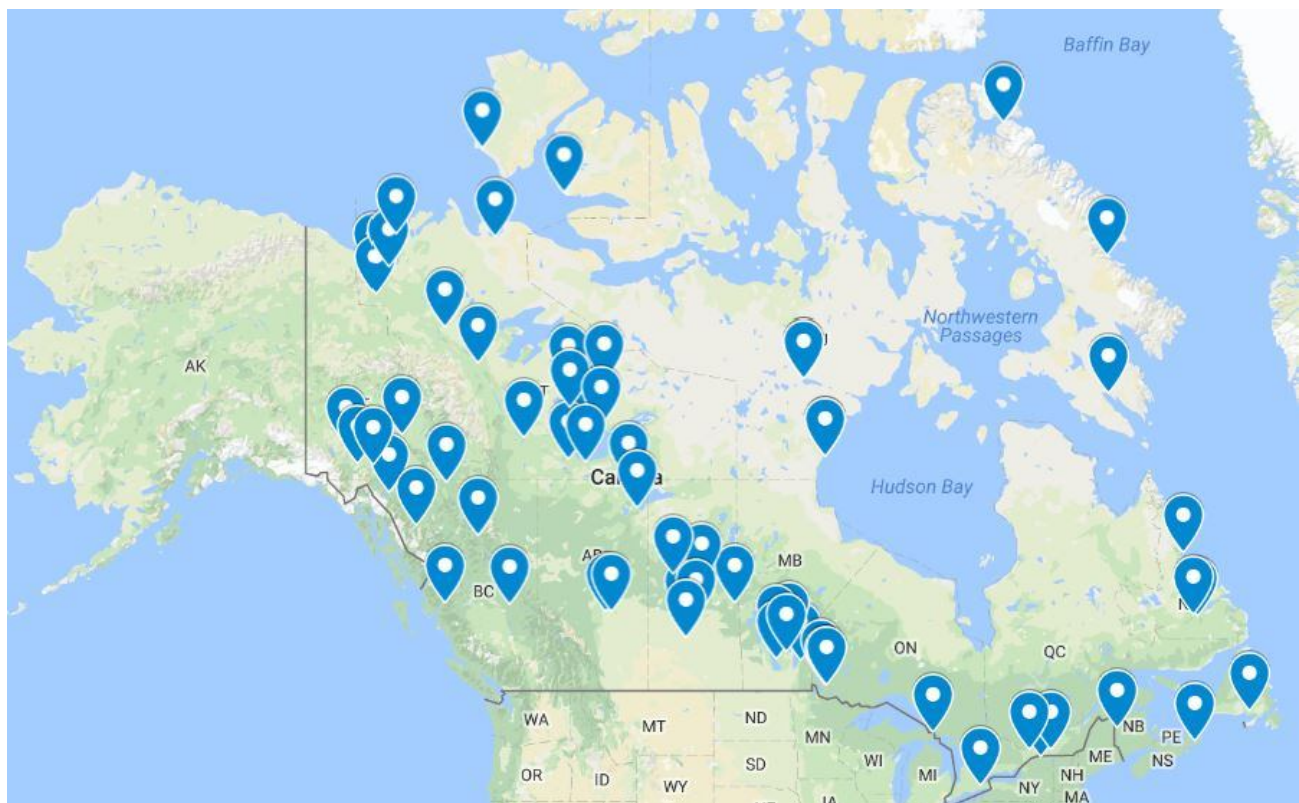


Figure 1: Map Representing Participants' Communities

The symposium objectives were to:

- Understand needs, interests and capacities for Indigenous community-based climate monitoring;
- Explore opportunities for and the connection between Indigenous Knowledge and western science climate monitoring data;
- Discuss data management platforms and analysis tools to transform data into useful information for decision-making;
- Provide insight on priority setting and development of the Indigenous Community-Based Climate Monitoring Program; and,
- Support networking opportunities for Indigenous communities to explore potential climate monitoring initiatives with other Indigenous communities, scientists and government agencies.

## 1.1 OVERVIEW OF SYMPOSIUM PROCESS

The workshop used a series of interactive presentations and break-out sessions to share knowledge and ideas and encourage dialogue (see Appendix B for the Save the Date and Appendix C for the Symposium Agenda). The interactive format encouraged participants to provide insight on priority setting and development of INAC's Indigenous Community-Based Climate Monitoring (ICBCM) Program; identify climate change impacts to Indigenous communities; identify regional priorities; explore monitoring project/program ideas; and, think about partnerships and possible regional collaborations.

Over the course of the symposium, Indigenous communities from coast to coast to coast shared their stories and reflections on climate change and/or their ICBCM initiatives. Government representatives from various Federal agencies provided presentations on the different climate change related federal programs, including:

- INAC's Community-Based Climate Monitoring Program;
- INAC's Northern Contaminants Program;
- Health Canada's Climate Change and Health Adaptation Program;
- Parks Canada Indigenous Guardians Pilot;
- Department of Fisheries and Oceans Indigenous Affairs – Aboriginal Fund for Species at Risk (AFSAR) & Aboriginal Aquatic Resources and Oceans Management (AAROM) programs; and,
- Environment and Climate Change Canada.

Further information on INAC's Community-Based Climate Monitoring Program is provided in Section 2.1. See Appendix D and E for Indigenous speaker biographies and contact/program information for Federal representatives, respectively.

The break-out sessions were organized in different ways (i.e., regionally; by the seven Ojibway teachings: Truth, Humility, Love, Courage, Respect, Honesty and Wisdom; and according to their role as a youth, Elder or technical representative) to allow for participants within and across regions and in various roles to have the opportunity to share experiences, learn from each other, and develop new relationships.

Throughout the two and a half days, participants were given the opportunity to take part in real-time polling to provide further insight and reflection on the symposium topics. These results are weaved throughout this report. A graphic facilitator also joined the group to capture the symposium discussions through graphic images, several of which are included in this summary. All symposium materials (e.g., presentations, notes from small group sessions, speaker biographies, symposium graphics, funding guidelines and other resources) are in this report and/or can be downloaded from <http://www.yourcier.org/indigenous-community-based-climate-monitoring-symposium.html>.

## **2.0 DAY 1: SYMPOSIUM SUMMARY**

The workshop started with an opening prayer from Elder Clarence Nepinak and water ceremony by Barbara Nepinak, Pine Creek First Nation, Manitoba. This was followed by welcome remarks from Mark Hopkins, Director General, Natural Resources and Environment Branch at INAC. Kate Cave, Project Manager for CIER and symposium facilitator, welcomed the group and discussed the purpose of the symposium.

The following provides a summary of the Day 1 symposium proceedings including a list of speakers, discussion on key questions from participants and a summary on the small break-out sessions.

Before the start of the presentations, we asked the participants to answer a live polling question about their current level of knowledge regarding Indigenous Community-Based Climate Monitoring (ICBCM). As Figure 2 illustrates, about 45% of the participants indicated "some" to "a lot" of knowledge regarding ICBCM. Only 11% of the participants had "no" knowledge regarding ICBCM prior to attending the symposium.

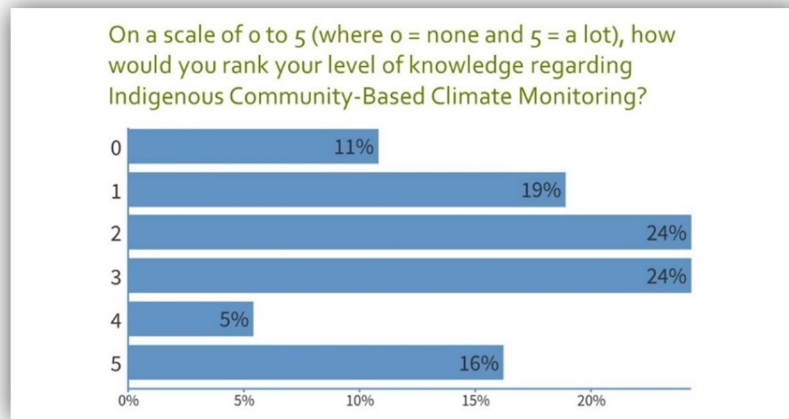


Figure 2: Level of Knowledge Regarding Indigenous CBCM

## 2.1 INAC'S INDIGENOUS COMMUNITY-BASED CLIMATE MONITORING PROGRAM

Marie-Eve Néron, Director of Climate Change and Clean Energy at INAC, gave an overview of the new Indigenous Community-Based Climate Monitoring Program. In Ms. Néron's presentation, she acknowledged that community-based monitoring (CBM) is nothing new - Indigenous Peoples have been using local environmental observations to make decisions for millennia, even if "monitoring" has not been the term used. She explained that CBM is a tool used by communities to gather information, both Indigenous Knowledge and/or western science, to support land-use planning, resource management, and climate adaptation. She also indicated that CBM can involve collaboration with external partners such as government agencies, academic institutions, and non-governmental organizations.

Ms. Néron provided some background on the Program. She explained that through the development of the Pan-Canadian Framework on Clean Growth and Climate Change, national Indigenous organizations identified two key needs: (1) community-based climate monitoring; and, (2) co-application of Indigenous Knowledge with western science and decision-making. In addition, there are significant climate data gaps in parts of Canada. For example, the lack of weather monitoring stations in certain regions may lead to unreliable climate projections and weather forecasts. To help address climate data gaps, INAC has received \$31.4 million over 5 years to implement an Indigenous Community-Based Climate Monitoring Program. The program has two main objectives:

- To support Indigenous communities in monitoring climate change impacts through documenting Indigenous Knowledge and climate information; and,

- To collect and share information to support climate change adaptation and help increase Indigenous communities' understanding of climate change.

### 2.1.1 Plenary Discussion

Participants had several questions and insights to share about INAC's ICBCM program, the impacts of climate change and ideas for future ICBCM initiatives. The plenary discussion began with a statement by one of the Elders that everyone is here because "we have embraced collaboration". INAC staff explained that the intent of this symposium is a discussion to help inform a path forward for the Indigenous Community-Based Climate Monitoring Program. Communities sought clarity on how they would have a say in defining and shaping the implementation of the program and that they wished their voices would remain independent. Some key comments raised by communities were about being in the 'driver's seat', the ability to determine what would be considered an ICBCM initiative and to implement these initiatives.



## 2.2 PANEL OF INDIGENOUS SPEAKERS

A series of presentations by Indigenous speakers working on CBM initiatives was provided during the morning of Day 1. The following is a list of the presenters, a summary of their presentations and a graphic illustration (Figure 3) of the topics they discussed and their stories.

