



NWT WATER STEWARDSHIP STRATEGY

12th Annual Implementation Workshop

November | 2021

STRATÉGIE SUR LA GESTION DES EAUX DES TNO

12^e atelier annuel de mise en œuvre

Novembre | 2021

Government of Northwest Territories
Gouvernement des Territoires du Nord-Ouest



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Appendix 1: Full workshop agenda

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1.0 Introduction

This report provides an executive summary of the **12th Annual NWT Water Stewardship Strategy Implementation Workshop**, which was held virtually on November 16-18, 2021, and presents the key points from panels and presentations, including chatroom and facilitated discussions, survey polls and results by each day. Over three days the interactive workshop included a total of two pre-registration surveys, seven presentations, four panel discussions, four live survey polls and a workshop satisfaction survey. The executive summary below is intended to highlight the purpose, goals, intended outcomes and proposed actions for each session. A key contact, link to additional resources, referenced reports and strategies have been provided within the text of the report where available.

The workshop was facilitated by Sherry Lovely, Momentum Training Services, with technical support services provided by Vincent De Leon, Kellett Communications.

For the full workshop agenda please refer to **Appendix 1**. A summary of all poll questions and responses are provided in **Appendix 2**.

2.0 Executive Summary

The **12th Annual NWT Water Stewardship Strategy Implementation Workshop** was held virtually on November 16-18, and featured three-half day sessions from the *Water Stewardship Strategy* Implementation partners, the new Climate Change Advisory Group, and presentations on the proposed Great Slave Lake Research and Monitoring Program.

Under the theme of **Collaborating for Water**, this workshop allowed for knowledge sharing and recognized the meaningful work of water and climate change partners, highlighting the importance of continuing collaboration to achieve the goals of the current and future [Water Stewardship Strategy, 2021-2025 Action Plan](#) and the [2030 NWT Climate Change Strategic Framework \(CCSF\)](#).

To encourage collaboration on overlapping issues between water and climate change, this year's workshop brought water and climate change partners together for the first time. The following objectives were met:

- Share recent work and discuss how to work together to implement the new five-year *NWT Water Stewardship Strategy Action Plan (2021-2025)* and to ensure continued progress towards the vision of the *Water Stewardship Strategy*. Presentations and panel discussions informed partners of updates.
- Introduce the purpose of the new Climate Change Advisory Group and identify how to increase collaboration to address climate change. This session included presentations on the state of climate change in the Northwest Territories and an introduction to adaptation planning. Two break-out group discussions were facilitated and focused on identifying adaptation actions, priorities, and barriers to address water-related climate change risks.

- Raise awareness of existing and proposed research and monitoring programs on Great Slave Lake (GSL), including the development of a coordinated GSL Research and Monitoring Program proposed by the Department of Environment and Natural Resources (ENR). This session included presentations by the Arctic Research Foundation, the Department of Fisheries and Oceans Canada, and ENR about research and monitoring programs on GSL and sought feedback from partners on advancing local Indigenous collaboration and engagement using survey polls and a facilitated discussion.

Close to 120 people attended each day of the workshop with a total of 156 water partners participating, representing 21 different Indigenous government and Indigenous organizations, nine academic institutions, seven Northwest Territories regulatory agencies, eight non-governmental organizations and 12 federal and territorial government departments. The Water Strategy Indigenous Steering Committee (ISC) also participated in the workshop, representing their respective Indigenous government and Indigenous organization interests.

A full list of workshop participants is provided in **Appendix 3**.

“The waters of the Northwest Territories will remain clean, abundant, and productive for all time.”

NWT Water Stewardship Strategy Vision

2.0 Sommaire

Le 12^e atelier annuel de mise en œuvre de la *Stratégie sur la gestion des eaux des TNO* s’est déroulé virtuellement du 16 au 18 novembre. L’événement comportait trois séances d’une demi-journée animées par les partenaires de mise en œuvre de la *Stratégie sur la gestion des eaux* et le nouveau Comité consultatif sur le changement climatique, ainsi que des présentations sur la proposition d’un programme de recherche et de surveillance sur le Grand lac des Esclaves.

Sous le thème « **Collaborer pour l’eau** », cet atelier a permis de partager des connaissances et de souligner le travail important des partenaires des secteurs de l’eau et du changement climatique, mettant en évidence l’importance d’une collaboration continue pour atteindre les objectifs de la *Stratégie sur la gestion des eaux*, du *Plan d’action de 2021 à 2025* et du *Cadre stratégique sur le changement climatique des TNO 2030*.

