2022 Virtual Mackenzie Valley Resource Management Act (MVRMA) Workshop Series: Session 4: Climate Change

WORKSHOP REPORT

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Submitted To

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Executive Summary

Co-management Boards and the federal and territorial governments in the Mackenzie Valley typically host an annual workshop on the *Mackenzie Valley Resource Management Act* (MVRMA) for community representatives, Indigenous governments, and organizations as a key engagement activity to support an effective co-management system. Given the ongoing COVID-19 circumstances, the MVRMA Workshop Planning Committee chose to host a series of four virtual half-day workshops in 2022 rather than a single in-person workshop. The topics of the virtual workshop were based on a survey conducted in Fall of 2021.

The fourth and final instalment of the virtual workshop series was held on December 15 and 16, 2022. This session focused on climate change within the context of the MVRMA. The workshop was intended to:

- Share information about how:
    - The Mackenzie Valley regulatory regime is affected by climate change and how climate change is currently considered in the resource management decision-making processes;
    - climate change is impacting the Mackenzie Valley; and
    - industry is innovating to decarbonize and adapt to climate change.
- Discuss how Indigenous science is weaved with western science to inform and enhance decision-making related to climate change.
- Discuss opportunities for improving consideration of climate change in the Mackenzie Valley regulatory regime, including how climate change is integrated into Board and government decision-making.

For this session, 131 participants joined the virtual workshop on Day 1 and 113 on Day 2, representing government employees, co-management board members and staff, industry representatives, and Indigenous governments and organizations. The workshop included presentations, panels, virtual engagement tools, and open question and answer periods to explore, develop and clarify concepts within the workshop scope. See Appendix A for the Agenda.[1]

Day 1 of the workshop included a panel representing the MVRMA Boards, the Government of Northwest Territories (GNWT), and the Government of Canada to discuss climate change as it relates to the decision-making processes in the Mackenzie Valley. A keynote presentation explored climate change, permafrost, and impact assessment in the Mackenzie Valley and Western Arctic. Day 1 was concluded with a summary presentation on the Strategic Assessment of Climate Change (SACC) from Environment and Climate Change Canada (ECCC).

Day 2 of the workshop began with perspectives on the actions industry is taking to mitigate and adapt to climate change, and how these actions relate to the MVRMA. A presentation on weaving Indigenous science with western science to inform decision-making related to climate change set the stage for a panel of emerging leaders and Elders. This panel shared their perspectives on what support is needed from decision-makers in the face of climate change impacts. The panel also explored what the Mackenzie Valley should be striving for as it adapts to a

[1] NOTE: Appendices are found under a separate cover.

future with climate change.

Key takeaways from this Workshop include:

- Climate impacts are accelerating. The Mackenzie Valley area is one of the most rapidly warming regions of Canada. Observations on the land, including wildlife changes (e.g., fewer insects, new species), permafrost thaw, and slumping / ground subsidence, point to a transition from gradual to accelerating changes as well as extreme events (e.g., landslides caused by rainfall and thawing permafrost).
- MVRMA decision making requires robust information and clear direction. Long-term climate projections are less certain, which presents a challenge for decision makers. MVRMA decision-making processes require realistic project timelines as well as policy direction to make consistent and informed decisions (e.g., on long-term mine closure solutions). MVRMA Board decision makers also require more direction from the federal and territorial governments on how to regulate projects with carbon emissions. Water management planning must consider that extreme events (e.g., extreme rainfall events) will become more frequent.
- Indigenous Knowledge complements western data. Indigenous people are excellent observers and interpreters of change in the environment. Indigenous Knowledge provides detail that is critical for verifying climate models and evaluating climate change scenarios. Indigenous Knowledge also provides observations of changing landscapes, including increased instability and subsidence of the land, that can inform project decision-making (e.g., project location).
- The transition to a low carbon economy presents new opportunities for the NWT. Access to critical minerals will play an important role in the transition to a low carbon economy; for example, to shift away from combustion vehicles to electric vehicles. The growing demand for critical minerals presents an opportunity in the NWT, and greater leverage of these opportunities could be achieved by moving past Impact Benefit Agreements to Indigenous ownership (and equity stake) and Indigenous representatives on company boards. Industry also seeks more regulatory support for timely approval of green power.
- Collaboration is needed. Climate change is a collective problem, and we need to work collaboratively to identify and achieve meaningful solutions. Collaboration between federal and territorial governments, the Land and Water Boards, MVEIRB, industry, and communities is critical to help address the climate change crisis.

Introduction

Co-management Boards and the federal and territorial governments in the Mackenzie Valley host an annual workshop on the *Mackenzie Valley Resource Management Act* (MVRMA) for community representatives, Indigenous Governments, Indigenous Organizations, and government as a key engagement activity to support an effective co-management system. The fourth and final instalment of the virtual workshop series was held on December 15 and 16, 2022 and focused on climate change within the context of the MVRMA.

The workshop was attended by participants representing government employees, co-management board members and staff, industry representatives, and Indigenous Government and Indigenous Organization employees. The workshop included presentations, panels, virtual engagement tools, and open question and answer periods to explore, develop and clarify concepts within the workshop scope. See Appendix A for the Agenda.

Workshop Purpose

- To help familiarize participants with the co-management and integrated system of land and water management established through the MVRMA.

Workshop Goals

- Share information about how:
    - The Mackenzie Valley regulatory regime is affected by climate change and how climate change is currently considered in the resource management decision-making processes;
    - climate change is impacting the Mackenzie Valley; and
    - industry is innovating to decarbonize and adapt to climate change.
- Discuss how Indigenous science is weaved with western science to inform and enhance decision-making related to climate change
- Discuss opportunities for improving consideration of climate change in the Mackenzie Valley regulatory regime, including how climate change is integrated into Board and government decision-making

The Workshop Planning Committee was responsible for the delivery of the workshop. Stratos Inc., an ERM Group Company (Stratos), was engaged to support the design and facilitation of the workshop, provide technical support, and prepare this report. A full list of the Workshop Planning Committee and Stratos Delivery team members can be found in Appendix B. Corrina Keeling (Love Letters for Everybody) provided graphic recording for the session.

This report provides a detailed account of all presentations and discussions from the two sessions. Much of the content is the opinion of speakers and participants and reflects a range of views. This report can be used to inform the next steps to be taken by industry, co-management boards, and the government as they work to mitigate and adapt to the impacts of climate change within the Mackenzie Valley.

Synopsis of Day 1 (December 15, 2022)

Opening Prayer

The first day of the climate change workshop was held virtually on December 15, 2022 (9am-12pm MT). The workshop began with an opening prayer from Elder Doris Enzoe at the Explorer Hotel in Yellowknife, Northwest Territories (NWT).

Opening Engagement

As a warm-up activity to the workshop, participants were invited to reflect on the prompt: ***What are you most excited to learn about over the next two days?*** and share their thoughts in plenary using a virtual engagement tool that displayed participants' ideas including[2]:

- "How climate change considerations will be / can be incorporated into the MVRMA."
- "What industry is doing to reduce its greenhouse gas (GHG) emissions."
- "Options for climate change adaptation planning in the regulatory regime."
- "What we can learn from Indigenous Knowledge."
- "Indigenous perspective on climate change."
- "How we can best consider the future impacts of climate change."

Panel: Climate Change in the MVRMA Decision Making Processes

Following the workshop opening, Stefan Reinecke of Stratos moderated a panel discussion with representatives from the MVRMA co-management boards, the Government of Northwest Territories (GNWT) and the Government of Canada.

Stefan began by framing the conversation. There is much happening within the climate change space, including meetings, research, reports, and initiatives. Stefan spoke briefly to the recent release of the Federal Government's *National Adaptation Strategy,* and the Climate Change Advisory Gathering (CCAG) held in October in Dettah, as examples of climate change initiatives. The CCAG provided a forum to discuss climate risks, adaptation, and resilience to inform the territory-wide Climate Change Risk and Opportunities Assessment that is underway; the MVRMA Climate Change Workshop can be seen as building on the CCAG. Stefan emphasized that climate change is affecting, and will continue to affect, the Northern context in a variety of ways. Northern communities are particularly vulnerable to climate change in Canada. Climate risk is known through the lived experience of the people who reside in those communities. Stefan also highlighted the climate change impacts on ecosystems that are leading to fundamental changes to the land, wildlife, and our relationships with the land and wildlife. The underlying assumptions of climate change / climate risk are shifting, and these are the assumptions under which regulators, organizations, and communities will do their risk analyses and planning. Stefan concluded

[2] Appendix D provides all answers collected during engagement.

by stating that climate change, through extreme weather events, will impact our day-to-day activities (i.e., our ability to get to work, enjoy the outdoors for daily needs, etc.)

Alan Ehrlich
Manager of Environmental Impact Assessment, Mackenzie Valley Environmental Impact Review Board

Patty Ewaschuk
Geological Environmental Engineer, Ewaschuk Consulting

Cory Doll
Manager of Climate Change and Air Quality, Government of Northwest Territories

Eva Walker
Senior Environmental Assessment Officer, Environment and Climate Change Canada

Stefan introduced Alan Ehrlich, Patty Ewaschuk, Cory Doll, and Eva Walker, who participated in an interactive roundtable of questions to discuss climate change as it relates to the decision-making processes in the Mackenzie Valley.[3]

How does climate change intersect with decision-making in the Mackenzie Valley and how might climate change impact that decision-making in the Mackenzie Valley? What are some of the challenges and potential negative impacts that we should be aware of?

Alan: My speaking will all be from the staff perspective of the Mackenzie Valley Environmental Impact Review Board (MVEIRB) and might not necessarily reflect the official position of the Board. Based on the experiences we have had, we know that climate change has had, and will continue to have profound implications on ecological, social, and cultural well-being in the Mackenzie Valley. When climate change is affecting ecosystems, social well-being, or cultural well-being, it's affecting the same aspects that MVEIRB's environmental assessment decisions are supposed to protect.

There are three real ways that decision-making in environmental assessments is affected by climate change. Assessing emissions is one of them – we already know there is too much carbon in the atmosphere, so any project that emits carbon is already past the threshold, but it is impossible, and undesirable, to stop all development in the Mackenzie Valley. When it comes to assessing emissions, MVEIRB will evaluate a project's emissions based on the goals that are put forward by the territorial and federal governments, so we'll be looking for a framework that we can reference about what is acceptable and what isn't based on the GNWT and ECCC's advice.

I'd like to focus on two bigger challenges that are not as obvious to environmental assessment but have to do with assessing what will happen when the projects are built. Especially when failures are much more likely due to climate change and there is much more uncertainty about what the future is going to be like based on climate

[3] For full bios of each panelist, see Appendix E.

change.

For example, at the Faro Mine, Yukon, recently increased precipitation has raised the level of a contaminated lake, which has caused the contaminated water to run offsite. In Giant Mine nearby, some of the biggest risks when I was leading that assessment included a lot of precipitation leading to a freshet causing an overflow of a channel of water into a pit, which could flow to highly soluble arsenic trioxide.

There are implications to projects, in terms of ice roads. If you have a shorter ice road season, or failed ice road season there is risk to trucks, workers, efficiency, changes to the project cost and public interest overall is affected.