### ***George Low, Dehcho First Nation, Northwest Territories***

George provided an overview of the Dehcho First Nation's Aboriginal Aquatic Resource and Oceans Management (AAROM) Program which is a Department of Fisheries and Oceans community based capacity building and collaborative management program that deals with Dehcho community concerns and issues regarding the aquatic environment and fish. The

program has established community-based research and monitoring projects in nine of their member communities. Twenty-two seasonal First Nation guardians are hired to patrol the waters. The guardians' record activity, survey anglers and harvesters, observe wildlife and assist researchers.

George discussed how climate change impacts the fish and fish quality due to the change in temperature and quality of water which may be attributed to a culmination of glacial melt and upstream developmental impacts. Changes in water temperature and turbidity alter spawning rates of fish and reduce their survivability in opaque waters.

The Dehcho AAROM Program plans to upgrade their existing guardians program to operate in all seasons and partner with academic institutions to conduct studies on climate change in their region.

***Peggy Pyke-Thompson, Mohawk Council of Akwesasne, Quebec***

Peggy Pyke-Thompson's presentation focused on three key statements:

"As Indigenous people, we are well aware that climate change is here and affecting our communities. We have seen this in the past, some 10- 15,000 year ago as the climate change occurring at the end of the ice age. This change is reflected in many of our stories and ceremonies.

We also know that climate change not only affects us, but also is having a dramatic impact on the animals and plants around us. Many species of flora and fauna will be, and are already, affected by climate change; forests will disappear from the southern extreme and slowly move northward. Dangerous insects are on the move and food plants that were once abundant will diminish. However, our people know how to adapt to these changes.

Using the skills of our ancestors, we will move forests northward, we will assist species at risk and we will try to maintain habitats already impacted by modern society".

***Henry Lickers, Mohawk Council of Akwesasne, Quebec***

"Climate Change is real and we have all the information we need to react to it". Henry talked about the Akwesasne Environment Program, established in 1975 and has been studying climate

change and its impacts on the community since its inception. Henry explained how Akwesasne's understanding of the issue extends to infrastructure, hazardous events, storm events and general governance structures of Council.

He spoke about how the Indian Act deals only with forests and aggregates (mining). The community must deal with 15 Federal Acts that have impacts on the Akwesasne community. With no funding for the communities, they are considered lawless and without regard for the Environment. Henry stated that "this couldn't be farther from the truth. Our culture, spirituality and governance center on the Environment and we must be responsible for our people, the animals and the plants around us. The children's story, 'The Three Little Pigs' can help show the effects of climate change and the world around us. Watch out for the Big Bad Wolf known as climate change."

***Chris Wilson, Haisla Nation, British Columbia***

Chris provided information on how the Coastal Stewardship Network was established and how the various Nations work together. In 2009, at a meeting in Prince Rupert, various First Nations from the central and north coast, including the Haida Gwaii, met and formed the Coastal Guardian Watchman Network (now the Coastal Stewardship Network). At this meeting, the communities decided to set aside political and territorial boundaries and to focus on data collection, agreeing to collect data in the exact same manner.

The Coastal Stewardship Network staff developed the regional monitoring system, which has evolved from 'rite-in-the-rain' forms to electronic forms (e.g., Trimble units, then android tablets). The Network collects data on: sports fishing, tourism, enforcement, crab surveys, wildlife (terrestrial and marine), impacts to significant sites, eulachon, amongst others. Collected data is stored on the Android device, downloaded onto a computer and uploaded onto a server. There are always at least two copies of data. It was agreed that each community would only be able to view its own data, with limited data sharing.

The Coastal Stewardship Network provides consistent personnel coverage of most of the central and northern coast. The vessels used all fly the same Network flag and the majority of the communities use the same type of uniform with their community's crest as a distinguishing feature. The Network covers a significant area of the coasts and collects comprehensive data on a range of subjects.



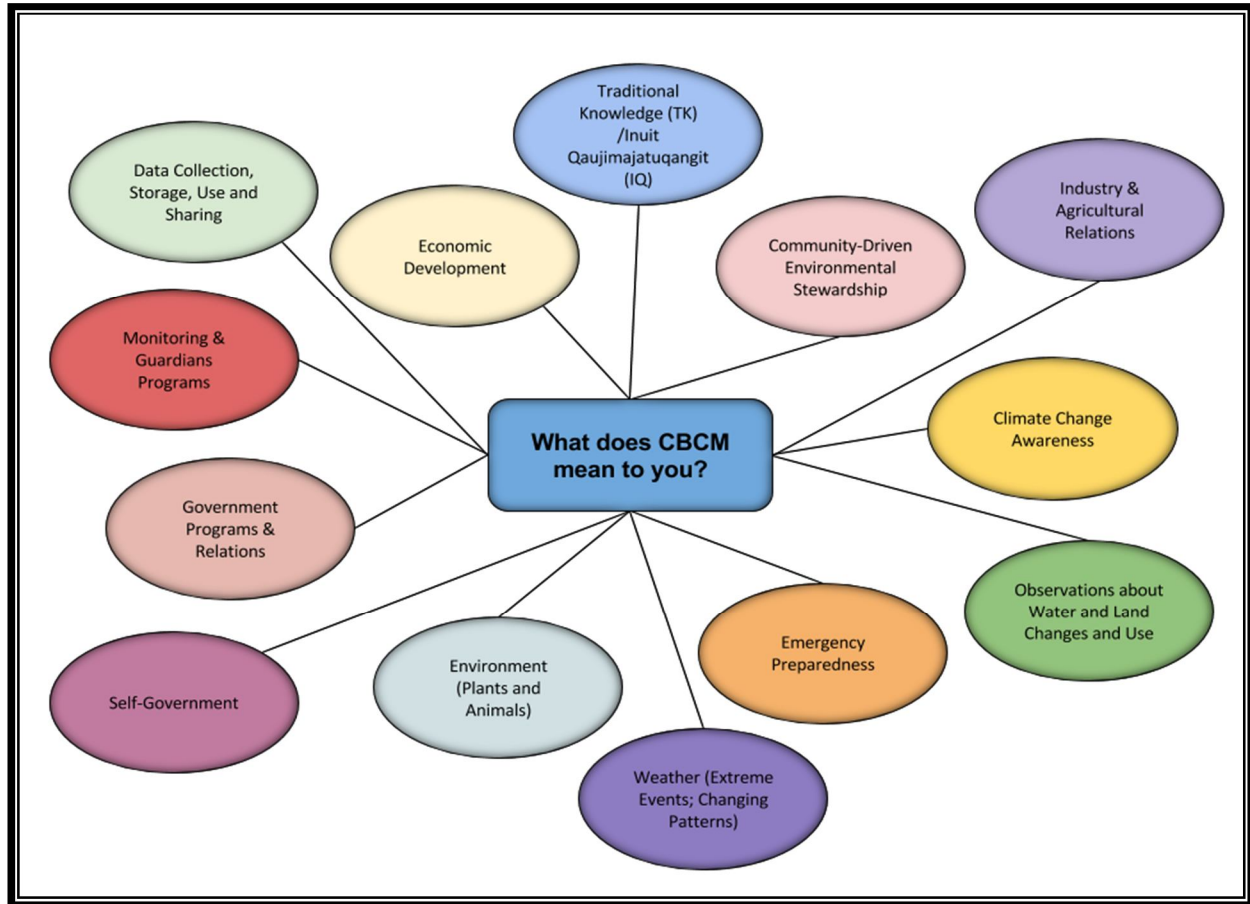


Figure 4: What Does CBCM Mean to You?

Overall, there were a few overarching messages that emerged from the discussions about what ICBCM means such as:

- The importance of identity and unity;
- Being our own guardians and controlling our own destiny;
- Being in the driver’s seat and being built at the community level;
- Guided by a community decision-making process for data collection and sharing;
- It is a form of self-governance;
- Collaboration is important;
- Youth are our future leaders; and,
- Giving a voice to the fish/wildlife/environment.

There were also several questions raised during small group discussions:

- How does climate change affect our environment, our wildlife, traditional lifestyle and harvesting activities?
- What is in the permafrost melt? Can it kill the animals/fish?

- Is the increase of vehicles and people in the north affecting the environment?
- What are the invasive fish species doing to our char population?
- Are we getting new insects that are affecting caribou and muskox?
- How much carbon is tied up in grasslands?
- How do we get long-term climate predictions?
- How can First Nations help existing monitoring networks?
- What can be done now to deal with future impacts?
- How do we standardize?
- Why is industry not paying?
- How to translate hunter knowledge into programs/databases?
- What is the growing grizzly population doing to our caribou and muskox?

## 2.4 KEYNOTE PRESENTATION

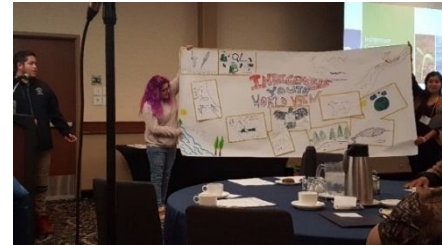
During lunch Matthew Issumatarjuaq and Jimmy Napayok, of the Young Hunters Program out of Arviat, NU, provided a short overview of the program and shared a video. The video is not publicly available online but it shared information about the program and how it has positively impacted the youth of Arviat, by reducing self harming behaviours/incidences of suicide through the intergenerational transmission of culturally important hunting skills and knowledge.

## 2.5 CONCURRENT SESSIONS

During the afternoon of Day 1, the participants participated in concurrent sessions organized based on role (i.e., youth, technical representative or Elder). Each session had a specific purpose and approach. The **youth** focused on visioning their involvement in the ICBCM movement, what that would look like and documenting their discussion through a parallel process of learning about visual scribing. The **technical representatives** were divided into several smaller groups to discuss the connections for both Indigenous Knowledge and western science in ICBCM; the collection and storage of data and the guidelines and protocols; and, data management platforms and analysis tools. The **Elders** focused on discussing what climate change means in their own language and the changes in climate and impacts that climate change has had in their communities. Several key messages emerged from the Elder session which are summarized in Section 2.5.3 below.

### 2.5.1 Youth Session

The youth session started with an introduction on "What is Graphic Facilitation?" which is the capture of conversation into a visual form, rather than just words. This type of skill is a great tool that can be used to explain or present concepts in an easy to understand, visually appealing format.



The youth then participated in a hands-on practice session. The participants partnered up and interviewed each other to practice listening skills and create a visual introduction which they then shared back with the larger group. The session finished by creating a large mural (Figure 5) that represented what ICBCM meant to the youth as the younger people in their communities. Each person created their own visualization that was added to the mural.