Afin de favoriser la collaboration à l’égard des problèmes communs des secteurs de l’eau et du changement climatique, cette année, l’atelier réunissait les partenaires de ces secteurs pour la première fois. Les objectifs suivants ont été réalisés :

- Partager les travaux récents et discuter de la manière de travailler ensemble pour mettre en œuvre le nouveau *Plan d’action de 2021 à 2025 de la Stratégie sur la gestion des eaux* et pour poursuivre la mission de la *Stratégie sur la gestion des eaux*. Les partenaires ont été informés des dernières nouvelles au cours de présentations et de panels.

- Présenter la fonction du nouveau Comité consultatif sur le changement climatique et identifier les façons d'améliorer la collaboration pour lutter contre le changement climatique. Cette séance incluait des présentations sur l'état du changement climatique aux Territoires du Nord-Ouest et une introduction à la planification des mesures d'adaptation. On a organisé deux discussions en petits groupes, axées sur l'identification de mesures d'adaptation, des priorités et des obstacles pour faire face aux risques créés par les effets du changement climatique liés à l'eau.
- Mettre en lumière les programmes de recherche et de surveillance sur le Grand lac des Esclaves et les propositions de tels programmes, dont l'élaboration d'un programme coordonné de recherche et de surveillance sur le Grand lac des Esclaves, suggéré par le ministère de l'Environnement et des Ressources naturelles (MERN). Cette séance comportait des présentations de l'Arctic Research Foundation, de Pêches et Océans Canada et du MERN sur les programmes de recherche et de surveillance sur le Grand lac des Esclaves. Par l'entremise de sondages et d'une discussion, on a recueilli l'avis des partenaires sur les façons de faire progresser la collaboration et le processus de consultation avec les Autochtones de la région.

Près de 120 personnes étaient présentes chaque jour, et un total de 156 partenaires du secteur de l'eau ont participé à l'atelier. Ces derniers représentaient 21 gouvernements et organismes autochtones, neuf établissements d'enseignement, sept organismes de réglementation des Territoires du Nord-Ouest, huit organismes non gouvernementaux et douze ministères fédéraux et territoriaux. Le Comité directeur autochtone (CDA) de la *Stratégie sur la gestion des eaux* a également participé à l'événement, représentant les intérêts de son gouvernement et organisme autochtones.

L'**annexe 3** présente la liste complète des participants.

« Les eaux des Territoires du Nord-Ouest resteront toujours propres, abondantes et productives. »

Mission de la Stratégie sur la gestion des eaux des TNO

3.0 Day 1: NWT Water Stewardship Strategy Implementation Workshop Session

3.1 Opening Remarks

The workshop opened with a high-level overview of the agenda and opening Prayer from Indigenous Steering Committee Member Leon Andrew, Sahtu Secretariat Inc. and welcome remarks from Dr. Erin Kelly, Deputy Minister, Environment and Natural Resources.

3.2 NWT Water Stewardship Action Plan 2021-2025

(Meghan Beveridge, Manager Watershed Partnership and Agreements, ENR)

This presentation gave a brief overview of the new NWT Water Stewardship Strategy five-year Action Plan for 2021-2025 (November 2021). The presentation shared the goals, objectives, governance structure, and the role of the Indigenous Steering Committee in guiding the implementation of the new Action Plan.

The presentation outlined that, while the Action Plan is similar to the previous two five-year Action Plans, the 2021-25 Action Plan included new features:

- Principles for strengthening Indigenous knowledge, perspectives, and values in water stewardship. Throughout the engagement process, water partners expressed that:
 - Water stewardship in the NWT should be based on collaboration between Indigenous knowledge and western science.
 - Successful water-related research projects require relationships between outside researchers and community members through early and continued community engagement.
 - Water stewardship should reflect the importance of the wisdom contained in Indigenous languages, in particular place names, and the importance of intergenerational knowledge transmission.
 - The Action Plan should clearly recognize and respect Indigenous and Treaty rights.
 - Icons indicate which Action Items link to other GNWT strategies or action plans.
 - Proposal for a WSS multi-stakeholder working group to enhance collaboration (see Section 3.5).

3.3 Panel: Indigenous Steering Committee (ISC)

Panel members were asked to identify each of their roles in the ISC (formerly the Aboriginal Steering Committee) for strengthening collaboration for the next five-years and to identify top water priorities for the coming years. This is what we heard:

Leon Andrew, Sahtu Secretariat Inc.