We saw the atmospheric river that caused enormous flooding in British Columbia that washed away pipelines and, at the same time, prevented emergency responses to those environmental crises because no one could get there. If you have a pile of wild cards that could cause the project to go wrong in ways that are unpredictable and difficult to recover from, it isn't just about harm to the project, but rather about harm to the environment and the people all around as a result of the project failure.

> *"Climate change means more uncertainty for what the future will look like, which makes it harder to predict the impacts as well as the baseline. There will be major impacts on culture."*
> - Alan Ehrlich

Climate change means more uncertainty for what the future will look like, which makes it harder to predict the impacts as well as the baseline. There will be major impacts on culture. Distribution of wildlife is going to change, new diseases are going to come up, and less harvesting will happen because going out on the ice suddenly becomes a life-threatening prospect in the shoulder season. We care about climate change because it changes how we assess emissions, it changes how we look at things going wrong, and it makes it harder to make good predictions in the future.

Patty: I am here representing the four Land and Water Boards (LWBs) (the Wek'èezhìı, the Gwich'in, the Sahtu, and the Mackenzie Valley LWBs) and the work they do. The LWBs do preliminary screenings that come before an environmental assessment, but largely the Boards are issuing land use permits and water licences. The Boards also set financial security for projects. The LWBs don't regulate air, so they're not involved in restricting GHG emissions.

When I started with the Wek'èezhìı Land and Water Board (WLWB) in 2006, climate change was something talked about, but it wasn't very concrete or technical. The Boards didn't yet have written expectations for what to submit or how to address climate change. Over the past five or so years, climate change has started to play a big part in the Board's decisions on large projects such as mines, roads, etc. As Alan alluded, a lot of difficulty is present in regulatory situations dealing with climate change where we are trying to look far into the future. Often these situations are found in planning for mine closure. The most common situation where climate change becomes a very large conversation is with structures in mine closure that must stay frozen to prevent contaminated seepage from entering the environment. There are challenges with a consistent climate change scenario to use for all projects. When we look across projects, most climate change scenarios go to the year 2100. Typically, in submissions, the Board predictions are not very reliable after 2100, however, we can't put blinders on for the period past that. Mine closure plans are required to last for hundred to thousands of years, but we don't have a great way yet of how to consider that period.

It is very difficult when you don't have predictions, but we can still have some judgement apply to that period and

some conservativism to ensure that in the year 2110 things don't start to degrade into the environment.

Cory: At a broader scale, the GNWT within the Legislative Assembly brought in something new where all Cabinet and Financial Management Board decisions are now requiring a review of climate change considerations, including considerations of emissions impact, adaptations, etc. This is to show that those connections we've been speaking about are happening at a few different levels. Within the MVRMA, the term 'climate change' is not explicitly identified, however, project proponents are required to consider climate change in the project, including how climate change may impact the project over its lifetime and how the project may result in GHG emissions that contribute to climate change. From a regulatory perspective, it is important to consider how these decisions made today might be impacted by different climate considerations and conditions, and during environmental assessment or regulatory process. GNWT staff are reviewing documents like developer assessment reports, water licence applications, and management plans to make informed recommendations to MVEIRB and the LWBs to ensure climate considerations are noted aspects of the project.

> *"From a regulatory perspective, it is important to consider how these decisions made today might be impacted by different climate considerations and conditions, and during environmental assessment or regulatory process."*
> - Cory Doll

Eva: To Environment and Climate Change Canada (ECCC), climate change is a consideration for everything. Climate change consideration is particularly important here in the North because we're warming faster than the global rate. My colleague, Matthew, will later speak to the Strategic Environmental Assessment on Climate Change (SACC), which is a key piece of guidelines as part of the *Impact Assessment Act* (IAA) in the South. The SACC will require some adaptation to be incorporated into some of the regulatory regimes in the North, but that will be what I primarily refer to.

From my perspective, environmental assessment as a planning tool is uniquely positioned to ensure that individual projects can be designed to mitigate contributing factors of climate change and is front of mind when ECCC is assessing projects and providing advice to proponents and Boards.

ECCC has two main groups that contribute to the advice we provide to the Boards:

- The Climate Research Division: focuses on how projects will be affected by the changing climate by looking at climate modelling.
- The Energy and Transportation Directorate: has several divisions and experts to address various aspects of GHG emissions (upstream and downstream), predicting, green emerging technologies and how they can be applied to projects, etc.

ECCC is primarily available as a resource to provide research, advice, and recommendations to the Boards. Although we don't make the decisions, we hope that our advice and recommendations help decision-makers in the Mackenzie Valley.

Question and Answer with the Climate Change in the MVRMA Decision Making Processes Panel

Following the questions asked by Stefan, participants were invited to pose questions / comments to the panelists using the chat or 'raise hand' functions. As time permitted, the below questions were asked of the panelists.

Charlie Catholique: We are all here for one reason – to deal with climate change. I see my community surrounded by climate change. In my hometown, we were planning to have an ice road this year, but due to the warmer weather conditions it seems that it won't be possible. Climate change is preventing us from going out on the land and it is only getting worse. We are here today to share our thoughts and observations from our communities: warmer water is creating late freezing; water levels are so high this year; bears are coming around to communities to find food. Elders told us when we were young that we would be dealing with change. Caribou move further east and do not come around anymore. My way of life is impacted because I live off the land every day. I depend on caribou, fish, and any other animal I see on the land. I see climate change is affecting everyone in our communities.

> *"My way of life is impacted because I live off the land every day. I depend on caribou, fish, and any other animal I see on the land. I see climate change is affecting everyone in our communities."*
> - Charlie Catholique

Roger Beck: I've worked around the Great Slave Lake my whole life in many different positions, including a pressure welder, forestry worker, and a millwright. I travel by dog team, and I monitor animals to understand what is going on with the land. We know when there is going to be a lot of snow because the beehives will be high in the trees and animals start storing food early in the fall.

I feel that the federal government should be here because climate change impacts are infringing on our treaty rights and I don't know if the territorial government or the harvesters, like myself, can fix this. I think it goes way deeper, for example, the chemicals in the water flow. The Government should work with Indigenous people and community members to do their research since we have knowledge about the animals and where they will be at different times of the year.

Canada's goal is 45-50% reduction in GHG emissions by 2030, and GNWT's goal is 30% reduction by 2030. Are projects assessed, and regulated, to achieve these goals? How?

- Eva: It is difficult because the SACC is currently a southern piece of regulation, so it doesn't specifically apply in the North. The SACC is tied into the *Impact Assessment Act* (IAA), which is applicable only in Southern Canada. We're currently working with the Boards and GNWT. The goals are set and zero emissions by 2050 is something that is incorporated into all project considerations in the NWT and Nunavut.
- Alan: When it comes to assessing the emissions from projects, we are going to rely on the goals of others. MVEIRB needs the territorial and federal governments to step up during environmental assessments and clearly lay out the frameworks to evaluate the impacts of projects. It is important to have the right frame of reference provided by the GNWT and ECCC for assessing impacts of projects in the NWT. It is not just about ecological impacts…it is about real impacts to real people. Stressors exist around how people are going to feed their family in the future and how people will keep their cultural identity in the future – this is not an abstract piece of scientific research for most people in the NWT. This is about their well-being, their family's well-being, and their kid's, kid's well-being. Anyone who is not deeply alarmed by climate change probably doesn't understand what is predicted for the NWT over the next century. Our Board takes climate change very seriously as one of the big priorities. This crystallized clearly to me when I rode my bike through ice in Yellowknife Bay, which is ice that I have lived on for eight years and have gotten to know very well. Suddenly, at a time when the ice should have

> *"Anyone who is not deeply alarmed by climate change probably doesn't understand what is predicted for the NWT over the next century."*
> - Alan Ehrlich

been solid, I found myself swimming with my bike under the ice. I started thinking, "what would happen if I was out there because my family needed me to be out there to put food on the table like so many people do?" If I were an Elder, and suddenly the ecosystem and how the Land works has suddenly started to change from what I knew, what does that mean for Traditional Knowledge and the Traditional Knowledge-holders? It is a crisis.

For any new mine or project seeking approval, is there a climate change contingency budget requirement to ensure there is money left over to tackle any environmental challenge after its closure?

- Patty: The Boards have the authority to set financial security. For major projects, that security would be set under a water licence. For a mine, security is calculated with a specific-engineering lens used to calculate the estimates. All the estimates have a contingency amount on them because every cost estimate is a prediction, but it does not cover the uncertainties of a project. However, Boards can add more security if a proponent cannot demonstrate that they can properly mitigate issues resulting from their project. Another recent option that has been employed is a 'hold back' where because of climate change uncertainty related to a mitigation effort, the Board is able to set an amount of security that will be held back for a certain amount of time even once that mitigation effort has been implemented.

With a hotter Arctic climate possibly drying up the land, how do the Boards and ECCC deal with prospects for lower lake levels? It's possible to foresee scenarios where lower lake levels are no longer capable of providing water to mines for ore processing and/or camp use without significantly impacting fish habitat within those lakes.

- Eva: ECCC would consider lower lake levels in several ways, depending on when and why ECCC is providing advice. If it's considering future scenarios, we would have our Climate Research Division consider the climate scenarios used, including precipitation scenarios that would consider lower lake levels. For an assessment now or in the near future, our water quality and mining experts would take into consideration the impacts of water use by the mine on water quality in the lakes. Both the Climate Research Division and our Water and Mining Experts will work together in providing recommendations for all project reviews. ECCC only considers impacts to water quality, but we work with the Department of Fisheries and Oceans on these types of questions as well, who are responsible for fish and fish habitat. Ultimately, water withdrawal is the responsibility of the Land and Water Boards.

How are the NWT Land and Water Boards working with Alberta and British Columbia to prevent downstream impacts? The oil sands are affecting global warming. Does the GNWT intervene in the oil sands hearings when applications happen?

- Mark Cliffe-Phillips, MVEIRB: If a project is undergoing an environmental assessment s. 142 of the MVRMA says: "Where a development proposed to be carried out wholly in a region of the Northwest Territories, Yukon or Nunavut adjacent to the Mackenzie Valley, or wholly in a province, might have a significant adverse impact on the environment in the Mackenzie Valley, the Review Board may, with the approval of the federal Minister, enter into an agreement with the authority responsible for the examination of the environmental effects of such developments in that region or province to provide for the participation of the Review Board in the examination of the environmental effects of the development by that authority."

David Krutko: The MVRMA came out of the Land Claims Agreements and the definition for impact on the environment very clearly includes the effects on air, land, water, wildlife, harvesting, social, cultural, etc. I think it is important that we focus on the effects the project is going to have on the social, cultural, and economic well-being of residents in the Mackenzie Valley. I think we are realizing now that the community being able to sustain themselves is greatly affected by climate change (i.e., harvesting, gathering, getting out on to the land, etc.). To speak about climate change and its effects, you must consider people. Not just in the confines of the environment, the land, and the water…you must consider how people fit into that picture.

> *"To speak about climate change and its effects, you must consider people. Not just in the confines of the environment, the land, and the water…you must consider how people fit into that picture.*
> - David Krutko

In the Mackenzie Delta last summer, we had three weeks of extreme heat. Now we are seeing a major problem with infrastructure (i.e., slumping of roads) and the effects to wildlife (i.e., caribou season entirely off). As regulators, the cultural and social impacts must be considered and how we can mitigate these impacts through our decisions. The problem is not going to slow down, it's going to get worse.