Figure 5: Indigenous Youth World View of ICBCM

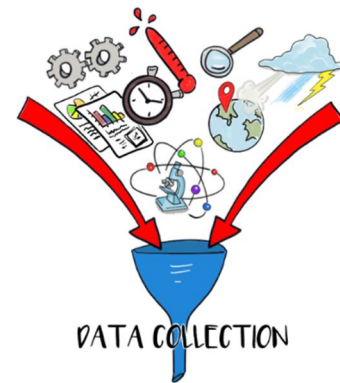
Following the session youth expressed their concern about being segregated for this session and would have preferred to be part of the general 'programming' to be fully engaged and to foster the Elder-youth relationships and intergenerational knowledge transfer.

### 2.5.2 Technical Session

For the technical session, the participants were organized into smaller groups to facilitate dialogue and allow for broader participation and learning. The discussion has been categorized into four main areas: data collection, data management and analysis, key challenges and, key principles for developing ICBCM programs. The following provides a summary of the key themes of each group. See Appendix G for additional notes on the four main areas.

### 2.5.2.1 Data Collection

The dialogue on data collection focused on what drives data collection; what should be monitored; how data should be collected; who should be involved; and, what CBCM data collection programs and tools already exist. There are several drivers that are initiating data collection (e.g., monitoring waterways, contaminants, exploration activities, fisheries) and areas of priority include monitoring animals for contaminants (e.g., caribou), ice thickness, and country foods.



Participants indicated that data collection starts with community discussions about concerns and priorities through interviews, meetings, and consultations surveys to guide land users in gathering information about the land and keeping track of animals, plants, and people in a holistic way. It is important that data collected by others (researchers, government, industry, etc.) is shared so communities can benefit. Participants also discussed different guardian programs (e.g., Department of Fisheries and Oceans Community Aquatic Monitoring Program; Canadian Aquatic Biomonitoring Network; Junior Ranger Programs) and tools (e.g., Survey123, ESRI, Cybertracker, SIKU, RAID-10, Lidar, drones) that already exist to support ICBCM.

### 2.5.2.2 Data Management and Analysis

The dialogue around data management and analysis led mainly to a set of key recommendations, including:

- Establish an Indigenous Circle of Experts for data interpretation/peer review;
- Establish a Tri-Council review process with women, youth and Elders;
- Coordinate regional data systems at a national scale;
- Coordinate a national workshop on data management;
- Develop a set of protocols for regional data sharing and that address intellectual property rights;
- Develop a national Indigenous app for guardians programs;
- and,
- Create culturally appropriate ways of sharing information, such as through stories and videos.



### 2.5.2.3 Key Challenges with Developing and Implementing ICBCM



The conversation on data collection, management and analysis raised several key challenges with developing and implementing ICBCM. One of the overarching challenges heard from participants was the lack of capacity among communities to participate in monitoring (training, sustainable funding, equipment, in-house expertise) and establish long-term monitoring programs. Specifically, in terms of data collection, there are challenges with the lack of baseline data; developing consistent methodology, protocols and standardization for ICBCM; and, the availability of easy to use tools for monitors. Regarding data management and analysis, there is poor communication and collaboration with others (researchers, government, industry) on how existing data is being used, where it is being stored, and who has access to it. Data are often misrepresented and misinterpreted and it is hard to

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*"Monitoring data is like a fine wine, the older it is and the longer it's done,  
the more valuable it becomes." Symposium Participant*

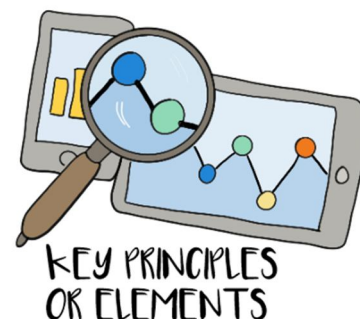
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bring ICBCM to a national level to affect policy.

### 2.5.2.4 Key Principles for ICBCM

Several key principles for ICBCM can be gleaned from the conversation on data collection, management and analysis:

- Follow OCAP principles (ownership, control, access, possession);
- Address concerns about proprietary information to ensure community buy-in;
- Establish mechanisms to safeguard data;
- Always involve youth and Elders and encourage unity between communities;
- Establish fluid communication and information sharing at all scales (local, regional, national, international);
- Develop a data validation process;



- Recognize Indigenous Knowledge and western science as having equal value; and,
- Communicate data in accessible ways (e.g., newsletters, social media, meetings).

### 2.5.3 Elder Session

The goal of the Elder session was to create an Elders “vision statement” that would guide the ICBCM program. Given the diversity and unique perspectives of the Elders from coast to coast to coast, it was determined that in order to develop a robust all-encompassing vision statement from Indigenous Elders in Canada, that more time would be needed than the session allowed. Thus, the Elder session focused on capturing what climate change means in traditional languages and discussing the climate change impacts that Elders have seen in their communities.

The Elders were asked to write what climate change means in their own language as an effort to understand what this term means to various Indigenous communities. The process was challenging because many Elders are fluent but unable to dictate their language in written form. Videos were taken of several Elders on the verbal pronunciation of climate change and some Elders were also able to provide the written form. It was explained to the facilitators that when you translate traditional languages to English form, the spirit of the language is lost.

Following this exercise, the Elders discussed the changes in climate and impacts that climate change has had in their communities. Many Inuit and Elders in the Northwest Territories have observed changes in salt water (less salt) and its impact on the aquatic diversity of species, where more species that are salt-loving are disappearing and more species that are freshwater species are migrating to the ocean waterways. Salmon populations are increasing in numbers where predominately char populations are found and this is a concern for the northern Indigenous Peoples. Southern Ontario First Nations are seeing a gradual shift in the viability of tree species due to climate change and are working together with tribal communities in the United States to study how to ‘walk trees’ northward. These are only a couple of examples of Elders observations. See Appendix H for detailed notes on the summary of the Elder group discussion. Figure 6 provide a graphic illustration conveying the key messages from the Elders.



Figure 6: Graphic Illustration of Elders Session

## 2.6 CLOSING ON DAY 1

Participants were asked to provide one piece of knowledge that they learned during the course of the first day. As summarized in Figure 7, many of the participants focused on networking, collaboration and partnerships with several learning about climate and the importance of leadership in ICBCM. The first day of the workshop ended with a networking session to provide an opportunity for participants to continue learning about CBCM initiatives, build relationships and partnerships and talk with INAC representatives about the Indigenous Community-Based Climate Monitoring Program and other INAC climate change programs.

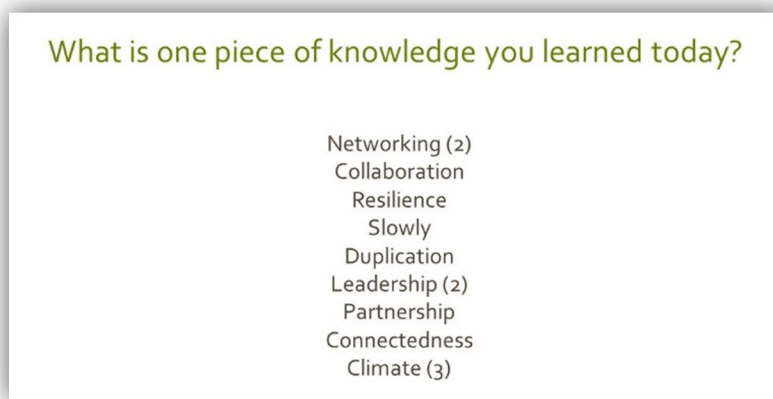


Figure 7: What Participants Learned on Day 1

### 3.0 DAY 2: SYMPOSIUM SUMMARY

As Day 1 was intended for Indigenous participants only and there were several new participants and government representatives on the second day, Kate Cave began the morning by providing opening remarks and a summary of the discussion from Day 1.

#### 3.1 PANEL OF INDIGENOUS COMMUNITIES FROM ACROSS DIFFERENT REGIONS

A panel of Indigenous speakers shared their stories on ICBCM projects in which they are involved. The following is a list of the presenters, a summary of their presentations and a graphic illustration (Figure 8) of the topics they discussed and their stories.

##### ***Tanya Ball, Dena Kayeh Institute, BC***

Tanya provided an overview of the Dena Nan Yáďá' Kaska Land Guardian Program. The program employs guardians in Lower Post, BC whom conduct activities such as:

- Conducting field patrols for wildlife monitoring, water sampling, data collection, game checks with British Columbia and monitoring high cultural use areas;
- Establishing wildlife health programs with sample kits;
- Providing community and public education (wildlife harvest surveys, community meetings, handing out brochures, meeting with hunters);
- Collaborating with neighboring First Nations (training opportunities and wildlife management);
- Developing and maintaining a community freezer; and,
- Promoting relationship building with other land users- mushroom pickers and resident/non-resident hunters.

Data collected during field patrols is logged as a survey and uploaded with the use of Survey 123 Connect for ArcGIS. Surveys have been documented for butterflies, birds, insects, frogs, toads, climate change observations, environmental concerns, hunter patrol, morel mushroom monitoring, plant, fungi, Indigenous Knowledge observations, wildlife questionnaires, and harvest surveys. A number of the surveys were conducted in English and in the Kaska language in the identification of wildlife and aquatic species.

Key messages from Tanya were to learn from our Elders and remember the ways of our ancestors, instill Indigenous Knowledge and language within our children and use Indigenous Knowledge and science to inform land management.

***Donna Carroll and Patricia Nash, NunatuKavut Community Council, Newfoundland***

NunatuKavut means "Our Ancient Land" and is home to the Inuit of NunatuKavut, the Southern Inuit, who reside primarily in southern and central Labrador and includes 30 coastal Inuit communities. The NunatuKavut Community Council integrates Indigenous and western science by working with Elders and knowledge holders, and collaborating with academic and government researchers, and non-governmental organizations. The NunatuKavut Guardian program is a model in eastern Canada which incorporates the knowledge of Inuit Elders and working with youth. Guardians are essential to monitoring environmental conditions, ensuring compliance, and for outreach and education. Indigenous groups increasingly require the capacity and resources to respond to change.

Implementation of the national DFO Aboriginal Fisheries Strategy (AFS) & Guardian Program in NunatuKavut involves a two-pronged approach for resource management which includes the participation of four guardians, three fishery stewards and over a thousand fishers. The team conducts studies on fish and fish habitat, monitoring the Mealy Mountain caribou herd, polar bear safety workshops, polar bear monitoring and research, spill site monitoring and monitoring persistent plastics recovered in harvested foods.