- Has been involved in Water Strategy since 2013 – water is very important to the people of Sahtu and look forward to continued discussion.
- Unprecedented changes due to climate change are already happening and can be seen by land users up and down the Mackenzie Valley.
- Priorities are to collaborate with neighbours and continue to keep the youth involved.

Tim Heron, Northwest Territory Métis Nation

- Noted that he is happy that collaboration is ongoing and is working well with federal government partners. Priorities are that “water is all of our responsibility” and “don’t bugger it up.” We are on the right path for water protection:
 - Keep the youth involved.
 - Continue to build partnerships with scientists.
 - Continue to maintain good records.
 - Recognize that our youth are the future - let’s get them trained.

Michelle Gruben, Inuvialuit Regional Corporation

- Traditional knowledge and local knowledge are very important and she expressed how pleased she is about the good work that has happened, which included significant community input.
- Priorities include finalizing and implementing the Yukon Transboundary Water Agreement and continuing to increase youth involvement.

Phoebe Rabesca, Tłı̨chǫ Government

- There have been significant differences in local water levels in the Tłı̨chǫ region.
- Water quality and sediment sampling provides baseline data.
- In the future would like to go the White Beach, in the North Arm area, a proposed protected area - Dınàgà Wek’èhodi - to take water samples.
- There is concerned about climate change as ice is thin and fresh water is not as fresh as it once was.

Highlights from discussion that followed are captured below

[Comment from a staff member at the Tłı̨chǫ Government:](#)

The Marion Monitoring Stewardship Program monitors for heavy metals, contaminants in the water, fish and sediment in the Marion watershed which links the Tłı̨chǫ watersheds together. This program was started because of potential mining at NICO Mine (Fortune Minerals) and a need to establish baseline data prior to the mine opening.

Comment from a member of the Tulita Renewable Resource Council:

Water is very important to the community of Tulita. We have been told by our elders that water is the highest priority. Climate change has changed the experience for us and youth are getting more involved. We want to ensure the community always gets the water they need. The breakup a few years ago in Fort Good Hope and Fort Simpson left uncertainty about what is in the water and today they are collecting fish to sample, and water continues to be so important. Today's elders are passing on and climate change impacts are being felt and elder knowledge is key to protect the waters of the future.

3.4 Panel: Collaborations in Water Management and Monitoring

Representatives from the Gwich'in Tribal Council and the Guardian Program shared their initiatives to achieve the NWT Water Strategy's vision.

3.4.1 Gwich'in Tribal Council; Gwich'in land, culture & economy for a better future

(Christina Martin, Gwich'in Tribal Council)

The presentation highlighted the Gwich'in Settlement Region (GSR), gave an overview of Gwich'in Tribal Council (GTC) objectives and emphasised that the Gwich'in participate equally in the regulation of land and water in the Gwich'in Settlement Region (GSR) by appointing members to regulatory authorities. Collaboration with water partners includes:

- Water licenses involve engagement and consultation with Gwich'in stakeholders.
- Gwich'in Land and Water Board follows projects throughout their lifespan.
- Water Stewardship Strategic Goals.
- Gwich'in Renewable Resources Board is a main instrument of wildlife, fish and forest co-management frameworks.
- Priorities include: muskrat and beaver programs, species at risk, and whitefish monitoring.

Collaborating organizations in the GSR include University of Alberta, Wilfrid Laurier University, and Department of Fisheries and Oceans, among others.

3.4.2 Presentation: Collaboration in Water Management and Monitoring K'ahsho Got'ine Guardians, Summer 2021

(Presented by Twyla Edgi-Masuzumi with input from full Guardian project team)

The four full-time Guardians are John Tobac, Joseph Tobac, Twyla Edgi-Masuzumi, Danny Masuzumi and Buddy Gully. The purpose of the Guardian Project is to address community and management

board concerns identified around water quality and to conduct long-term water monitoring. The following initiatives were discussed:

- Wetlands and Water Quality: A Community Approach.
- Aquatic Ecosystems in the Fort Good Hope Area as Indicators of Environmental Change.
- Groundwater and Ground Thermal Regimes Around the Dump.

Highlights from discussion that followed are captured below

Comment from Josh Baller - ECCC:

Thank you for the presentations! For the various guardians' programs, can you share the approach taken for braiding Indigenous Knowledge (IK) and western science? Are there any example reports you can share that highlight your approach to IK braiding?