- **Ryan Fequet, WLWB:** Thanks for reiterating, David, how the integrated MVRMA co-management system - built from the Land Claims - is holistic and includes all components of the environment - including air! To clarify the previous comment from Patty was that the LWBs do not 'regulate' air, but both the LWBs and the Review Board absolutely assess impacts to air during the environmental impact assessment process.

Are the Boards, ECCC, and GNWT considering Indigenous Knowledge when setting targets for climate change in frameworks or when assessing projects? And if yes, how is Indigenous Knowledge being considered/incorporated?

- **Simon Toogood, MVEIRB:** The Review Board is required to consider all Traditional Knowledge it receives in the course of an environmental assessment. It considers TK in the context within which it was given, and this includes aspects related to climate change or in the determination of significance for project-specific or cumulative effects.

Does each LWB consider the Intergovernmental Panel on Climate Change (IPCC) Scientific Assessment Paper when doing assessments?

- **Simon Toogood, MVEIRB:** The Review Board would consider all scientific knowledge and traditional knowledge with which it is provided during the course of an environmental assessment. For instance, the Review Board is asking developers to describe potential future climate scenarios, and how their project may affect or be affected by these future scenarios in recent assessments (for example, in the Pine Point Mine *Terms of Reference*).

Final Thoughts of the Climate Change in the MVRMA Decision Making Processes Panel

To close the segment, the four panelists were invited to share one closing thought around the conversation that had unfolded.

Alan: With respect to securities, I really appreciate that impact assessments are about anticipating and avoiding problems instead of being reactive. One of the ways to improve projects is to get more detailed information from developers and more scrutiny from government on what the project's vulnerabilities are to climate change over

time.

With respect to what we've heard from Charlie, Roger, and David, the fact that Indigenous worldviews recognize the interconnected nature of people and the land is an important part of the solution to this problem. We know that a big domino is going to fall, but knowing what other dominos get hit from that and the relationships between the valued components will help us to understand what impacts are going to happen when that first domino falls. Indigenous Traditional Knowledge is a much more useful source to this solution than most western scientific knowledge because it isn't siloed into compartments like western science and government can be.

Government is siloed into many different departments to narrow in on all the different components (such as, fish, water and climate change). In impact assessment, getting the climate change experts to make strong predictions for how all the valued components fit together and inter-relate is critical. This will help the Review Board to make better decisions.

> *"We cannot turn a blind eye to what will happen to the land, the people, the wildlife, etc. in the future; decisions need to be made with the long-term aspect in mind, even though it is very difficult."*
> - Patty Ewaschuk

Patty: It is great to focus on the holistic nature and to ground us in those realities. The LWBs work is fairly specific and there is some room for optimism, even from what I've seen changed over the 15-year period I have been with the Boards. The LWBs now have in their guidelines requirements for all applications to describe how the applicant considered climate change. There is still a lot more that could be done, but it is good to see movement. In the Board public review process, all the parties are loud about climate change and raised as an issue in areas where it should be heavily considered. I hope there will be progress in making sure we are looking at the right climate change scenarios and that there will be more guidance on which climate change scenarios to use, as well as what to do past the point where we can't predict. We cannot turn a blind eye to what will happen to the land, the people, the wildlife, etc. in the future; decisions need to be made with the long-term aspect in mind, even though it is very difficult.

> *"We do work together, you might not necessarily see it externally, but it is happening. Please keep pushing for that collaboration, so that it continues to happen."*
> - Eva Walker

Eva: Climate change is such a complex issue and from the perspective of the federal government. I hear you Alan in that departments must work together, but mandates make it difficult. We do work together, you might not necessarily see it externally, but it is happening. Please keep pushing for that collaboration, so that it continues to happen. In addition, ECCC will be working with MVEIRB and the LWBs in 2023 for training to happen on the SACC. The SACC feeds into the *Impact Assessment Act* and borrows heavily from the northern co-management process, which includes Traditional Knowledge and working with communities to incorporate their feedback.

> *"If we're going to be working on these massive problems, we can only do that by breaking down those internal and external silos and work together in a meaningful way."*
> - Cory Doll

Cory: The GNWT is building on the climate and services function, which would be a resource to support some of the regulatory pieces, including the Climate Resource Library and a support function that could help to link users to some of the best practices. We want to use the best climate projections and have an apples-to-apples approach. I worked in the context of Alberta for many years where the conversation was centered around whether climate change was really happening. The great value in the NWT is we regularly get to hear the impacts

people are seeing, which is profound. Looking at the adaptation piece, it is a newer field and very complicated to address in the NWT. We are doing work to get some shared understanding of what those priorities are so we can focus limited resources to where they're needed. We're hoping the National Adaptation Strategy will build some resources and we can focus them on where they're needed in a collaborative way. If we're going to be working on these massive problems, we can only do that by breaking down those internal and external silos and work together in a meaningful way.

Figure 1: A snapshot of the Day 1 Panelists and Moderator, including Stefan Reinecke, Cory Doll, Alan Ehrlich, Eva Walker, and Patty Ewaschuk

Graphic Recording

Please note that the images found in this report are not meant to be comprehensive; aspects from the conversations will be missing from the illustrations, but what the Graphic Recorder (Corrina) was looking to capture was the heart of the conversations and the themes rising to the surface. The images belong to all the participants in both the physical and virtual room of the event. Appendix C provides the full set of Corrina's illustrations.

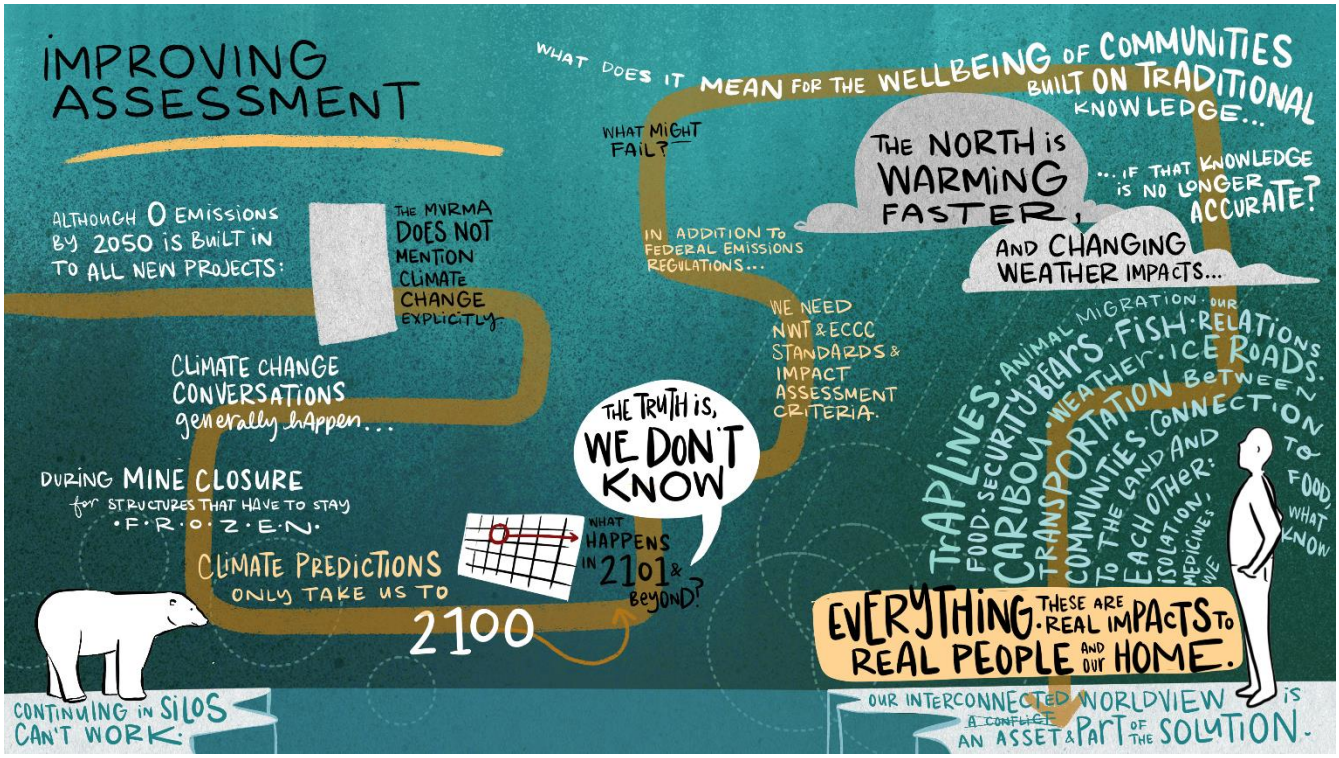

Figure 2: Graphic recording on Climate Change in the MVRMA Decision Making Processes Panel discussion, by Corrina Keeling

Dr. Chris Burn
Chancellor's Professor of Geography, Carleton University

Keynote with Dr. Chris Burn: Climate Change, Permafrost, and Impact Assessment in the Mackenzie Valley and Western Arctic

Chris Burn is Chancellor's Professor of Geography at Carleton University in Ottawa. He has been studying the permafrost environment in Yukon and the western Arctic since 1982. His research has focused on how permafrost terrain responds to disturbances, such as changes in surface conditions and in climate. Between 1998 and 2013 he participated in the review of several projects including the Diavik Mine, MGP, and ITH. He is currently President of the International Permafrost Association.

Please see Appendix E for more about Dr. Burn.

Historical Climate Change Context in the NWT

Dr. Burn set the stage of his presentation by introducing permafrost and the historical background on climate change in the NWT. Permafrost is the ground that remains below 0˚C for two or more years. On top of the permafrost is the active layer, which is the zone that freezes and thaws each year. Most of the permafrost that is in the Mackenzie Valley is very ice-rich material.

Air Temperature

The Mackenzie Valley area is among the most rapidly warming regions of Canada. Since 1970, the Mackenzie Delta has been warming at 3˚C in terms of the mean annual temperature, in comparison with the south where it has been warming at closer to 1˚C in the same timeframe. In the last 50 to 60 years, Inuvik has experienced a very steep increase in temperature. In 1998, the NWT was experiencing a very warm year due to effects within the Pacific Ocean, and it was believed to be an exceptional and unusual event, however, those events have been repeated in the last five years.

At the time of the Mackenzie Gas Project 20 years ago, there was large debate within the hearings over whether climate change was real and there was general disagreement within the public arena. In 2003, there was a small study to look at air temperature projections in the Mackenzie Valley over the next 20 to 50 years, which was the lifetime of the project. The variation in projections for climate over that period represent the upper range or the worst-case scenario. In both Fort Simpson and Inuvik, the actual record is worse than the worst-case scenario (Figure 3). There was much dispute (at the Mackenzie Gas Project hearings) over a "balanced" approach; however, the environment has not been balanced in this context and has exceeded our expectations.