***Leon Andrew, Camilla Rabisca, and Johnathan Yakeleya, Tulit'a Northwest Territories***

Community members from Tulit'a, Northwest Territories discussed the observed changes that they are seeing in the Sahtú Region that they believe are related to climate change. They indicated that it is important to document observations and discuss them with scientists. If a record is collected then it is possible to plan for the future. Three main environmental changes were discussed which include changes to the ice, water cycles, and the abundance of insects and birds. Elder Leon Andrew shared a historical comparison of how ice, water and bird and insects were before compared to what he is seeing happening now:

"I have been travelling to Shúhtaot'İnẹ Nẹ nẹ (my traditional territory in the Mackenzie Mountains) since 2007, and I've seen how fast the glaciers are melting, and how the permanent ice patches are shrinking and disappearing; this is affecting our mountain caribou that seek

refuge there from heat and bugs in the summer. Also, the spring breakup on the Mackenzie River has become very different; as soon as it gets warm, it turns into slush or crushed ice instead of breaking into big blocks as it used to, like a big puzzle.

On Begáhdé (Keele River) and Dəho (Mackenzie River) the water cycles have changed. The water doesn't go down late in the summer like it used to. The water is siltier than it used to be during that time of year.

The little land birds seem to be getting wiped out. During the mid-70s, a lot of little birds came up north and a big snowstorm killed many of them. Since that time, it seems that we have been getting fewer and fewer of those little birds. It has become quiet in our forests.”

Jonathan provided a high-level summary of the communities three year project (2014-2017) to design and test a wildlife track monitoring program that could be used by communities, industry and others to inform wildlife managers about the abundance and distribution of mammals in a region. Elders and youth from Tuli't'a and Norman Wells participated in the program with leadership support from the Tuli't'a Renewable Resources Council. Twelve wildlife species were identified in three years of tracking, with marten, moose and lynx being the most common. Results were used to determine the level of effort that would be required to detect a significant change in wildlife distribution. In the future, the program could be rolled out in other communities and with industry to monitor regional changes in wildlife distribution.

***Calvin Waquan, Councillor, Mikisew Cree Nation, Alberta***

Calvin introduced the Mikisew Cree First Nation (MCFN) CBM Program which has been in operation since 2008. He discussed how they have taken a proactive approach to data collection through a CBM team and Environmental Guardians, all who are Mikisew members. This has allowed their traditional scientists and knowledge keepers to collaborate with western scientists to collect the necessary knowledge to inform decision-making. The CBM program's vision is for: healthy traditional lands that support MCFN members for the next seven generations.

Calvin highlighted changes his Elders have witnessed from industrial development, including: habitat fragmentation/ habitat changes/ habitat losses; an increase in observations of deformed fish; declining water quality; loss of peak spring floods and Peace Athabasca Delta recharge;

low water leading to lost access to traditional use areas, which impacts treaty rights; contamination of wild food; huge fish kills; large reduction of muskrats; and, large reduction of waterfowl/ division of flyways/ oiled ducks.

Calvin provided information on how the MCFN CBM was developed and operates. The program was spearheaded by Melody Lepine in 2008, who is a respected CBM leader both nationally and internationally. Mikisew land users and Elders developed the MCFN CBM program through Indigenous and environmental knowledge. The program has been managed by Bruce MacLean since 2011 and employs three members and one summer student. The program has an annual operating budget of approximately \$200,000, and funding is secured from various sources (government - 80%; foundation/university/industry – 20%). CBM information and results such as annual reports and calendars are provided on their website ([www.mikisewgir.com](http://www.mikisewgir.com)). The program is coordinated with neighboring communities (e.g. Athabasca Chipewyan First Nation and Metis communities) and conducts special research projects with government and universities. The MCFN CBM includes: monitoring water depth and quality, winter ice and snow, and wild food and fish; youth/Elder camps; an accredited environmental monitoring training program; muskrat surveys; a custom database; and a navigational hazard app, 'Geokeeper'.



Figure 8: Graphic Illustration of Panelists Presentations

### 3.2 SMALL GROUP DISCUSSION: PRIORITIZING INDICATORS, CAPACITY NEEDS AND CHALLENGES/OPPORTUNITIES

The participants were divided into four regions (north, central, east and west) to discuss prioritizing indicators, capacity needs, and challenges/opportunities. The groups were provided the following questions to guide their discussion:

- What **indicators are you monitoring or do you want to monitor** regarding climate change? How should they be prioritized (immediate or long term)?
- What are the **capacity needs** for these monitoring the prioritized indicators? What support would you need (partners, information, funds)?
- What are the **challenges** to completing these monitoring projects? How might they be addressed?

Section 3.2.1 provides a summary of each regional discussion. Section 3.2.2 focuses on a national overview, highlighting all the indicators into a table based on four key theme areas: air/water/soil; weather; flora and fauna; and, humans.

#### 3.2.1 Regional Discussions

Most of the groups had a lengthy discussion on prioritizing indicators – talking about what indicators they are using or would want to use to monitor climate change and how they should be prioritized. The west and east groups were together in one break-out room which led to a collaborative discussion on their coastal regions. The following table highlights the main discussion points from each group. See Appendix I for further information.

*Table 1: Summary of Regional Discussions*

<b>NORTH</b>
<ul style="list-style-type: none"> <li>• The group discussed a variety of indicators that can be categorized into the following areas:                             <ul style="list-style-type: none"> <li>○ <b>Air/Water/Soil:</b> salinity; water (rivers, oceans, streams) quality, quantity, depth, sediments and temperature; air quality, temperature and noise; soil/land erosion; soil quality, depth and sustainability</li> <li>○ <b>Environment:</b> ice thickness; weather (rainfall measurements and levels of contaminants); wind; fires; permafrost; tree rings (reporting on healthy and burnt trees)</li> <li>○ <b>Fauna:</b> animal behavior (e.g. birds, insects, marine); migration patterns (e.g. caribou); wildlife health (e.g. sheep, caribou, moose, wolves); calving grounds;</li> </ul> </li> </ul>

- quantity and distribution of mammals and birds; country foods; fish sampling (e.g. arctic grayling); benthic invertebrates upstream and downstream
- **Flora:** new species and changes in plants; traditional medicines
- **Humans and development:** monitoring trails and transportation routes; chemicals such as arsenic leaking into water and animals; impact of exploration on wildlife migration; increase in marine transportation and impact on marine mammals and water quality
- The group prioritized several indicators:
  - **Immediate/short-term:** slumping (wash outs in the Mackenzie River); water quality; invasive species; seasonal changes impacting trapping activities; ice thickness
  - **Long-term:** slumping; water level monitoring; quality of fish habitat; seasonal changes impacting trapping activities

### CENTRAL

- First Nations should be setting the priorities.
- Recommended looking at the [Haudensaunee Thanksgiving Address](#), ceremonies and Treaties for the indicators that Indigenous communities could be using.
- Monitoring soil quality was one specific indicator raised by this group.
- The group suggested that it should be one person in each community versus numerous departments working on monitoring.

### WEST and EAST

- The group discussed a variety of indicators that can be categorized into the following areas:
  - **Air/Water/Soil:** sea level rise; erosion; ground and lake water quality, depth, levels; aquifer recharge; winter ice quality; permafrost depth; air quality; environmental changes
  - **Environment:** weather (wind, severe storms, temperature, precipitation/rainfall, snowfall); ice thickness and glaciers; pollution
  - **Fauna:** behaviour; distribution; quality and quantity of various species including insects, wildlife, fish, mammals, birds, invertebrates; invasive species (e.g., beech beetle, striped bass); water ticks
  - **Flora:** vegetation; berries/medicinal plants (harvesting times, quality and quantity); trees/culturally significant plants; quantity of fungi
  - **Humans:** health of people and community; food security; human activity (adaptation)
- Prioritizing indicators
  - This will depend on each community's context and needs
  - Human health is critical
  - Networking and collaboration is important as upstream activities effect downstream
  - Prioritize through a guardians program

### 3.2.2 National Overview

As there was cross-over between the regions on the indicator discussion, Table 2 below summarizes the indicators based on four key theme areas: air/water/soil; weather; flora and fauna; and, humans. Several groups expressed that Indigenous communities should be setting the priorities for the indicators as it will depend on each community’s context and needs. However, a couple groups did note a few immediate indicators or important elements to consider when prioritizing: invasive species taking over local species; slumping and landslides; thin ice and impacts on transportation routes and safety issues; and, wildlife monitoring and migration patterns.

Table 2: National Overview of Prioritizing Indicators

AIR/WATER/SOIL	FLORA and FAUNA
<ul style="list-style-type: none"> <li>• Snow depth; and snow pack analysis</li> <li>• Lake depth</li> <li>• Water quality, temperature, volume, flows, depth (channel making)</li> <li>• Aquifer recharge (ground water)</li> <li>• Contamination and chemical levels in sediments</li> <li>• Soil quality and sustainability</li> <li>• Sea level rise</li> <li>• Permafrost depth</li> <li>• Air quality</li> <li>• Slumping (wash outs), erosion, landslides/falls</li> <li>• Salinity (oceans is not as salty which is changing the ecology and diversity of species)</li> <li>• Ice thickness and glaciers</li> </ul>	<ul style="list-style-type: none"> <li>• Quantity and quality of wildlife (health, migration, behaviour)</li> <li>• Wildlife health and contaminants (bone, hair, blood, fat, brain and liver)</li> <li>• Location and counts of mammals and birds</li> <li>• Benthic invertebrates – upstream and downstream</li> <li>• Species at risk</li> <li>• Immigration of new species to the area</li> <li>• Invasive species taking over local species</li> <li>• Trees and culturally significant plants</li> <li>• Birds</li> <li>• Fish and small fish (diversity, quantity, quality, stock surveys, mercury levels)</li> <li>• Berries and medicinal plants</li> <li>• Insects – populations and links to human health issues</li> <li>• Fungi (quantity and timing)</li> </ul>

WEATHER	HUMANS
<ul style="list-style-type: none"> <li>• Severe storms, active weather</li> <li>• Ambient temperature</li> <li>• Precipitation</li> <li>• Length of seasons</li> <li>• Wind and fire</li> </ul>	<ul style="list-style-type: none"> <li>• Health of people</li> <li>• Food security</li> <li>• Human activity – how have we been adapting?</li> <li>• Community health</li> <li>• Air quality and noise</li> <li>• Trapping activities (changes due to seasonal changes)</li> <li>• Monitoring trails and transportation routes and safety</li> <li>• Shipping and impacts on water quality</li> <li>• Pollution; chemicals being used by humans</li> </ul>

### 3.2.3 Capacity Needs

Across the regions, there were eight cross-cutting themes regarding capacity needs for developing sustainable ICBCM: technical resources, communications, networking, youth engagement, Elders, funding, human resources, and training. Figure 9 illustrates the eight themes and Table 3 provides further discussion points on each theme. One of the fundamental principles that was raised by multiple groups is to ensure that the program approach is tailored accordingly to meet the community's capacity needs.