The premise that the Guardians work from is that the primary knowledge holders are K'ahsho Got'ine. We are lucky that we have built some longer-term relationships, and trust, with scientists who spend significant time with community members. As an organization, we hold meetings with community members to determine what questions the community is interested in studying, and then we reach out to scientists through our networks who can help us to investigate those questions. The baselines are inherent in the knowledge holders, and in the place names and language. Science is helping us to make sense of the accelerating changes due to industrialization and climate change - temperature and seasonal changes; increases in forest fires; greater risks from persistent organic pollutants (POPs) and the chemical impacts of industrialization. From the outset, the research questions are posed by the community.

3.5 Action Plan 2021-2025: Developing the Water Stewardship Strategy (WSS) Working Group

(Presented by Meghan Beveridge, ENR)

The 2021-2025 Action Plan was presented with a short overview and facilitated discussion with workshop participants to address

Action item 1.1.B.1 – *to establish a multi-stakeholder working group (to be called the Water Stewardship Strategy Working Group) to further support collaborative implementation of the Water Strategy Action Plan and priority Action Items, such as an Awareness Building Strategy, and to track progress.*

This session sought to identify top themes from water partners, discuss options for how a working group or groups would function, and to poll which water partners would like to be involved in this initiative.

The working group concept responds to recommendations from the independent evaluation of the 2016-2020 Action Plan and to the engagement feedback heard during development of the 2021-2025 Action Plan.

The working group would be made up of interested water partners, including IGOs, regulatory boards, non-governmental organizations, different levels of government, academics, and industry – similar to the WSS Action Plan Development Committee. It would be a working group that would respond to advice from the ISC, as well as other water partner organizations, and it would focus on specific issues.

In summary, 33 of the 52 respondents would like to participate in the WSS Working Group. Most voters were in favour of issue-specific working groups.

The WSS Action Plan identified a number of priorities – some specific Action Items; others are cross-cutting.

- Awareness building strategy (Action 1.2.1)
- Improve linkages/or alignment across local and regional initiatives (cross-cutting action)
- Strengthen capacity across community-based monitoring initiatives (Action Item 1.3 A 1 & 2)
- Improve data collection, sharing and management (Action 2.2A 1)
- Groundwater priorities (Action 2.1B 3)
- Enhancing the use of Indigenous Knowledge in decision-making and research (cross-cutting action)

Poll respondents identified these top three priorities:

1. Enhancing the use of Indigenous Knowledge in the decision-making and research (cross-cutting action) (38/52) 73%
2. Improve data collection, sharing and management (Action 2.2A 1) (35/52) 67%
3. Strengthen capacity and improve alignment across local and regional initiatives (cross-cutting action) (33/52) 63%

3.6 A Brief Look at the Current State of Water Quantity

(Presented by Shawne Kokelj, Hydrologist, ENR)

This presentation provided an update on water levels in 2021 but began with an acknowledgement that it has been a very difficult year in terms of water levels and water-caused damage across the territory, and a note that data presented should still be considered provisional as the Water Survey of Canada, who collects the data, have not yet completed their final data review process.

Unusually high-water levels in early 2021 led to a situation where there would be greater consequences if and when ice jams occurred, with a higher number of flood events. Record high water levels were seen in 2020 on Great Slave Lake and the Mackenzie River; and both remained high over winter into 2021. Spring flood events occurred in Hay River, Jean Marie River, Fort Simpson, Fort Good Hope and Aklavik. Over the past year, there were open water flood events (not related to ice-jams) on Great Slave Lake, at traditional hunting/trapping camps and seasonal cabins and also on Highway 1, closing access to the NWT along the primary road north for a short time in June 2021.

Highlights from discussion that followed are captured below

Question from Dinah Elliott

Do you know if the dam at Tazin Lake is designed for overflow, or is the overflow a concern for the dam stability?

- Overflows were anticipated but results of latest overflow period are being addressed. SaskPower has made an assessment and would be the contact for additional information.

Question from Jessica Jumbo

Has there been any data linked or research on the rise in water levels with permafrost melt and permafrost basins draining into creeks, rivers, and lakes?

- We have some information. On our larger rivers, we have not seen a trend in water levels increasing, whether due to permafrost thaw, or other factors. On smaller rivers, there are indications that winter flows have increased somewhat, and hope to investigate further.

Question from Barrett Lenoir

What about satellite imagery of the area? LIDAR, satellite imagery, observations, combined with algorithms borrowed from river engineering, could fill large gaps in our knowledge of global river flows where field data are lacking. Was there imagery during those times of flooding?