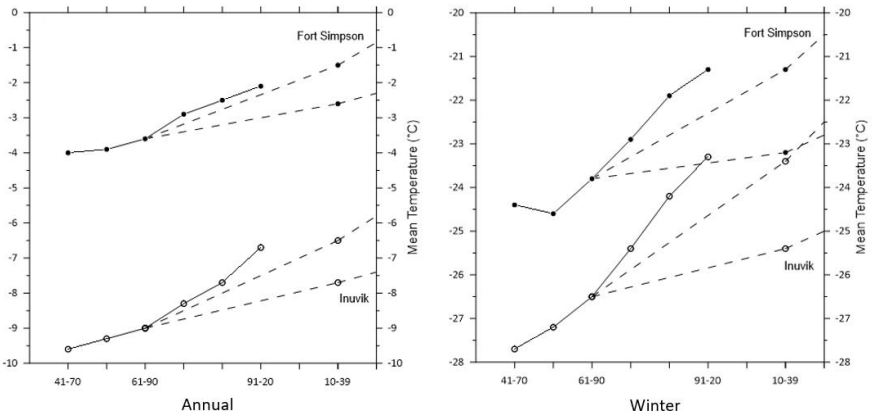

Figure 3: Air temperature projections and the record, 2000-2020

Precipitation

Across the NWT, there has been a

huge variation in precipitation from year-to-year, which means it is very difficult to determine the trend that is occurring. People have resisted from predicting what future precipitation might be like. Data suggests that the NWT is experiencing more rainfall in the shoulder season (August to September), when it was previously falling as snow. We have very strong evidence that the rainfall regime is changing in terms of summer rainfall.

Thaw Slumps

Some of the most dramatic impacts on permafrost that have been observed have been large permafrost thaw slumps, particularly in the Peel Plateau, which have largely been initiated by increased precipitation. Dr. Burn highlighted that had these same thaw slumps occurred in the past, we would still see them on the landscapes, but people who travel on the land don't speak of seeing old slumps. It appears that thaw slump disturbances to permafrost terrain is something new that has not happened since the last ice age and indicates a new shift in terms of how permafrost is responding to climate change.

Figure 4: Thaw slumps in Peel Plateau

There are changes that are occurring that can be observed on a human timescale, such as the failures on the Dempster Highway. The failures are associated with gradual adjustments within the permafrost beneath the road.

Relationship Between Climate Change and Permafrost

Equilibrium

Equilibrium. To consider everything to be in balance, the way climate change was considered in the 1960s-70s.

Illisarvik, a small, drained tundra lake on Richards Island

Permafrost is no longer in equilibrium with the climate. If the ground temperature were in equilibrium, the coldest temperatures would be at the surface and would get warmer with depth as you move closer to the centre of the Earth. In Illisarvik, it is instead warmest at the surface and getting colder with depth. Over the last 15 years, the surface has warmed 1.5˚C as it has at depth, therefore the surface warming is making its way into the ground at a gradual, steady adjustment.

Gradual Change

Gradual Change. Slow effects of climate change.

Garry Island

Researchers recorded daily ground temperatures on Garry Island from 1969 to 1971 and again more recently. There has been a substantial increase in ground temperatures since the early 70s, so that the slope area is close to -3˚C when it was previously understood to be closer to -8˚C. This difference becomes critical when dealing with the integrity of drilling waste sumps. Back in the 1970s, it was expected that permafrost would act as a

containment for the waste in the sumps, however, the freezing point of the material in the sump is now lower than the temperature in the permafrost around the sump. We must anticipate that in this environment, the permafrost will no longer act as a containment in the way that it was designed back in the 1960s and 1970s. The important question to ask is "how much time do we have until failure?" Dr. Burn noted that we do not know the answer, but we must determine the thresholds to manage the problem before thresholds are reached.

Carbon Balance

Another long-term issue associated with climate change is the abundance of carbon in permafrost terrain. Plant litter and debris in the permafrost terrain do not degrade quickly and remain in the ground, which is absorbed into the layers of permafrost. The Mackenzie Valley has a lot of soil carbon within peatlands. All the carbon that is currently frozen within the permafrost could potentially be released gradually into the atmosphere. The stock of permafrost carbon is approximately 1500 billion tonnes globally, which is around twice the amount of carbon that is currently in the atmosphere. Even if 1% of the permafrost carbon is released, a significant contribution of carbon will be made to the atmosphere. Dr. Burn noted it is important to remember that ecological sources of carbon are not included in many of the international treaties. When a project is assessed, it is not just the fuel burned that should be considered, but also the potential of the project to influence the emission of carbon from the permafrost (i.e., warming the ground up by changing where the snow accumulates).

Accelerated Change

Accelerating Change. Changes in ground surface conditions will accelerate warming and thawing of permafrost – positive feedbacks

Hillslope Ice Wedges

Ice wedges are found in the subsurface of permafrost regions. Over the past 15 years, more ice wedges have become visible on the hillslopes across the western Arctic, with increasing ground subsidence. In Illisarvik, the ground has subsided at approximately 3cm per year – a loss of 30cm over 10 years. The ice wedge degradation leads to troughs, which changes the water balance, and accelerates ground subsidence.

Extreme Events

Extreme Events. Events that we have never experienced / witnessed / or heard about in conversation

Caribou Hills

Caribou Hills is a series of gullies that was observed to have one or two landslides over many years through the 1950s and 1960s. On September 25, 2017, an intense rainstorm occurred. The next morning, people at Reindeer Station woke up to landslides across the Caribou Hill hillside, as well as all around the Reindeer Station camp. This was a single event over 11km of hills where 87 failures had taken place, initiated by rainfall.

Figure 5: Caribou Hills landslides September 25, 2017.

Key Takeaways

To conclude his presentation, Dr. Burn highlighted the key takeaways from his keynote presentation, including:

- If we want to think about climate change and permafrost being in **equilibrium**, that approach is no longer valid.
- Ground temperatures change **gradually,** and they have some slow-evolving effects with a long timescale involved (~30-40 years).
- There are some places where the change **accelerates** and can result in us experiencing very rapid impacts.
- **Extreme events** that we have observed have largely been driven by increases in rainfall and those increases in rainfall have not been adequately documented in the scientific community.

Dr. Burn outlined impact assessment requirements that will be needed to deal with the increasing pressures caused by climate change and the thawing of permafrost, including:

- **Up-to-date baseline conditions:** gather up-to-date baseline data to avoid using out-of-date data.
- **Timescale of project:** identify realistic project timelines to consider the gradual effects to the environment that may impact projects.
- **Ground ice conditions:** identify the ground ice / sensitive terrain within a project area that will respond to the adjustments of precipitation.
- **Water management:** scrutinize the water management plans that are proposed for a project to ensure they propose how to deal with events that will become more frequent (e.g., 100-year floods).

Question and Answer with Dr. Chris Burn

Following Dr. Burn's presentation, participants were invited to pose questions / comments using the chat or 'raise hand' functions. As time permitted, the below questions were asked of Dr. Burn.

Can you pinpoint which industry most influenced the increase in ground temperature?

- There are particularly warm years, which usually is a result of something in the oceans rather than from the atmosphere. The warmer years could be due to much warmer water movement towards the north into the Gulf of Alaska. The El Nino events occur about once every 10 years; however, we have had El Nino effects without having an El Nino occur. There is a general increase in the amount of energy coming from the tropical environments being moved up to the northern latitudes.

In your research, do you consider heavy metals regarding permafrost melt and thaw? That is a concern for Indigenous people and the impacts on fish.

- I am not a geochemist, however, there are people in collaboration with scientists who have been doing a considerable amount of work on what is coming out of the thawing permafrost and how that influences the chemistry of fish-bearing rivers and lakes. I personally do not have experience in the chemical elements, but there are people studying this. I would recommend looking into the NWT Geological Survey to seek that expertise.

Figure 6: A snapshot of Dr. Chris Burn during his keynote presentation.

Strategic Assessment of Climate Change

Matthew Zeppetelli
Acting Unit Head of the Strategic Assessment of Climate Change Team, Cross Sectoral Energy Division, ECCC

The Strategic Assessment of Climate Change session included a presentation from Matthew Zeppetelli, Acting Unit Head of the Strategic Assessment of Climate Change Team, Cross Sectoral Energy Division at ECCC. The presentation provided a summary of the Strategic Assessment of Climate Change (SACC) and an overview of how it relates to the federal *Impact Assessment Act* and Canada's climate change commitments. Please see Appendix E for Matthew's bio. Access to the slide deck of Matthew's presentation can be found in Appendix F.

Matthew began his presentation by providing context of the *Impact Assessment Act*, which came into force in 2019 and establishes a process for considering the environmental, health, social, and economic effects of certain projects. Among other factors, the impact assessment process considers the extent to which the effects of the designated project hinder or contribute to the federal government's ability to meet its environmental obligations in respect to climate change. He also outlined Canada's climate commitments and initiatives to advance climate action.

Matthew introduced the SACC, which enables consistent, predictable, efficient, and transparent consideration of climate change throughout impact assessments and describes the GHG and climate change information that project proponents need to submit at each phase of a federal impact assessment. The SACC requires proponents of projects with a lifetime beyond 2050 to provide a credible plan that describes how the project will achieve net-zero emissions. The Impact Assessment Agency of Canada will review and comment on the climate change information provided by proponents. The SACC applies to designated projects under the IAA, but the principles and objectives of the SACC may also apply to environmental reviews by other federal lifecycle regulators and non-designated projects under the IAA. Matthew noted that the SACC does not represent a new federal climate change policy, nor does it set specific conditions or benchmarks for projects to meet.

The Federal Government has two draft technical guides to supplement the SACC and provide additional details on specific elements, including Guidance on Quantification of Net GHG Emissions, Impact on Carbon Sinks, Mitigation Measures, Net-Zero Plan and Upstream GHG Assessment and Guidance on Assessing Climate Change Resilience.

Matthew concluded his overview presentation by describing ECCC's role in the SACC, which is to:

- Provide technical expertise related to GHG emissions and climate change to inform the review of projects; and
- Deliver comprehensive guidance that is consistent, predictable, efficient, and transparent for stakeholders and proponents.

Question and Answer with Matthew Zeppetelli

Following Matthew's presentation, participants were invited to pose questions / comments using the chat or 'raise hand' functions. As time permitted, the below questions were asked of Matthew.

Does the SACC consider a project's impacts on carbon sinks from a local perspective (i.e., small, localized surface disturbance associated with project footprints or activities) or global perspective (i.e., GHG emissions leading to regional or large-scale permafrost degradation and associated carbon release)?

- The SACC considers carbon sinks impacts only on the project's disturbance to the land that is being affected; it does not look at it from a global perspective on whether the GHG emissions released from the project affect global carbon sinks.

How does the SACC determine whether a project's plan to reach net-zero by 2050 is credible or not?

- Several factors are looked at that a proponent would submit. The first draft technical guide on quantification and net-zero planning lays out some considerations, which includes whether proponents set targets to ensure that they are reducing emissions over time from project start date to 2050. It also looks at whether proponents are considering emerging technologies and practices to reduce emissions over time and several other factors that are laid out in the technical guide to ensure that proponents have the lens for 2050 targets.

If I understood this, the IAA climate aspects COULD apply to agencies dealing with regional assessments - which is probably the North. So, does it apply to MVEIRB? If not, when will it or what will it take to make it apply?

- **Simon Toogood, MVEIRB:** The SACC and its associated technical guides were considered by MVEIRB in a recent Terms of Reference for the Pine Point Mine environmental assessment. Relevant parts of these documents were in the Terms of Reference.