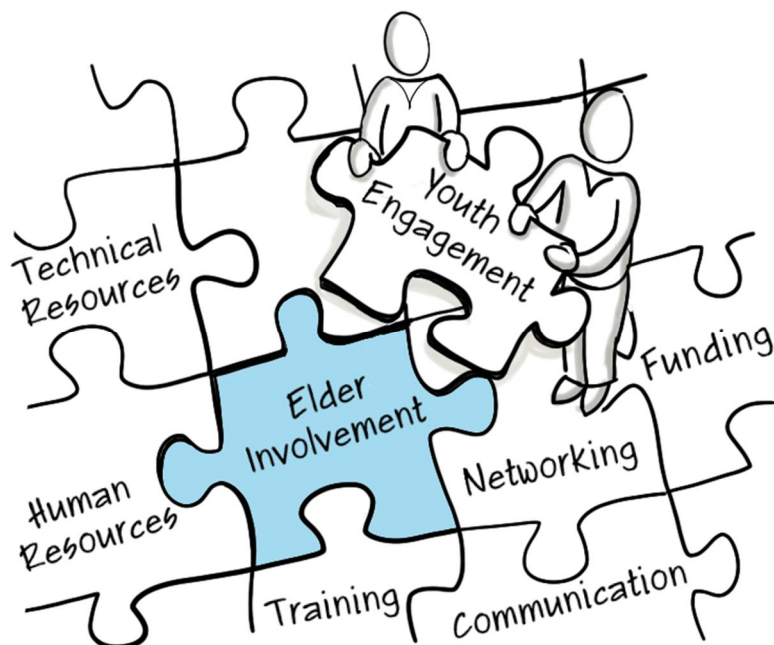


Figure 9: Crosscutting Themes Regarding Capacity Needs

Table 3: Discussion Points on Key Capacity Building Requirements

Theme	Discussion Points
<b>Elder Involvement</b>	<ul style="list-style-type: none"> <li>• Properly compensating Elders for their time and sharing of knowledge and ensuring that their participation does not negatively impact pension payments</li> <li>• Elder-led ICBCM initiatives</li> <li>• Develop an Elders council</li> </ul>
<b>Youth Engagement</b>	<ul style="list-style-type: none"> <li>• Knowledge transfer between youth and Elders</li> <li>• Develop ways to involve youth in school</li> <li>• Develop a youth council</li> <li>• More scientific teachings for youth to understand climate change</li> </ul>
<b>Networking</b>	<ul style="list-style-type: none"> <li>• Regional and national gatherings for information sharing and exploring partnership opportunities</li> <li>• Develop partnerships with academics and government agencies</li> </ul>
<b>Human Resources</b>	<ul style="list-style-type: none"> <li>• Technical (e.g., conservation officers; monitors)</li> <li>• Facilitators to provide training</li> <li>• Scientists to visit communities to teach youth</li> </ul>
<b>Training</b>	<ul style="list-style-type: none"> <li>• Community-based climate monitoring</li> <li>• Proposal writing</li> <li>• Project and financial management</li> <li>• Mentorship program</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Sustainable, long-term/multi-year</li> </ul>
<b>Communications</b>	<ul style="list-style-type: none"> <li>• Externally Nation-to-Nation</li> <li>• Internally within communities</li> <li>• Different types of educational materials (e.g., newsletters, presentations)</li> </ul>
<b>Technical Resources</b>	<ul style="list-style-type: none"> <li>• Equipment and tools for CBCM (e.g., ocean mapping; user-friendly database; sampling equipment such as precipitation gauges, DGT's, PMD's, YSI's)</li> </ul>

### 3.2.4 Challenges

Several of the groups identified key challenges to developing ICBCM initiatives related to different knowledge systems, community engagement, and resources as listed below. Figure 10 illustrates the different challenges with further detail in the text below.

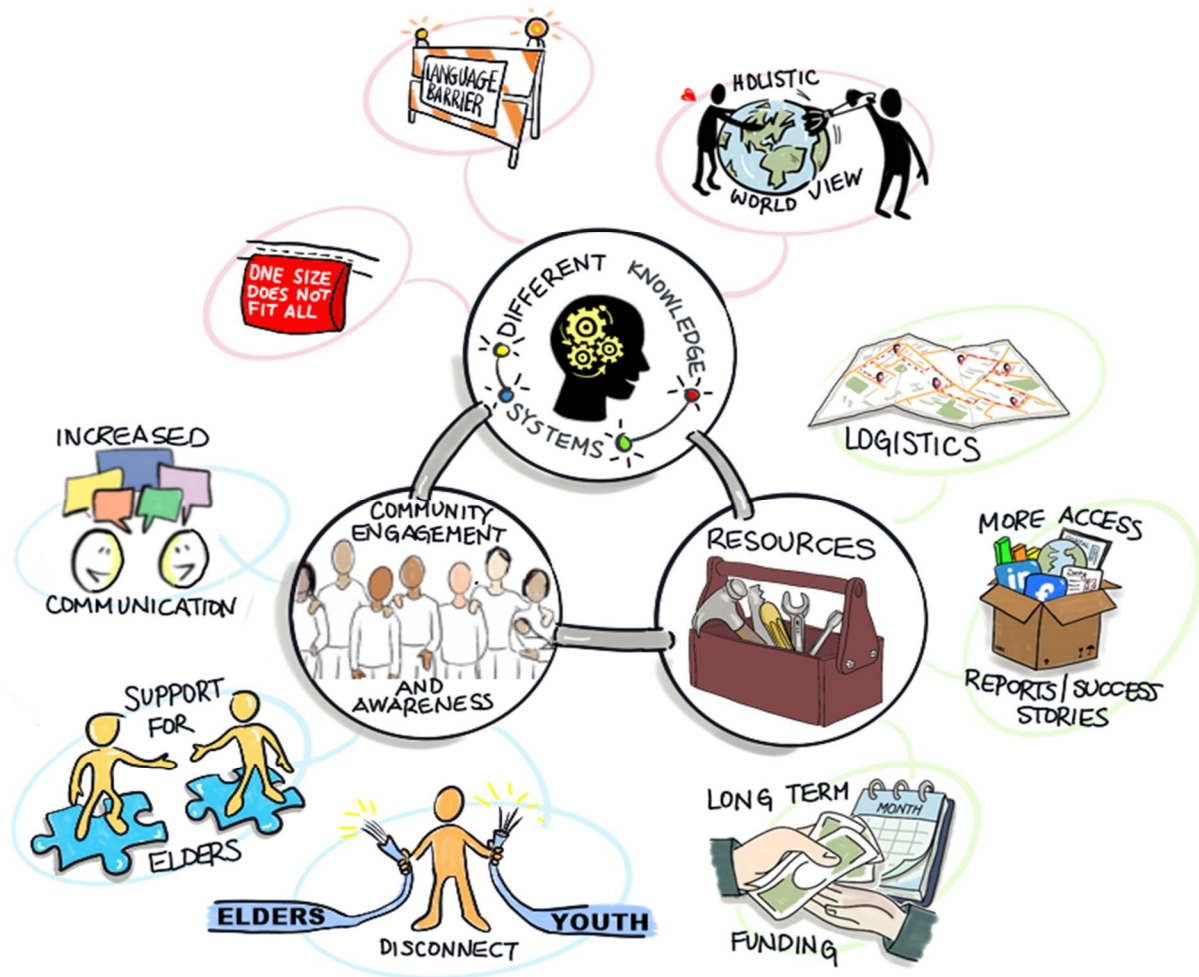


Figure 10: Challenges with ICBCM

- **Different knowledge systems**
  - Different nations, cultures, values and contexts require different approaches to ICBCM
  - Data/knowledge is not compartmentalized in Indigenous Knowledge systems (holistic worldview)
  - False dichotomy between Indigenous Knowledge and western science
  - Need mutual understanding and respect for Indigenous Knowledge and western science
  - Language barriers
- **Community Engagement and Awareness**

- Support for Elders (i.e., pension drops when they work on community projects; taxes are deducted)
- Elder-youth disconnect
- Need for increased communications with Elders, Indigenous Knowledge holders and/or community members
- **Resources**
  - Lack of capacity for facilitators to lead programs and provide training
  - Minimizing turnover of staff
  - Logistics
  - More progress reports, success stories and access to existing CBM program data
  - Commitment from government for long-term/multi-year funding
  - Getting results back from researchers
  - Developing programs where you can advance your CBCM skills and training

Participants identified a few ways to address challenges, such as, consistency on staffing and reporting, building government understanding and respect for Indigenous Knowledge, and applying a two-eyed seeing approach.

Following the discussion on capacity needs and challenges, participants were asked to answer a polling question to identify their top two needs for implementing an ICBCM project or program. As illustrated in Figure 11, 36% of the participants indicated sustainable funding as a top priority. Other priorities included equipment (12%); training, knowledge and citizen science (12%); human capacity (10%); and, CIER (7%).