- Yes, imagery has been taken. We also had satellite constellation imagery that was looking at ice specifically.

Question from Norman Snowshoe

Do we have precipitation records from the Yukon? Atmospheric river – Would this happen in the North?

- Not sure how an 'atmospheric river' is defined. In terms of the Yukon, we have a close relationship with their Hydrology group, and we use their data. These data may be available online. They do keep us posted year-round of any events that could be of concern in the NWT and they also publish a Spring Outlook for river conditions, similar to the GNWT.

3.7 Presentation: Celebrating 10 years of Community-based Monitoring - NWT-wide Community-based Water Quality Monitoring Program

(Presented by: Gila Somers, A/Manager, Research and Monitoring, ENR, Lindsay Day, Gordon Foundation and Mike Low – Dehcho AAROM, Alyssa Bougie, Sahtu Renewable Resources Board)

The final presentation for Day 1 was intended to celebrate the continuous efforts of the NWT Community-based Water Quality Monitoring Program (CBM) over the past 10 years, showcasing the 21 communities that have been engaged in monitoring initiatives.

The goal of the NWT-wide Community-based Water Quality Monitoring Program is to support communities to conduct local monitoring to answer their own questions about water. The role of ENR is primarily to provide equipment, hands-on training for community monitors and guardians, workshops, technical collaboration, analysis of samples, develop training materials, wayfinding ways, and to build relationships.

ENR has partnered with Gordon Foundation to develop an online tool to access water quality data like the CBM program data. Mackenzie DataStream has a collection of 700 water quality data samples since 2016 that are available for anyone to view at mackenziedatastream.ca.

The CBM Program is based on long-term working relationships. These relationships are true partnerships, and this program wouldn't be where it is today without them. Alyssa Bougie perspective of the CBM:

“Being a part of the CBM is great. We just started this summer, so it is still very new. It has been valuable for the youth to learn how to use different equipment, etc. It really is a great collaboration.”

Additional contacts and resources:

NWT Water Stewardship Strategy and Action Plan: www.nwtwaterstewardship.ca

Water Quality Guidebook, online version: <https://datastream.org/guide>

Celebration video: <https://www.youtube.com/watch?v=gqA3X4RD>

Mackenzie Data Stream: www.mackenziedatastream.ca

3.8 Wrap up of the day

Kevin Smith, ENR provided a summary of the morning and next steps. This included:

A nod to the Groundwater Knowledge Exchange Initiative; ENR and academic partners would like to gauge the interest from communities and Indigenous governments for an on-the-land groundwater knowledge exchange workshop to be held next year with interested communities. This workshop will be shaped around interests and concerns related to groundwater for each community and will be developed in partnership with participating communities.

A key message from the Indigenous Steering Committee is that unprecedented changes due to climate change are already happening. There was also much discussion around youth and the need for youth to be more involved in existing programs. It was mentioned that engaging youth in water stewardship was heard multiple times. ENR mentioned that it has an *NWT Water Stewardship Strategy Youth Grant Mentorship Program* that provides funding for youth to be involved or initiate community projects or events related to water.

There are several action items in the new Action Plan related to youth; we look forward to engaging with youth even more in the future. In terms of developing a working group, it was pretty clear that 81% of 52 respondents would like an issue-specific working group with the top three priorities being: Improve data collection, enhance Indigenous knowledge and decision making, and strengthen community capacity through the CBM program.

The great thing about the CBM slide show is that there are so many familiar faces who were actual participants in this workshop. So great to see the collaboration in action.

It is clear that there has been much progress but as we see with the new Action Plan 2021-2025, we have much more work to do, and we cannot do this work alone and will continue to collaborate with others. To paraphrase Tim Heron, ***“Water is crucial. Water is life. Don’t mess it up!”***

Additional contacts and resources:

For additional information or copies of the presentation from Day 1: NWT Water Stewardship Strategy Implementation Workshop session please contact Kevin Smith, Community Stewardship Coordinator, Water Management and Monitoring – HQ (Fort Smith) at: Kevin_Smith@gov.nt.ca

For any questions, or to express interest in the Groundwater Knowledge Exchange Initiative, please communicate with Isabelle de Grandpré at: Isabelle_de-Grandpre@gov.nt.ca

Additional water quantity data are available at: www.wateroffice.ec.gc.ca

More information on the *ENR NWT Water Stewardship Strategy Youth Grant Mentorship Program* can be found here: <https://www.nwtwaterstewardship.ca/en/nwt-youth-water-stewardship-and-mentorship-grant-program>

4.0 Day 2: Climate Change Advisory Group Session

4.1 Setting the Context

(Presented by Cory Doll, Manager, Climate Change and Air Quality, Environmental Stewardship and Climate Change, ENR, GNWT)

The purpose of this presentation was to set the context for Day 2 by providing an overview of the 2030 NWT Climate Change Strategic Framework (CCSF) and the CCSF Action Plan 2019-2023, an introduction to the NWT Climate Change Council, and the purpose of the NWT Climate Change Advisory Group.