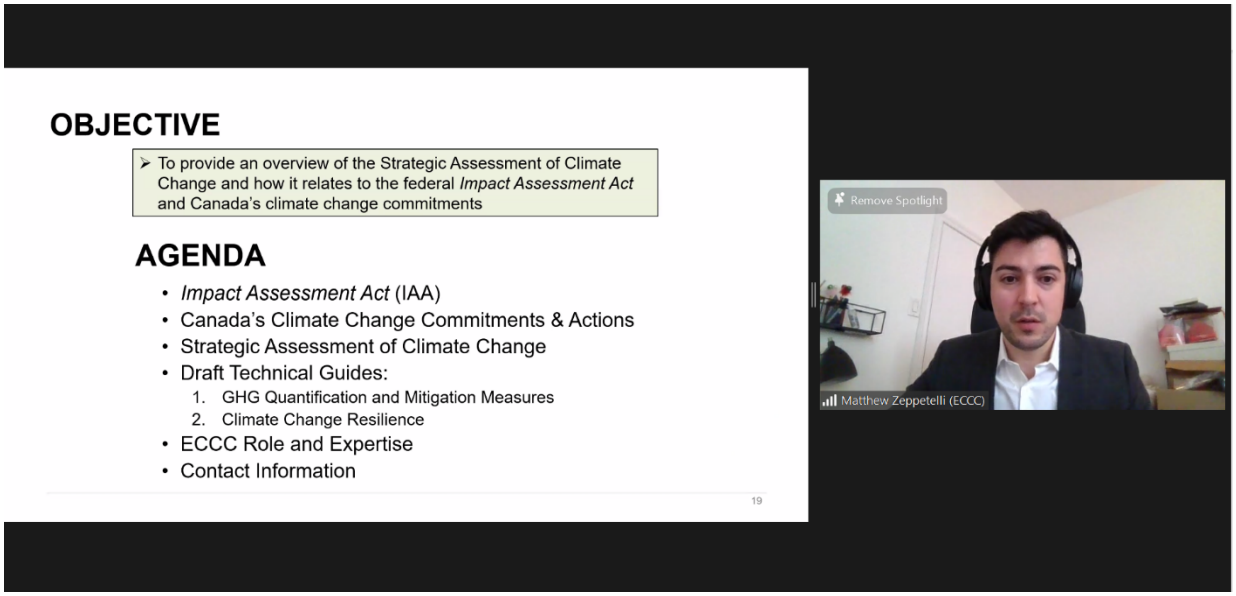

Figure 7: A snapshot of Matthew Zeppetelli during his presentation on the Strategic Assessment of Climate Change.

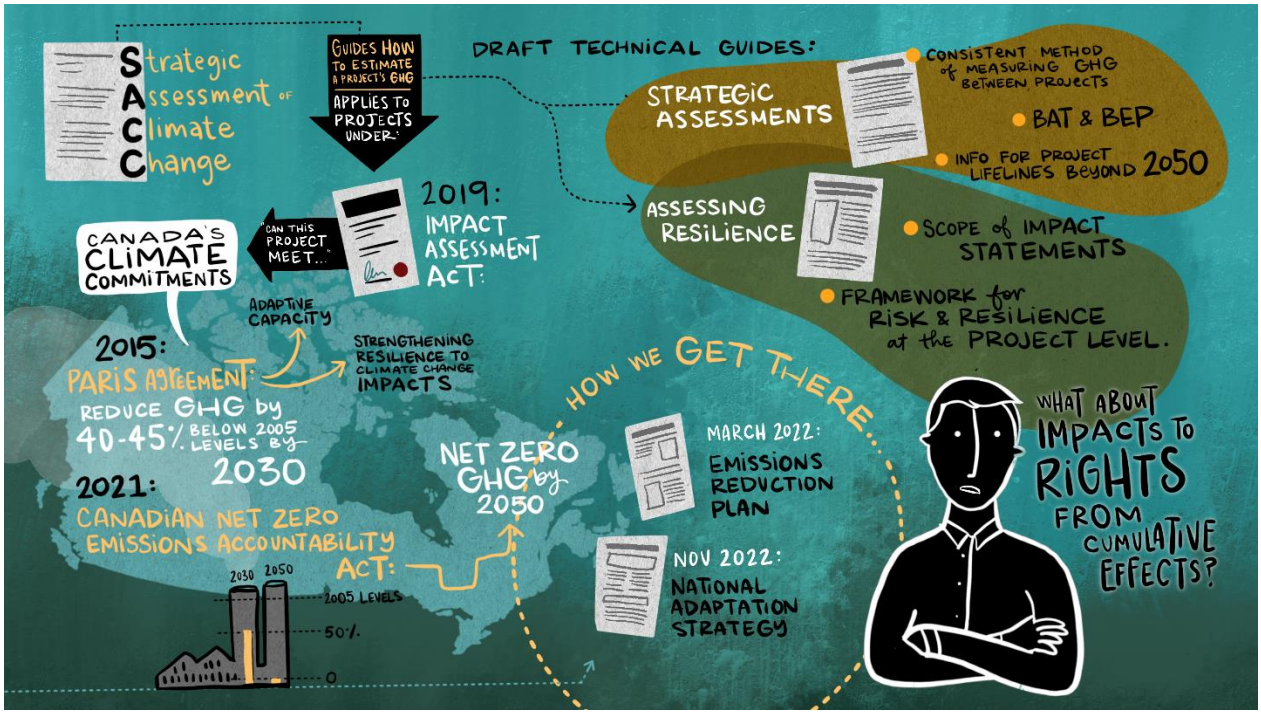

Figure 8: Graphic recording on Strategic Assessment of Climate Change discussion by Corrina Keeling

Carolyn concluded Day 1 of the workshop by thanking all the speakers and panelists from the day and reviewed the agenda for the upcoming day 2 of the session. She distributed a survey link for participants to submit feedback on any of the virtual sessions on the Land and Water Boards' websites. Corrina closed by providing an overview of their graphics from the day. See Appendix C to see Corrina's graphic from Day 1 of the workshop.

Synopsis of Day 2 (December 16, 2022)

The second day of the virtual workshop was held on December 16, 2022 to continue the conversation on climate change as it relates to the MVRMA. As a warm-up to the second day of the workshop, participants were invited to share *one reflection from the previous day's discussion*. Answers from the participants generated a Word Cloud. The most popular answers are demonstrated by a large font size.

Figure 9: A snapshot of the Word Cloud generated from participants sharing one reflection from the previous day's discussion.

Industry Innovations

The Industry Innovations session included presentations from David Connelly, Corporate Affairs and Strategy with Cheetah Resources and Marc Lincoln, Project Manager of Diamond FutureSmart with DeBeers Canada. The presentations focused on highlighting the actions industry is taking to mitigate and adapt to climate change, and how these actions relate to the MVRMA. Appendix F provides Marc's slide deck.

David Connelly
Vice President, Corporate Affairs and Strategy, Cheetah Resources (Nechalacho Project)

Marc Lincoln
Project Manager of Diamond FutureSmart, De Beers Canada (Chidliak Project)

David Connelly

David began his presentation with a land acknowledgement and emphasized that climate change is urgent and upon us and will affect all parties. He identified the importance of understanding and predicting some of the climate change scenarios and how they will impact projects. A key question is how the North can contribute to the growing requirement for minerals to meet the need of adapting and adopting to climate change (i.e., moving from internal combustion engines to electric vehicles or moving from diesel power generation to wind and solar energy)?

The Critical Mineral Strategy identifies that most critical mineral projects are on Indigenous lands, so David asked how we could leverage those potential critical mineral projects into opportunities for Indigenous economic reconciliation, which will likely require moving past Impact Benefit Agreements (IBAs), to see more Indigenous ownership and membership on company boards.

David noted that most critical mineral projects look quite different / smaller from other mining projects and therefore may require a different regulatory approach. They tend to be significantly smaller and that may affect the impact and the way regulators look at the impact.

The word 'urgency' was highlighted by David. Countries around the world have passed laws requiring industry to transition to electric vehicles in a relatively short timeframe. There is a window of opportunity to capture economic benefit and, in parallel, protect the environment and ensure there is Indigenous participation in the projects.

David spoke to the topic of air and some of the changes that will occur in relation to climate change. When the critical mineral industry talks to the automobile industry or the cellphone industry, etc. the first thing they ask is if the proponent will be able to supply a carbon-neutral product. The proponent must have a path to production that does not burn carbon. The second thing they want to see is that the proponent can show they have a high Environmental, Social and Governance (ESG) performance. There is a strong growing alignment between the regulatory process and what customers / financiers are demanding.

David believes many would argue that the approach to reducing carbon should not be through heavy-handed taxing of carbon. If one of the goals is socio-economic focused, it would not be beneficial to make it more difficult to invest. However, there does need to be ways to encourage the use of hydro, solar, and wind power. David

emphasized that to reach a decarbonized environment, there is a requirement to permit decarbonized energy generation.

With climate change, David noted that we are experiencing higher wind speeds, different solar availability, and fluctuations in precipitation. The difficulty with project design is that the solution today may not be the appropriate solution 20 to 50 years into the project life, meaning there must be ability to adapt and adopt throughout a project lifecycle.

David highlighted that climate change will likely cause a longer shipping season in the North; conversely, this will mean a shorter ice road season. These are all factors that will have to be considered when designing and permitting a project to prepare for those changes. The changes do create economic opportunity for Indigenous groups to be the co-owners of the companies that will implement adaptive solutions (i.e., barging companies to ship product; ownership of a hydro line to bring in green power, etc.).

Historically, mines in the NWT were built around diesel equipment and diesel generation. Moving forward, we will see electrification of mines; therefore, there must be a permitted way of having green power in a timely and efficient manner.

David concluded by stating that there are several new technologies that have emerged and will continue to evolve that can reduce contaminants, the use of water, the creation of tailings, etc., so projects must be able to adapt and adopt to the latest best practices as they are introduced to the mining industry.

Marc Lincoln

Marc introduced his presentation on the Diamond FutureSmart initiative by describing it as a program created to enable transition at existing mining operations and to shift the mining paradigm for future greenfield operations. Marc emphasized that the Diamond FutureSmart program has a vision to change the way they do things to create a truly smart, connected mine with a smaller physical footprint and a healthy environment. Diamond FutureSmart has several targets it hopes to achieve (i.e., a mining world where communities prosper and thrive; where the natural world is respected; where safety is supreme, etc.) with support from 14 guiding principles to help the development of the diamond mine of the future.

Marc provided context for the vision of a mine with a smaller physical footprint. The smaller the footprint, the less dust and energy, and the easier it is to close the mine. Marc emphasized that DeBeers leverages the use of emerging technologies to help foster the carbon-free environment and reduce water usage.

Since the aim of the Chidliak Project in Nunavut is to become a completely carbon neutral operation under the Diamond FutureSmart initiative, any of the options that are brought to the investor must be 100% carbon-neutral, which can often be complex. Marc noted that they have found that once they get to the 60-80% carbon neutral mark, very dilute forms of solar or wind energy are not great for operations. The capital investment has been found to skyrocket for small deposits, which becomes a complex problem that requires other innovations to solve.