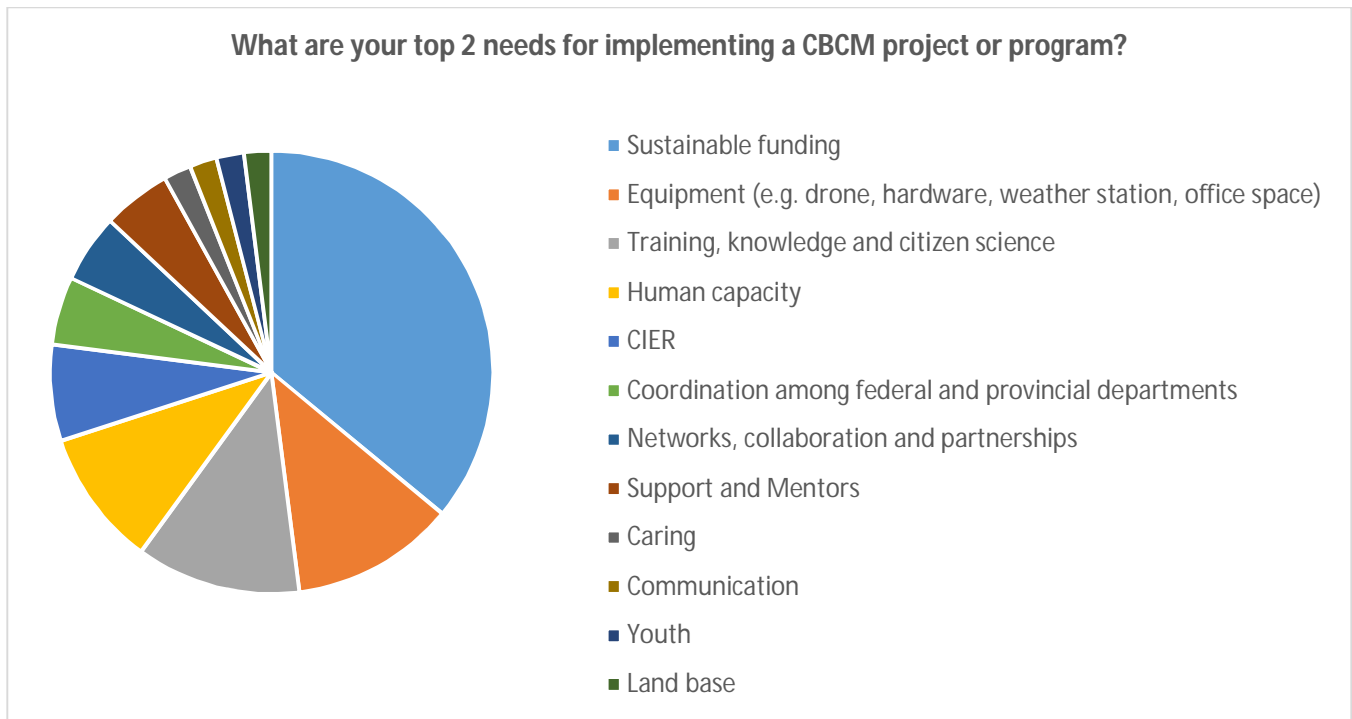


Figure 11: Top 2 Needs for Implementing a CBCM Project or Program

### 3.3 INUVIALUIT SETTLEMENT REGION PANEL

Shannon O'Hara, Inuit Research Advisor for the Inuvialuit Regional Corporation facilitated a northern panel of eleven Indigenous representatives from Inuvialuit Settlement Region to share their insights on community-based climate monitoring. The following is a list of the panelists:

- Raymond Ruben, Paulatuk
- Margaret Kanayok, Ulukhaktok
- Kyle Wolki, Sachs Harbour
- Lennie Emaghok, Tuktoyaktuk
- Albert Elias, Inuvik
- Chukita Gruben-Elias, Tuktoyaktuk
- Dougie Esagok, Inuvik
- Joshua Oliktoak, Ulukhaktok
- Nellie Arey, Aklvaik

The panelists discussed several different topics including how climate has been changing in the north, how climate change has impacted their way of life and various initiatives they have worked/are working on to address and adapt to climate change. Canada's north may be one of

the most impacted regions from climate change and this panel provided firsthand accounts of the changes occurring. The panelists welcomed open collaboration and provided an open invitation to anyone



interested in working with these northern communities. Key themes from their discussion were:

- **Climate change indicators** (e.g., soft ice, soft snow, different birds coming north, heavier rains, stronger winds, extreme storms, longer seasons, increase/decrease in animal and fish populations, erosion, landslides, rising water tables, floods, changes to animal species, introduction of new species to the area).
- **Impact of climate change to livelihoods** (e.g., creating hazardous conditions for Elders; unpredictable weather and increased forest and tundra fires affecting the environment and impacting travel and opportunities to fish and sustain themselves).
- **Various initiatives they have worked on** (e.g., national park to preserve calving grounds for caribou, marine protected areas, drawing comparisons between animal populations and weather, chasing polar bears out of the communities rather than destroying/putting them down). There was discussion about the Inuvialuit Regional Corporation has co-developed a regional climate change adaptation strategy and six individual community adaptation plans through a youth program from 2014-2016. This report is now available as a PDF and will be launched soon in the region.
- **Obstacles to developing and implementing CBCM initiatives** (e.g., financial obstacles in involving Elders).
- **Opportunities and principles to consider when developing and implementing CBCM initiatives** (e.g., equal participation from all partners, pass along knowledge and way of life to young people to help each other now and in the future in adapting to climate change).

### 3.4 TRAINING OPPORTUNITIES AND PROGRAMS

Shianne McKay, Project Manager at the Centre for Indigenous Environmental Resources (CIER), provided a presentation on training opportunities and programs that Indigenous communities might consider when developing an ICBCM program (see Appendix J for a list).

The presentation highlighted a selection of university and college programs (e.g., Aurora College's Environmental Monitor Training Program and Environment and Natural Resources Technology Program), certification opportunities (e.g., BEAHR environmental training programs, CABIN), and other tools and resources (e.g., Indigenous Guardians Toolkit, CIER's CBM software).

Following the presentation, participants were asked to answer a polling question about the kind of training they would like to see to implement an ICBCM project/program. As Figure 12 summarizes, there are four key areas of training Indigenous communities would like to see to implement an ICBCM project or program: professional development; youth; community specific training; and, other technical training. Based on the results, project coordination, logistics and management (professional development); youth engagement (including a high school monitoring program); and, specific technical training related to environmental and climate monitoring and data analysis, were most frequently raised.

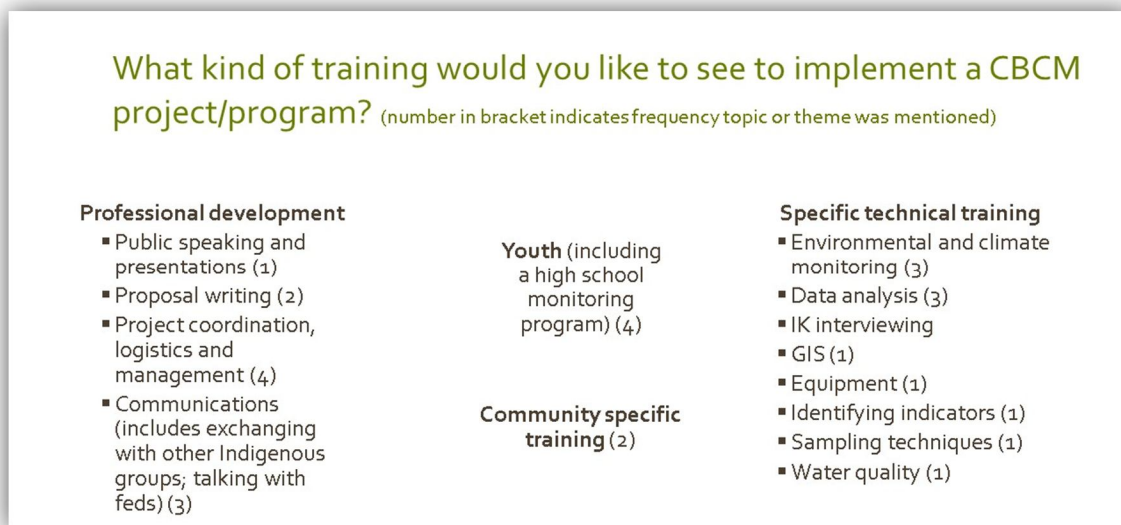


Figure 12: Training Needs for Implementing an ICBCM Project or Program

### 3.5 PANEL OF GOVERNMENT REPRESENTATIVES

Several federal government representatives provided short presentations on their respective programs and any upcoming funding opportunities to which Indigenous communities can seek support to undertake a climate change monitoring initiative. The following is a list of the speakers.

- Jim Frehs, First Nation and Inuit Branch, Health Canada (now Department of Indigenous Services Canada)
- Stephen McCanny, Natural Resource Conservation Branch, Parks Canada
- Tavis Findlay, Indigenous Affairs and Reconciliation Directorate, Department of Fisheries and Oceans
- Jamie Smith, Meteorological Service of Canada, Environment and Climate Change Canada
- Lo Cheng, Canadian Centre for Climate Services, Environment and Climate Change Canada
- Jason Stow, Northern Contaminants Program, Indigenous and Northern Affairs Canada
- Donald McLennan, Science and Technology Program, Polar Knowledge Canada

### 3.5.1 Plenary Discussion

Following the federal panel there was a short plenary discussion that provided the opportunity for participants to ask questions for clarification or reflect upon the presentations. The key message from this discussion was that participants would like to see more coordination between federal programs.

### 3.6 CLOSING ON DAY 2

The second day of the workshop ended with a polling question to the participants on what they are interested in learning or talking more about during the networking session on the final day (illustrated in Figure 13). The results from this polling question guided CIER and INAC in organizing the networking session on Day 3 (see Section 4.0). That evening there was a dinner buffet and traditional Métis dancing group provided by the Ivan Flett Memorial Dancers and United Thunder.



## What are you interested in learning or talking more about tomorrow during the networking session?


- More information and stories on monitoring of the ocean
- Monitoring of the ocean
- How can we collaborate on circumpolar regions issues and concerns?
- Apps to collect data
- Data access
- Digital field documentation
- Examples of how TEK and science were used together to better understand climate change
- Cier
- Having regional proposal writing workshops
- Moving forward how do we address such diversity
- Regional discussions
- Inuit outbreak groups
- Inuit specific discussion
- The Métis Nation
- Métis Guardian Pilot Program - Parks Canada 
- Métis specific CBCM event
- It is possible to have the same panel for tomorrow morning
- INAC programming
- Forward contact info to communities
- Funding contact info

Figure 13: Options for Networking Session

## 4.0 DAY 3: SYMPOSIUM SUMMARY

The third day was opened by two youth representatives, Alexandria Marie, Fort Smith, NT and Shane K Monague, Beausoleil First Nation, Ontario, whom are previous Youth Water Leaders for the CIER Project, “Our Water, Our Future”.

They talked about how the Youth Water Leaders Project inspired them to become environmental leaders in their communities. They stressed that now is the time for action, we cannot wait any longer. They indicated that they are and will be the voices for those that cannot speak.



### 4.1 NETWORKING SESSIONS

Based on the polling results from the previous day the following network sessions were provided for the participants: youth engagement; federal programming; Métis; Inuit; ocean monitoring and circumpolar collaboration; data apps, collection and access; and, CIER.

**Youth Engagement:** Give youth the opportunity to participate! Participants in this session talked about the need to increase youth involvement in ICBCM, by means of offering job shadowing and/or employment opportunities while attending high school and post-secondary. The youth talked about having “no choice” but to move away from their communities to seek employment as there are no job opportunities at home.

Many Elders joined the youth session to share their support for improved youth and Elder engagement, recognizing that there is a desperate need to transfer knowledge from Elders to youth before it is too late. Additionally, it was recognized that inherent in the knowledge transfer will be teaching of traditional languages and that this gap in knowledge is a direct result of residential schools. It was recommended that any CBCM initiative include Elders and youth, however, the youth raised concerns about Elders receiving tax penalties for their participation in federally funded initiatives. Youth suggested using Facebook as a communication/information tool for connecting with other youth. In terms of implementing CBCM projects, there were recommendations to consider the following:

- Include at least one Elder and youth in each CBCM initiative;
- Hire a youth coordinator/liaison in communities to coordinate CBCM initiatives;
- Integrate language and teachings into CBCM initiatives;
- Coordinate traditional cultural and language camps/hunts, potlucks/potlatch;
- Provide opportunities to talk about the experiences from residential schools; and,
- Include room for spirituality and prayer.

**Federal Programming:** This session was an opportunity for participants to learn more about federal funding opportunities related to climate change and CBM. In terms of format, the federal representatives sat at different tables and participants were free to move around the room to learn about the different programs. The discussions were centered on:

- Questions on program requirements;
- The need for improved coordination between federal programs;
- The need for improved outreach to raise awareness on federal funding opportunities; and,
- Questions around regional representation at the symposium.

**Métis:** The Métis group talked about the challenges with the Federal government and the lack of funding to Métis communities. It was recommended that the Federal government work with Métis to organize a symposium and develop Métis specific initiatives. In terms of implementing CBCM initiatives, the group identified the following:

- Need for funding and technical staff to develop projects;
- Increase youth engagement:
  - Importance of maintaining and teaching language to youth;
  - Develop a youth council;
- Accountability and transparency are really important;
- Teach history to Canadians – Métis were relocated and not compensated;
- Connecting youth to Elders; and,
- Use existing CBM initiatives as a starting point (e.g., wildlife management surveys in Manitoba).

**Inuit:** The Inuit group discussed the importance of improving networking across the North to facilitate information sharing and joint monitoring. The participants recommended several possible CBCM related initiatives, such as, the development of a user-friendly northern database, ocean mapping, and monitoring projects (e.g., caribou; impact of shipping, mining,

commercial activities on water quality; migratory fish species). The group also spent time talking about the INAC ICBCM program and offered several recommendations for moving forward with the programming structure:

- Make available in Indigenous languages;
- Be flexible enough to work with different groups in the communities;
- Align with land claim agreements
- Have regional coordinators who understand the regions to facilitate program implementation;
- Program should be over a long period of time; and,
- Develop a way to assess program results collaboratively with communities/regions to ensure it meets its targets.



**Ocean Monitoring and Circumpolar Collaboration:** The Ocean Monitoring and Circumpolar Collaboration group discussed different CBCM initiatives that are going on in the circumpolar area (e.g., changing animal ranges for moose and grizzly bears; monitoring mining activities and their efforts on the watershed and caribou numbers). Participants made the following recommendations in moving forward with other CBCM initiatives:

- Members from Indigenous communities should accompany government observers/monitors in the field to share knowledge and experiences;
- Importance of integrating Indigenous Knowledge and western science to help conservation and build trust;
- Explore parasites from permafrost melt; and,
- Inform communities about conferences, scientific conversations, so that they can contribute.

**Data apps, collection and access:** The Data Apps, Collection and Access group discussed different types of apps and tools available for data collection and mapping (e.g., ArcGIS, ESRI, Global Mapper, Google Earth, ebird, Trailmark, drones). The group talked about the lack of internet service and connection speed limiting communities' ability to access some of these tools. The group also spent time talking about sharing data (e.g. traditional maps shouldn't be shared, free data ownership, increasing the number of open source software applications).

**Centre for Indigenous Environmental Resources (CIER):** The CIER group talked about proposal writing and capacity building. In terms of proposal writing, the participants suggested

that CIER organize a webinar series to support technical staff in this process. Regarding capacity building, the group made the following two key recommendations:

1. Develop a program for communities to provide guidance and support on navigating funding programs; and,
2. Develop a protocol, based on the [First Nation principles of OCAP](#), for universities/researchers/non-governmental organizations that is customizable for establishing contact with Indigenous communities and ensures information/research goes back/stays in the community.

#### 4.2 INDIGENOUS PANEL – REFLECTIONS FROM PAST TWO DAYS

The third day ended with an Indigenous panel of speakers who provided their thoughts on the past few days. The following is a list of the panelists and a short summary on their reflections.

- Chris Martin, Six Nations of the Grand River, Ontario
- Melaine Simba, Ka'a'gee Tu First Nation, Northwest Territories
- Rainy Crane, Saskatchewan Aboriginal Land Technicians, Saskatchewan
- Albert Marshall Sr., Mi'kmaw Nation, Nova Scotia



The panelists reflected on several topics:

- **Observations regarding climate change:** weather shifting, invasive species, travel is becoming increasingly dangerous
- **Current initiatives or approaches:** take knowledge holders out when technical staff are working on monitoring/field work to teach each other, embrace the spirit of collaboration, exchange stories
- **Opportunities:** map changes on GIS software, identify ways to keep inventories of data, to be more reactive instead of proactive, two-eyed seeing might prepare us for the challenges to come

- **Challenges:** increase the involvement of youth, enforcement is difficult without capacity, manage data to improve availability and use

*“Through our inaction and silence, we have allowed our ecological integrity to be compromised.”*

*Albert Marshall Sr.*

The symposium participants also had the opportunity to add final comments to a “leave your mark” graphic (Figure 11) and answer two final polling questions.

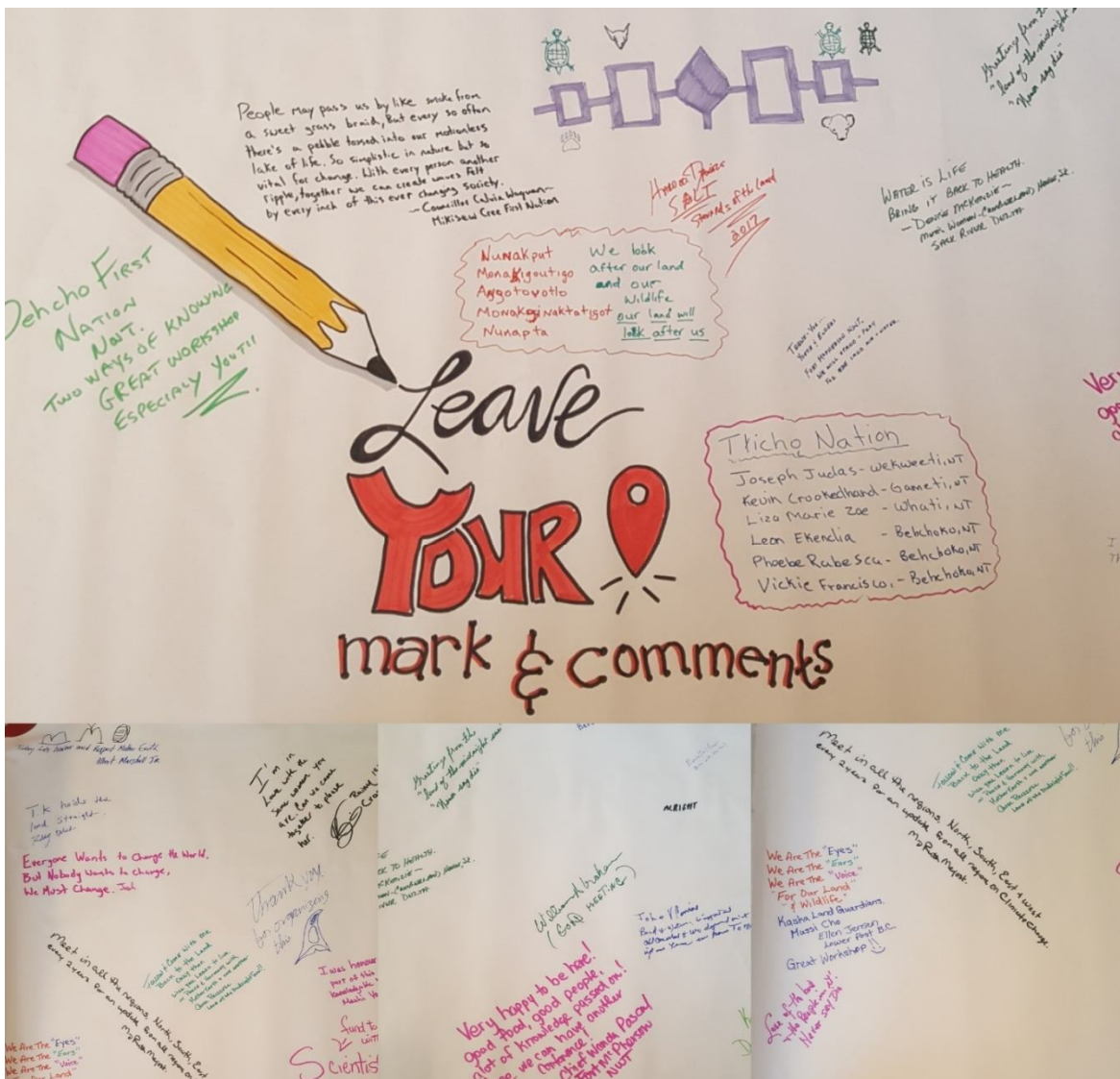


Figure 12: Leave Your Mark and Comments

Participants were asked to answer two last polling questions. One hundred percent of those who responded are in favour of attending another ICBCM symposium. Participants were also asked about what topics or themes they would be interested in learning more about or discussing further at future meetings. As summarized in Figure 14, the top 3 areas of interest are (1) data collection, sharing, storage and management; (2) Métis specific gatherings; and, (3) networking and collaboration.