Marc outlined some of the constraints with respect to clean energy, including:

- Footprint is extensive for wind and solar energy – lots of materials, including concrete
- Logistics to the remote areas

- Life of generation and storage equipment is finite (15 years)
- Hydro storage is expensive and has a large footprint
- Nuclear has a bad name, but is the silver bullet for microgrid environments

Nuclear is currently the 2nd largest carbon-free energy source, after hydro, with huge energy density and very little waste. Marc noted that Canada has huge uranium reserves and at current rates, economically feasible uranium reserves would last more than 60,000 years.

Marc spoke to hydrogen truck use in mines, which he emphasized as very innovative. Anglo American, the holding company of DeBeers, also has SMART Power, which is renewable power generation to displace grid power and generate green hydrogen for use in haul trucks. Currently, haul trucks are the second largest energy consumer in open pit operations, so this initiative has the potential to reduce emissions and create an opportunity to develop a hydrogen economy for mines.

Marc concluded by stating that we need to change our mindset and adapt electrical system management, grid management, and the training of personnel to the changing environment. Education is a big theme – not only in the operation of a mine, but the way we design and construct mines in a much more holistic way. He stated that we must explore all our options when it comes to climate change adaptation, including nuclear and other innovations that emerge with time.

Question and Answer with the Industry Innovations Speakers

Participants were invited to pose questions via the chat or 'raise hand' functions to David and Mark. The questions posed for the panelists include:

The issue of emissions from industry has been a major discussion with most industries engaging with the Lands Regulation Division with the Tłı̨chǫ Government. I'm glad that you touched on most points, but how do you include the supply chain associated with the industrial emissions in reduction?

- **David:** Most critical minerals are not commodities, so the bank is interested to see that you have sold your product all the way through the chain to the manufacturer. The manufacturers will want to do a green audit, where carbon emissions and ESG are key components, and must know if the company in question has green energy sources by the established target date. For example, all the manufacturers of automotive components (i.e., the electric motor that goes in the car) get audited back to its original power source and must agree that they have green energy sources before the product will be purchased or financed.

For the audience: Marc introduced the solution of small modular reactors (SMRs), but there have been historical incidents with nuclear reactors that have caused concern and limited acceptance. As we look at ways of moving towards green energy, what is the audience's view? Should we at least ask the regulatory boards to consider small modular technology?

- **Gloria Enzoe:** We have a lengthy history with SMR and nuclear energy, and it is not a good history. I personally wouldn't want to go in that direction. Reactors have issues in regard to cooling down, combusting, etc. If it's not 100% safe and there are known concerns to the environment and people's health, I would not be accepting of it.

Charlie Catholique: I am retired now, but I worked in the mine for a long time and have been heavily involved within my community. I sit on the Emergency Management Assistance Program (EMAP). When industry put up the BHP mine, they came to our community and the Elders spoke on the emissions from trucks exhaust. The proponent mentioned that they would install a filter on the exhaust of the trucks, but it never happened. They say they are going to make improvements, but they don't. While I was working in the mine, I saw the yellow haze floating in the air around the mine. In EMAP, we talk about the fact that improvements are never made, and we must do something about it. The workers do not speak up because they are worried about losing their job – I was the same way. Once the ground is broken to make way for the mine, it is already damaged and now we are trying to deal with the issues today. At the end of the day, we, as land users, are the ones that are impacted.

> *"Once the ground is broken to make way for the mine, it is already damaged and now we are trying to deal with the issues today. At the end of the day, we, as land users, are the ones that are impacted."*
> - Charlie Catholique

- **Marc:** The mining industry hasn't been legit for a long time, and I think that tide is changing. I can say that at Anglo American and DeBeers I think we will only be an underground mine going forward, which will prevent disturbance to the surface that is typically seen. We have innovative technologies with the hydrogen trucks, so instead of exhaust being emitted, only water is released. These are big innovations that I think will help address a lot of your concerns.

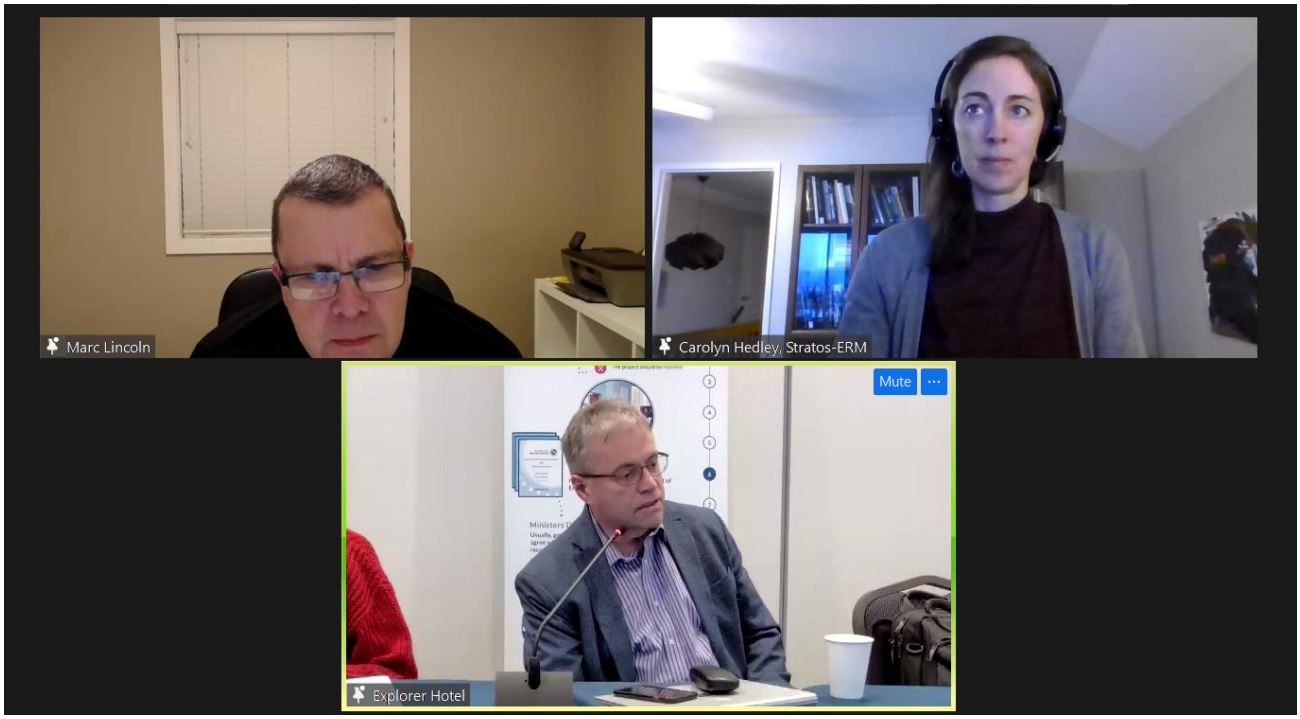

Figure 10: A snapshot of the Industry Innovations presenters, Marc Lincoln, and David Connelly, with Facilitator, Carolyn Hedley.

Break Video: Happening to Us

During the break on Day 2, a trailer video was played for participants. *Happening to Us* is a Tuktoyaktuk

Community Corporation film project made by the youth of the Inuit community of Tuktoyaktuk, Canada. The film was played, with their permission. For more information or to see the whole film, please contact Kendyce Cockney with the Tuktoyaktuk Community Corporation.

Comment from Roger Beck

Following the video shared at break, Roger Beck shared a few words as a follow up from his comments on Day 1. Roger shared that he is a harvester and land user who worked many trade jobs and noted that not many people from his community are trained to work in the mine. He indicated that harvesters in his community have concerns regarding pollution in the water and damage to the animals and plants. These concerns come from community members who were forced to move due to their way of life being altered and losing 25% of their land, water, and farm to the mine.

> *"We invite you to come to our community and work alongside us."*
> - Roger Beck

Roger wrapped up his comments by stating his community would benefit from the mine [representatives] going to the communities and experiencing the damage of the land, plants, water, and animals. As well as talking to the community members about the damage and how to better monitor the effects on the communities.

Indigenous Science

Dieter Cazon
Manager of Lands and Resources,
Łíídlıı Kúé First Nation

The Indigenous Science session included a presentation from Dieter Cazon, Manager of Lands and Resources of Łíídlıı Kúé First Nation (LKFN) on weaving Indigenous science with western science to inform decision-making related to climate change.

Dieter's presentation included a timeline (2017 – 2022) that noted significant changes to the area around Fort Simpson and how the LKFN worked to mitigate and adapt to the changes as a community.

Dieter presented two photos from 2019 where the community noticed significant changes to the areas around Fort Simpson. One photo shows the buds on the trees produced a month early, in March, and the other photo shows no snow on the ground in November. Both photos are examples of the significant changes the communities are seeing due to climate change.

In the fall of 2017, the LKFN held various information-gathering and Traditional Knowledge sessions with members to discuss changes and concerns regarding a local project. While travelling by plane to and from the working areas, they observed an early precursor to land subsidence in certain areas near Fort Simpson that were caused from melting permafrost. After the first snowfall, they saw that the land had slid into the river. With this alarming information, the LKFN approached the Scotty Creek Research Station Team to collaborate on determining the cause for the melting permafrost. They concluded that the permafrost thaw and hydration of the

soil was creating an issue of instability in the land and causing the ground to slide into the water. After presentations to the Canada Energy Regulator and the MVLWB, based on recommendations put forth by the LKFN Traditional Knowledge Study, major changes in the local project occurred, such as altering timelines to prevent disturbances to migration patterns.

In the fall of 2018, researchers at Scotty Creek and community members from the Dehcho investigated the subsidence by foot because they could not see the real damage to the land and the scale of the damage from the helicopter, which they used to previously monitor the area. The closer investigation raised concerns and questions from the community around the instability and what the community would be able to do about it. Dieter shared that they were working on ways to refreeze the ground through cost-effective thermosiphons as a potential solution. The soil is too granular to foster permafrost regrowth.

Figure 12: Members of the Dehcho Guardian Training Program.

Dieter also presented on the Dehcho Guardian Stewardship Program, which was developed in 2017 by the community. This program held training for 30 guardians in permafrost monitoring certification, commercial boat safety, radio operators license, and more. Through the training program, the Dehcho Guardians learned how to use Traditional Knowledge to identify and monitor issues and gained an understanding of the changes in the climate. A guardian-in-training asked what Traditional Knowledge is. Leaders of the program explained to the trainees that Traditional Knowledge is everything that makes you Dene; how you see the world, how you interact with the world, and how it affects you.

The community secured funding to work on the Dehcho Collaborative on Permafrost. This funding will support the community in investigating the following:

- Where is permafrost located in the Dehcho and where is it thawing?
- What is the rate and pattern of permafrost thaw?
- How is permafrost thaw changing the land?
- What adaptation and mitigation measures can or should be taken?
- How is permafrost thaw changing the flow and storage of water on the land?
- What is the long-term trajectory of thaw-induced change to the land and water?

Although these are basic questions, Dieter explained that they have given a focal point for research at Scotty Creek to understand the changes that will impact surrounding communities.

One of the long-term goals of the Scotty Creek Research Station was to become an Indigenous research station. It was an understanding that Traditional Knowledge doesn't have all the answers, nor does western science, but by working together the questions of climate change can be addressed to understand the changes that are occurring. In August of 2022, the land lease was transferred from Scotty Creek Research Station to the LKFN Chief and Council. Unfortunately, Dieter shared that in October 2022, the Scotty Creek Research Station was hit by a

forest fire due to high winds and dry temperatures. The LKFN is hoping to have the research station repaired and open for research again in 2024.