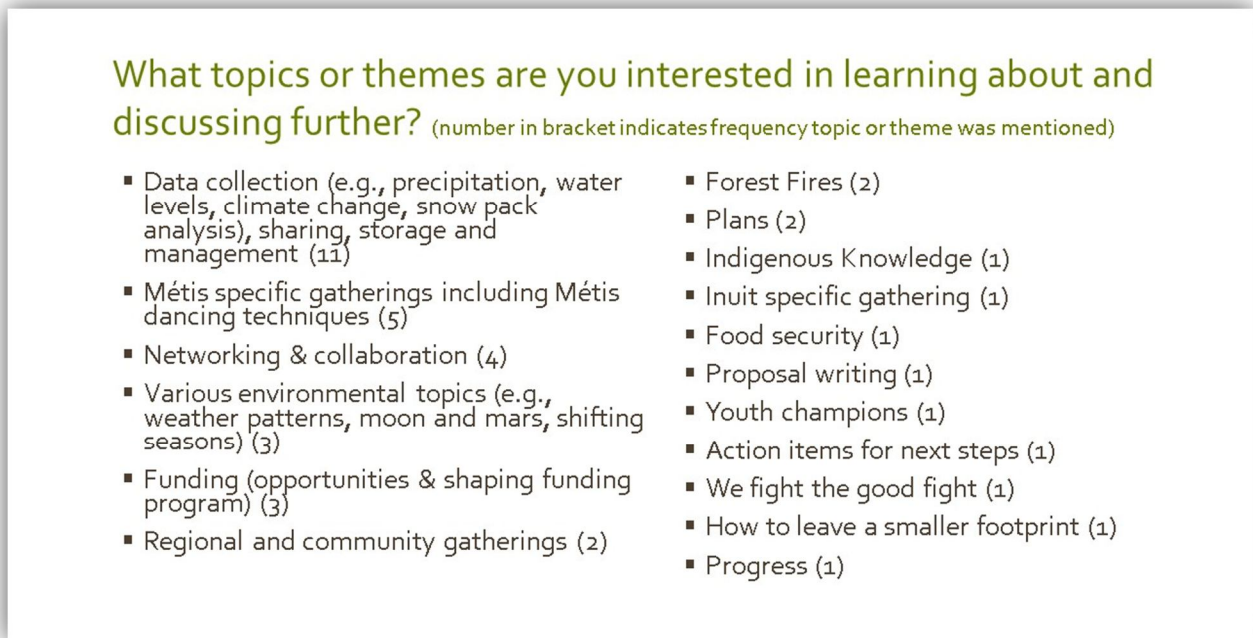


Figure 14: Future Topics or Themes for Discussion

### 4.3 CLOSING ON DAY 3

The three-day symposium closed with a few remarks and reflections from Marie-Eve Neron, Director, INAC Climate Change and Clean Energy Directorate. Henry Lickers, Akwesasne Elder, provided closing remarks and sent a reminder to participants to return home and embrace their loved ones, and to share what they've heard and learned over the past few days. Clarence Nepinak provided closing prayers and the symposium concluded.

## **5.0 WHAT WE HEARD**

The following section refers back to the symposium objectives to provide a reflection on what we heard from participants for advancing ICBCM.

### **5.1 UNDERSTAND NEEDS, INTERESTS AND CAPACITIES FOR ICBCM**

One of the key messages raised about understanding needs and interests for ICBCM, was about the importance of communities being in the ‘driver’s seat’ and being equipped to determine what would be considered an ICBCM initiative. This includes active community participation to ensure the community’s priorities and concerns are documented and access to and support for ICBCM training opportunities.

Participants highlighted the need for opportunities to facilitate knowledge transfer through various gatherings (e.g. Métis, Inuit, youth and Elders), online platforms and materials to learn from each other and share knowledge related to data management, protocols, tools and best practices. Internally, communities need communication materials that can be used at the community level to raise awareness about ICBCM (e.g., posters and briefing notes on symposium discussion; progress reports on program implementation on projects funded; summary of available government funding). Indigenous communities also need the capacity to provide opportunities for youth to connect with Elders and scientists to learn about both knowledge systems as it relates to climate change.

### **5.2 EXPLORE OPPORTUNITIES FOR AND THE CONNECTION BETWEEN INDIGENOUS KNOWLEDGE AND WESTERN SCIENCE CLIMATE MONITORING DATA**

While there was not a specific session on exploring opportunities for the connection between Indigenous Knowledge and scientific data, participants took the opportunity throughout the symposium to discuss the importance of recognizing the different types of indicators – both scientific data and Indigenous Knowledge – as part of developing an ICBCM program.

### **5.3 DISCUSS DATA MANAGEMENT PLATFORMS AND ANALYSIS TOOLS TO TRANSFORM DATA INTO USEFUL INFORMATION FOR DECISION-MAKING**

On the first day of the symposium there was a technical session that focused on discussing four main themes: data collection, data management and analysis, key challenges and, key

principles for developing ICBCM programs. We heard from participants about the lack of capacity among communities broadly to establish sustainable monitoring programs – from data collection to analysis and networking.

In terms of data collection, we heard that there are challenges with the lack of baseline data; developing consistent methodology, protocols and standardization for ICBCM; and, the availability of easy to use tools for monitors. The discussion on data management and analysis emphasized the need for Indigenous communities to meet and discuss further topics, such as data management and analysis, concerns about proprietary information, establishing mechanisms to safeguard knowledge (both Indigenous Knowledge and science data), and improving communication between Indigenous communities and others (researchers, government, industry).

Recommendations to support data collection, management and analysis among Indigenous communities with respect to climate monitoring in the future included:

- Explore opportunities to improve access to existing baseline data.
- Establish an Indigenous Circle of Experts for data interpretation/peer review.
- Establish a Tri-Council review process with women, youth and Elders.
- Coordinate regional data systems at a national scale.
- Coordinate a national workshop on data management.
- Develop a set of protocols for regional data sharing and that address intellectual property rights.
- Develop a national Indigenous app for guardians programs.
- Support communication and collaboration between Indigenous communities and others (researchers, government, industry) on how existing data is being used, where it is being stored, and who has access to it.

#### **5.4 PROVIDE INSIGHT ON PRIORITY SETTING AND DEVELOPMENT OF THE INDIGENOUS COMMUNITY-BASED MONITORING PROGRAM**

Participants voiced concerns that the funding for climate monitoring is insufficient. It was suggested that, as everything is connected, INAC should be looking at the supporting communities with their monitoring programs holistically. It was recommended by the participants that the government should increase accessibility to federal programs by working on streamlining federal funding processes.

The INAC ICBCM program needs to be flexible as different nations, cultures and contexts require different approaches. Monitoring a wide range of indicators would provide a better understanding of climate change and its impacts. The program needs to provide equal opportunity for all regions to participate in the program.

### **5.5 SUPPORT NETWORKING OPPORTUNITIES FOR INDIGENOUS COMMUNITIES TO EXPLORE POTENTIAL CLIMATE MONITORING INITIATIVES WITH OTHER INDIGENOUS COMMUNITIES, SCIENTISTS AND GOVERNMENT AGENCIES.**

The ICBCM Symposium brought together over 130 Indigenous participants (ranging from Elders, youth, community leaders, scientists, environmental technicians, and land managers), as well as government agency representatives working on, or interested in, ICBCM. We heard that the symposium provided the space to listen and talk about different Indigenous climate monitoring initiatives across Canada through case studies, networking and formal presentations.

Recommendations to support networking and collaboration among Indigenous communities with respect to climate monitoring in the future included:

- Provide Indigenous communities with support to continue networking and sharing best practices, to learn more about how other communities implement monitoring programs, how they keep them funded and what training is typically needed.
- Explore future events to help communities to learn from each other regionally and north-south (e.g., northern based – north of 60, Nunavut Inuit specific workshop).
- Support networking and conduct research to understand what exploration and shipping companies are doing and how they are impacting the environment.

### **5.6 ADVICE ON FUTURE WORKSHOPS**

Following the symposium, participants completed an evaluation and provided invaluable advice on organizing future regional and national gatherings. The participants found the following panels of presentations all very useful: Indigenous communities on CBCM; the various break-out sessions; the CIER presentation on training opportunities and programs; and, panel of government representatives about programs and funding. The reflection panel on the final day and polling questions throughout the workshop were received with a mixed response (mainly

neutral to very useful). The majority of participants found the workshop useful in increasing their level of understanding of CBCM and advancing their climate change work.

In terms of improving the delivery of future workshops, participants had the following suggestions:

- Ensure youth have the opportunity to network with Elders and technical staff through the sessions.
- Ensure representation from across Canada to the extent possible.
- Consider taping the symposium instead of just taking notes.
- Ensure meeting materials are circulated well in advance of the conference.
- Invite leadership and more local representatives from communities.
- More presentations from different regions and other experts (e.g., scientists).
- Make sure equal representation from across the regions.
- Provide sufficient time for participants to gather information locally that they can share at the meeting.
- Engage Indigenous women more around issues related to climate change.

## 6.0 NEXT STEPS

Information gathered through the symposium was used by INAC to refine the funding guidelines for the 2018-2019 ICBCM Call for Proposals for funding, including the key climate indicators, program eligibility requirements, and key project components. Information gathered through this symposium has highlighted the important monitoring which is already underway in many communities as well as gaps related to capacity, tools, networking opportunities, data management support and other areas. The meeting outcomes will help to guide investments to begin to address identified gaps while building from, and sharing, CBM successes. The outcomes from the symposium will be used to inform the development of future meetings and symposia. Indigenous Community-Based Climate Monitoring Program will be working to seek improved coordination among other Federal programs in support of community-based monitoring and climate programs to maximize the benefit of and improve accessibility to these programs for Indigenous communities.

The information shared through the symposium will be useful in guiding the long-term objectives of the program. As per the symposium recommendations, the Indigenous Community-Based Climate Monitoring Program will be working to ensure Indigenous Peoples shape program development and delivery to ensure the program is targeted toward their needs and context.. Continuing dialogue with Indigenous Peoples regarding the program structure as well as the priorities and approach of the program as a whole will be critical to long term success.

The Indigenous Community-based Climate Monitoring Program is continuing to dialogue with Indigenous Peoples to better understand and respond to their needs and priorities with respect to ICBCM. Specific areas of future work will include:

- Investigating best practices in the collection and use of Indigenous Knowledge in climate monitoring and co-application of Indigenous knowledge and science.
- Researching and providing communities with access to tools and resources to support ICBCM.
- Conducting a review of available data management systems to support Indigenous community-based climate monitoring;
- Seeking out and learning from other initiatives underway to better coordinate data management; and

- Convening a focused meeting to discuss opportunities to enhance data management systems and approaches to support community-based climate monitoring.

In addition, CIER is currently conducting a review and analysis of different CBCM training opportunities and programs and producing a report to share widely with Indigenous communities. CIER will also be developing a map of the initiatives that were shared at the workshop that will be available on the organization's website.