Dieter mentioned that LKFN had concerns that the Boreal Caribou Management Plan should be updated more frequently than every 10 years because of the accelerated effects of climate change. The communities have noticed the loss of boreal caribou habitat, and willow trees and beavers have migrated further north. Dieter stated that there are so many changes that must be considered like invasive species, tourists, and industry bringing projects into town. Dieter concluded by asking the audience to reflect on how we integrate the changes we are seeing into better preparing the land for these issues.

Question and Answer with Dieter Cazon

Following Dieter's presentation, participants were invited to pose questions / comments using the chat or 'raise hand' functions. The below comment was made in response to Dieter's presentation:

Florence Catholique: My First Nation (Łutselk'e Dene First Nation) has done a lot of research for years and we are always open to hire institutions to come and do research. The methodology that we use is participation research, which involves community members to partake in research of all types. The need to take that approach is so that the community who are people that live off the land know what is happening and to involve them in the use of the language. We found out through the research that a lot of English words are not transferrable to our language. The elaborations of the use of the English to explain the comprehension of the English word is sometimes lengthy. I would like to know where the funding came from for LKFN. We once had the University of Chicago get in touch because they wanted to look at the waterways in a bay near my community. Because of the warm weather, they wanted to see if it had melted to see if prehistoric fish would be found – which they were.

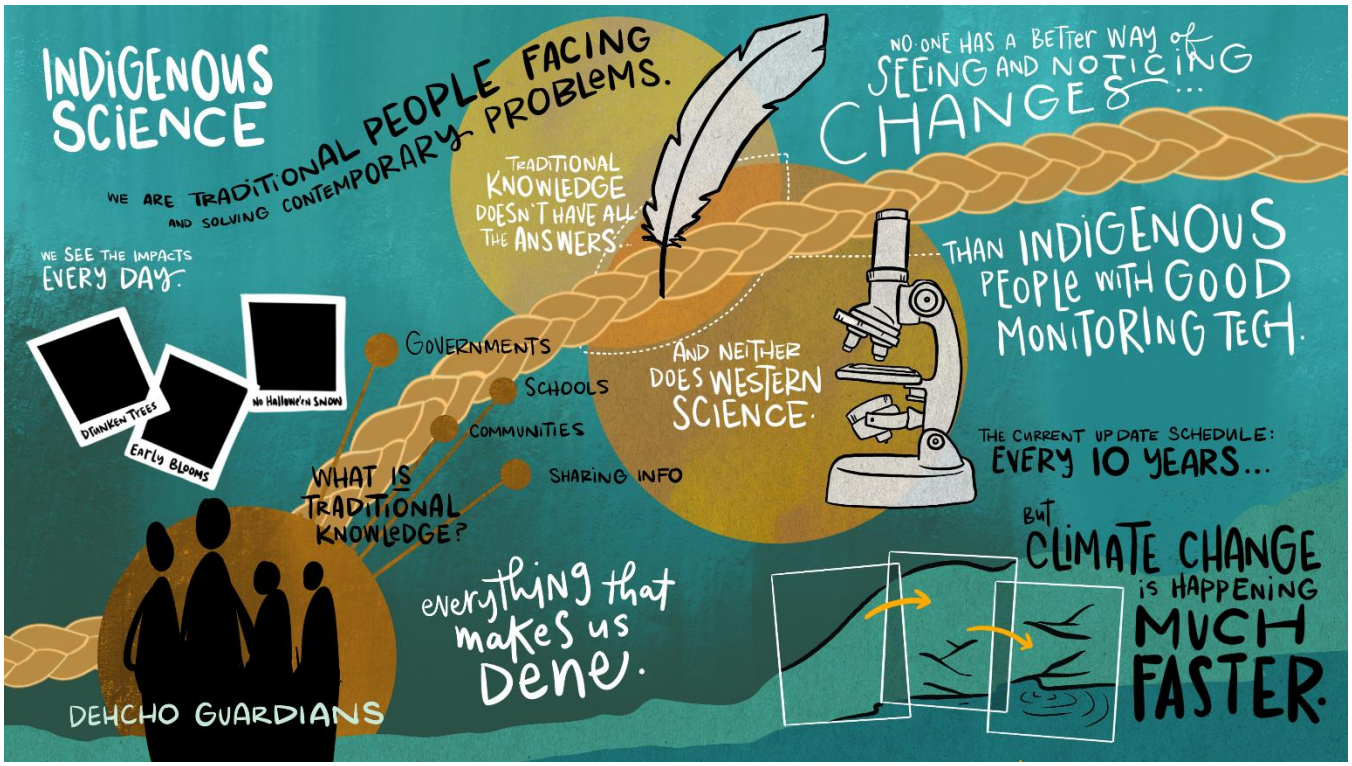

Figure 13: Graphic recording on Indigenous Science discussion by Corrina Keeling.

Panel: Emerging Leaders and Elders

Tanya Lantz, the Community Outreach Coordinator for the LWBs of the Mackenzie Valley, moderated a panel of Indigenous emerging leaders and Elders who shared their perspectives on climate change and the importance of collaboration and working together. Elder Edward Cholo, Monique Chapman, Lisa Tssessaze, Gloria Enzoe, Jennifer Duncan, and Dieter Cazon discussed what we should be striving for in the Mackenzie Valley as we all learn to adapt to a future with climate change.

Elder Edward Cholo
Łíídlıı Kų́ę́ First Nation / Fort Simpson

Monique Chapman
Yellowknife

Lisa Tssessaze
Athabasca Chipewyan First Nation

Gloria Enzoe
Łutsel K`e Dene First Nation

Jennifer Duncan
Behdzi Ahda" First Nation

Dieter Cazon
Łíídlıı Kų́ę́ First Nation / Fort Simpson

Tanya opened the panel noting that this will be the fourth panel of its kind and is pleased that Elders are participating this year for the first time. She welcomed the panelists and began a short introduction. Tanya noted that Indigenous people maintain 80% of the planet's biodiversity and 85% of the world's protected areas. With collective knowledge of the lands, sky, and sea, Indigenous people are excellent observers and interpreters of change in the environment. Collectively held knowledge offers valuable insights complementing scientific data with chronological and landscape-specific precision, and detail that is critical for verifying climate models and evaluating climate change scenarios developed by scientists that are a much broader spatial and temporal scale. Traditional Knowledge provides a crucial foundation for community-based adaptation and mitigations that sustain resilience of social and ecological systems at the interconnected local, regional, and global scales. Bringing Traditional Knowledge holders and science together is finally gaining momentum. She stated that Traditional Knowledge tells us that the world is going to change and that it always has been changing and scientists today recognize that there are Indigenous languages that have Indigenous words within them that can better describe

these empirical observations about the environment that don't exist in the English language. She stated that we need many forms of knowledge to tackle climate change together.

The alternative is to relocate or rebuild – we must work together. This is an opportunity to hear from Indigenous communities and the observations they have witnessed. Our grandparents taught us to look at the clouds and to see from them what weather will come and how the water moves, and to look at the stars and animal behaviour. Indigenous people have been here since time immemorial and have adapted to many changes. Tanya concluded by emphasizing that change is not new, but the rate of change is quite drastic. Tanya introduced the panel of very knowledgeable Indigenous emerging leaders and Elders, to bring together voices and share knowledge for the benefit of all.

Lisa, what have you experienced in your community in the face of climate impacts?

Lisa: I was born and raised in Fort McMurray, Alberta. I call it the Tar Sands Pit because we are surrounded by oil sands. At the Athabasca Chippewa First Nation we knew there were changes in climate and we asked ourselves – what's our plan? We created a community energy plan, which gave us some tools to invest in green energy; we bought solar panels in the communities and installed them on our homes in the land. We are working out the kinks and have been installing the solar panels, but we must teach members how to use them, maintain them, etc. We need to transition to adapt and we're working to empower our communities to help us transition.

> *"We need to transition to adapt and we're working to empower our communities to help us transition."*
> - Lisa Tssessaze

With industry, we hear what they're doing; they are working on the Pathways Alliance initiative of six companies. Rather than helping towards a goal of net-zero, the initiative is instead allowing the companies to continue developing the oil sands and continue emissions. Pathways Alliance say it is a carbon capture sequestration project and explains that modifications will be made to the stack to suck out the carbon and liquify it before it goes to the air. They are pitching that they will pipe it from Fort McMurray to Coal Lake and deep inject it 4000-feet deep, so it "never" impacts the environment. Pathways Alliance has not shared documents, proven research, etc. In my view, it is a huge campaign to help industry look good, but we, as the Nation, need to see proven methods. I see it as a pipeline and will continue to call it what it is. I think we should look at our demand as people of this earth. We are the ones demanding this energy and can control shutting off our lights, not driving so much, etc. We're in power, so what can we do to change our lifestyle to adapt to climate change so we're not making the impact ourselves? Conflicting governments don't help. We deal with the *Sovereignty Act* and have heard provincial government in Alberta say they don't need the federal government time and time again. The federal government is who we signed the treaty with, so we trust them, and we need more oversight from them in Alberta, even though the province and industry will not like that. We must get loud and creative when we talk about the impacts we face. We can't rely on industry or government; we must empower our community to create our own climate plan. We've adapted to massive changes over thousands of years, and I believe we can still adapt; we just need to give our people the tools they need to adapt.

Jennifer, can you speak to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and how that impacts the decision-making process?

Jennifer: I think of myself as Dene first, and then a lawyer. I had to keep that perspective when I went to law school, and I was learning western law and knowing it was my responsibility to translate between our Dene laws

and Western Canadian laws. I want to focus today on decision-making, which picks up nicely from where Lisa left off when she said that "it is up to us as Indigenous peoples to put forward our knowledge, our traditions, and our ways of governance and trust our own processes." I would like to highlight Article 32 of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and how that compliments the MVRMA. Article 32 speaks directly to free, prior, and informed consent (FPIC). We know that UNDRIP applies to the MVRMA, as it is federal legislation. The Canadian government did pass the *UN Act* and there is an action plan currently being drafted for implementation. The obligation to consult and cooperate in good faith to obtain FPIC is the Crown's responsibility and the Boards established under the MVRMA can assist in meeting the obligation. Proponents of projects must also comply with FPIC for their projects to succeed. FPIC in general is a relational and ongoing process as per the context and it is **not** a one-time yes or no.

Indigenous governments, project proponents, the Crown, and co-management boards must all implement consent-based decision models. It is encouraging to know that Mackenzie Valley co-management regime is premised on a collaborative decision-making act with Indigenous involvement, so the MVRMA already contains significant elements of FPIC. Because the MVRMA is a co-management regime based on collaborative decision-making with Indigenous governments, MVRMA can continue to meet and exceed the minimum standards of FPIC as laid out in UNDRIP. As we are seeing exciting new developments of UNDRIP being implemented in Canada, what we are seeing on the spectrum of consultation and consent is we're moving towards the consent-based decision model where Indigenous peoples are participating fully and effectively through their Indigenous governments. Here in the NWT, we are making a lot of movement forward in the co-management regime and ensuring that Indigenous voices are being heard.

> *"Here in the NWT, we are making a lot of movement forward in the co-management regime and ensuring that Indigenous voices are being heard."*
> - Jennifer Duncan

Dieter, can you expand on some of the approaches LKFN takes to advance climate change efforts?

Dieter: Some of the basic precepts that guide us and the work we're doing is the Dene laws and principles. My grandfather told my father, who told me, to take care of the land so the land will take care of us. There is so much trust from our ancestors that we will instill those principles in our youth. There is an issue with Traditional Knowledge and how we fund programs to support Traditional Knowledge – we must keep an eye on projects that we can apply for to receive funding. At LKFN, we take an 'A-B approach' for Traditional Knowledge gathering – the 'A' is the baseline information and information on climate change. Regardless of the project we are working on, we always gather this information because there are not many opportunities to do Traditional Knowledge interviews with Elders. We've lost many Elders and a lot of information, so it is critical to get that knowledge recorded for history. 'B' is the project-specific information that you are gathering. The main goal of every project is to ensure that the First Nation is taken care of first. Oftentimes, you will be told "you can't do this" about a project from government or other parties – I think it speaks to the resiliency of the Dene people. We must advance our work and we must communicate any issues and concerns and share useful information and strategies with other communities.

> *"My grandfather told my father, who told me, to take care of the land so the land will take care of us."*
> - Dieter Cazon

Elder Cholo, can you share some of your observations that have resulted from climate change in your community?

Elder Cholo: I was born and raised on the land and grown up a land user and harvester. I have seen a lot of changes, even in bees. I used to run into them all the time as a child and now you can walk all day and not see them once. Landslides are happening more frequently; fish are changing and disappearing. We used to go up the river and see shorebirds, but we don't see that anymore. We used to dip a cup in the water when we would go fishing, now we must buy drinking water to go with us. We use the land all year and ten years later we notice that where trails used to be, they are now either dried out or are under water. In September, we used to set traps and have ice on the river, now in November the river is still running. Nowadays, when you take youth out on the land to try and teach them Traditional Knowledge, they ask how much they're going to get paid and spend the time checking their phone. Climate change is changing so much, and we can't do anything about it unless we adapt to it. This summer, we had a very limited amount of rain. I used to cut the grass two or three times a week in the summer and now I only cut it two times in the entire season. In the spring, I used to wake up to the sound of many birds signing, but now I only hear the odd robin. I remember when we used to beaver hunt and sleep in the open and we would hear ducks, cranes, geese, and frogs, but now we hear nothing. It seems like there are hardly any of those noises around. Climate change is a human disturbance and changing the natural world around us. We need to learn how to adapt to change.

> *"We used to dip a cup in the water when we would go fishing, now we must buy drinking water to go with us."*
> - Elder Edward Cholo

In response to Elder Cholo's remarks, Tanya shared a short anecdote. She stated that when we wake up in the morning and get ready for the day, we look at our phones to tell us what the weather is, but we could just look outside. We could listen to our Elders because they didn't have phone apps to tell them what the wind direction would be, the cloud formation, the animal migration, etc., but instead they are all indicators that the Elders would be able to read. Tanya emphasized that the Elders and Traditional Knowledge holders are better than an app. The land is our supermarket where we go to get our food, clothing, medicines, and it is where we go to learn.

Monique, can you share some insight on your experience at the Conference of the Parties of the United Nations Framework Convention on Climate Change (COP27)?

Monique: I attended COP27 in Egypt and I have been using every opportunity to talk to decision-makers about what I heard and learned at the convention. While at COP27, it was great to see other youth from across Canada and across the world and I'd like to note that there were just as many women and Indigenous people participating and excited to learn, but not everyone was listening to us. We frequently had our own spaces and were talking to each other; it was disappointing to see very few men or non-Indigenous people listening to the youth conversations. In all these takeaways, there is a great opportunity for the NWT and the way we interact with our people, making sure our people are invited to the table and being offered these opportunities to speak and be listened to.

My next takeaway is that we are done with the 'doom and gloom' perspective, and I've noticed today that there have been some great positive spins to the climate change conversation – we are recognizing that there are a lot of impacts in the NWT and across the world. It can get really disheartening when you're constantly thinking about the negative, but there are still opportunities, solutions, and hope. That was not the focus of the conversation at COP27 unfortunately, it was still very focused on the negative. Youth are not given the opportunity to pretend

climate change isn't happening, so I appreciate that the conversation here today is different than it was in Egypt. It was quite disappointing to be at the convention and not hear about solutions. We know that there are solutions out there and Indigenous people are doing really great efforts. Our governments here are putting in the work that is needed, but I could count on one hand the number of times solutions were mentioned at the international scale. I was hoping to hear about new and innovative ideas to bring them back to the North so that we could improve our ways or create new solutions. I think that is an opportunity for the NWT as we are going to these meetings, whether local or international, that we are the ones emphasizing that we are done talking about the impacts and instead, talking about solutions. I did notice that one of the solutions brought up time and time again at the Indigenous pavilion was that we need to make sure we are using our language to recognize things and incorporating Traditional Knowledge into the work being done. The word 'resilience' was used a lot, and one of the other delegates from the Tłı̨chǫ Government mentioned that 'resilience' cannot be translated to Dene languages and the closest way of using it is "live past it." That example shows us that if we're going to continue to push this language amongst our own people, but it is not understood, then it is not effective.

> *"We need to make sure we are using our language to recognize things and incorporating Traditional Knowledge into the work being done. The word 'resilience' was used a lot, and one of the other delegates from the Tłı̨chǫ Government mentioned that 'resilience' cannot be translated to Dene languages and the closest way of using it is "live past it."*
> - Monique Chapman

The NWT set an example at COP27 – we had a delegation of five and majority were women, two delegates were Indigenous, two were youth – and I felt that what we shared was valued by other delegates. We had the opportunity to speak with other jurisdictions across Canada, urging them to ensure Indigenous and youth voices are being heard. We should commend ourselves in the NWT, we are doing great with mending our relationship with Indigenous people and it is great that we are continuing to work forward and be better.

Gloria, can you speak to the Ni Hat'ni Dene Guardianship Program and the importance of Traditional Knowledge in the face of climate change?

Gloria: It is important for me to recognize my parents. I sit here and think about the work my mom has put towards climate change efforts. It was the past Elders that were able to fight for us to be recognized to sit at these tables and participate in decision-making. I sit here to honour the Elders and honour their future generations. When I think about climate change, I think about the importance of terminology; a lot of the words used in these meetings cannot be translated into Indigenous languages. When we're at home talking about our experiences at these tables, the knowledge cannot be processed properly because we are using western terminology. When I think about climate change, there is not an Indigenous word for it; climate change is the future unknown, but the Elders would tell us that change is always occurring within our lands, but it is occurring faster than it should be. I have traditional parents, I have always lived off the land, and I've never really left home.

> *"When I think about climate change, I think about the importance of terminology; a lot of the words used in these meetings cannot be translated into Indigenous language."*
> - Gloria Enzoe

When the opportunity came to build a program based on the concern for the health of the land, that is how Ni Hat'ni Dene Guardianship Program came to be. Guardians across the nation are emerging so fast and we are proud of that. When I think about decision-making, I think about how guardians can partake in the decisions in the regulatory process and development of industry; their work needs to be recognized. I think about how I have a degree in Traditional Knowledge, but western science didn't give me that degree…my parents, the land users,

and the people in my home gave me that knowledge. I was able to participate in the Ni Hadi Xa Monitoring Program that is at Gahcho Kue mine. Western science doesn't recognize our Traditional Knowledge and it always seems to supersede what we're observing, yet they take our Traditional Knowledge, write it in their report, and take it as their own. Traditional Knowledge is its own science; we start to think about the data in our heads and the information that has been passed down to us, and we want to understand the changes that are occurring to help try and correct them.

I am hesitant when I think about climate change because industry can say they have impacts and that climate change is the force impacting the traditional area. At the same time, you sit at these meetings and hear that industry infrastructure now needs to change because climate is changing. If that's what is happening, then we know we're going to have impacts on our livelihoods, which is living off the land. When Indigenous people are sitting at a table and questioning a program and wanting things tested, industry needs to respect that because we've always lived off the land. I've seen changes myself: landslides, erosion, new species, water levels changing, sediments in water changing and the warming of water. When all these things are occurring faster than they should be, as a Traditional Knowledge holder, we are in safety mode. As travelers on the land, we notice all the changes. Right now, we travel by boat and ice. I've noticed the ice itself is freezing differently because it is warmer and freezes over like slush. The cracks are smaller in the spring and it's thawing faster making it unstable and safety has become a real issue. The importance of Traditional Knowledge must be recognized. We need to understand we are in a critical time for climate change, and the sooner we recognize that Dene people have degrees in Traditional Knowledge, the sooner we can address the issues that are occurring.

"I've seen changes myself: landslides, erosion, new species, water levels changing, sediments in water changing and the warming of water."
- Gloria Enzoe

Tanya concluded by thanking the panelists for sharing their insightful knowledge on climate change. She left the audience with a question to reflect on: "How do you see future collaborations to get to a position where voices, worldviews, and common concerns, of Indigenous, Settlers, Immigrants, all citizens are brought to a place of common and valuable action?" She emphasized the importance of building and sustaining reciprocal relationships where we work together based on respect. She ended with "It is a responsibility of us all."

Figure 14: Screenshots from the Emerging Leaders and Elders Panel. Panel members: Elder Edward Cholo, Monique Chapman, Lisa Tssessaze, Gloria Enzoe, Jennifer Duncan, and Dieter Cazon. Moratorium: Tanya Lantz.

Figure 15: Graphic recording of Emerging Leaders and Elders panel discussion by Corrina Keeling.

Closing Thoughts

To conclude the fourth and final instalment of the MVRMA Workshop Series, Carolyn summarized the climate change topics discussed over the two-day event for the audience and thanked all the speakers and the participants for engaging on the topics and providing such thoughtful and important reflections. She noted that a donation on behalf of all panelists and speakers had been made to the Indigenous Wellness Camp as a gesture of appreciation.

Corrina outlined their graphic recordings from the day, which can be found in Appendix C.

Mark Cliffe-Phillips from the MVEIRB offered closing remarks on behalf of the organizing committee. He highlighted that the workshop has been a great example of the need for collaboration. Climate change is universal and impacts us all globally. We heard messaging throughout the past two days that because climate change is such a collective problem, we need to look at collective solutions. He noted that collaboration is where we come out ahead in the NWT. We need to leverage our great start to find meaningful solutions and make decisions that are informed and effective in tackling the tough challenges caused by climate change. Mark expressed gratitude to the Elders and all the speakers that were able to participate.

Figure 16: A snapshot of Mark Cliffe-Phillips providing closing remarks on behalf of the organizing committee.

This was the culmination of four virtual workshops, which was different than the approach of previous years. Mark noted that with the challenges we faced with COVID-19, the format was changed to virtual, however, the intention for next year is to pursue an in-person MVRMA workshop and in-person visits in the region and communities.

Closing Prayer

Mark introduced the Yellowknives Dene First Nation (YKDFN) Drummers to close-out the MVRMA Workshop Series in a good way. Cody Drygeese of the YKDFN Drummers introduced the journey song they performed, which is a song done traditionally to close events and gatherings to show gratitude for the journey that brought us together and to pray for a safe journey home.

Figure 17: A snapshot of the YKDFN Drummers performing the closing prayer song.

Appendices are available under a separate cover.