The GNWT's response to climate change in the NWT is guided by three departments:

- ENR is the lead department for coordinating the GNWT's response to climate change.
- Department of Infrastructure is the lead department for mitigating energy.
- Department of Finance is the lead department for putting a price on carbon emissions.

The 2030 CCSF is the road map for how the NWT can address climate change challenges from 2018 to 2030 and it incorporates the actions of all government departments and partners to address climate change. The framework is being implemented in tandem with the Energy Strategy and Energy Action Plan, which sets the path to more affordable, secure and sustainable energy in the NWT, and the NWT Carbon Tax, the NWT's approach to carbon pricing.

The 2019-2023 NWT Climate Change Action Plan is the first of two action plans under the CCSF. Reporting on this action plan occurs annually. The NWT Climate Change Action Plan 2020-21 Annual Report and plain language overview can be found here:

[NWT Climate Change Action Plan Annual Report 2020-21](#)
[Responding to Climate Change in the NWT – Plain Language Overview Report](#)

In March 2021, the NWT Climate Change Council was established as a forum for sharing information, collaboration, and engagement between twelve Indigenous governments, Indigenous organizations, representatives of NWT Association of Communities and the GNWT. The Council provides guidance and advice to inform and advance GNWT climate change and environment programs in alignment with Indigenous governments, Indigenous organizations and community perspectives, interests, and knowledge. In addition to the council, a NWT Youth Advisory Group is also in development and will further inform the priorities of the Council and the GNWT.

The Climate Change Advisory Group (CCAG) is a mechanism to bring together climate change partners (Indigenous governments, Indigenous organizations, youth, industry, academia, territorial and federal government representatives, and non-for-profits) to support knowledge sharing and to identify challenges, opportunities, and actions to support the CCSF. This Day 2 session was the first gathering of the CCAG and is intended to become an annual event. The information heard during this session will inform the NWT Climate Change Council's priorities

and ongoing GNWT adaptation work and will also be used to help inform the [National Adaptation Strategy](#) to ensure northern priorities are understood and properly addressed.

4.2 State of Climate Change in Freshwater and Marine Ecosystems

(Presented by Brian Sieben, Climate Change Knowledge Lead, Climate Change and Air Quality, ENR, GNWT)

The purpose of this presentation was to provide an overview of observed and projected climate change impacts on fresh water and marine ecosystems in the NWT and the Arctic in general. The key points are highlighted below:

1. Observed Climate Change Impacts on Freshwater and Marine Ecosystems
 - Traditional and Indigenous land-users are observing the changes in climate every day.
 - Warming is clearly happening and undeniable. Global average temperatures have increased by 1.1 degrees since the late 19th century.
 - The warming trends differ across Canada and through the seasons. North-western Canada (NWT/Yukon) has the highest rates of warming, with the winter warming rates being greater than the summer rates.
 - Since 1957, Hay River has warmed by 2.7 degrees and Inuvik has warmed by 4.4 degrees in annual air temperature.
 - Beaufort Sea surface temperatures have shown a long-term increase.
 - 2021 had the twelfth lowest sea ice extent in the satellite record.
 - Decreasing surface reflectivity as more dark surfaces are exposed and snow/ice decrease is causing accelerated warming in the north as more dark water is available to absorb more energy.
 - Arctic sea ice extent is decreasing.
 - Marine impacts are being observed – sea level rise, coastal erosion, and ocean acidification.
 - Tuktoyaktuk is impacted by both coastal erosion and sea level rise.
 - Pacific salmon are moving further north.
 - Marine sea snails, the base of the food chain in the Beaufort Sea, are dissolving due to ocean acidification (higher in Arctic Ocean than anywhere else in the world).
 - There is an overall trend of increased precipitation, but lots of variability – trends are not as clear as the temperature trends.
 - Permafrost is thawing – causing unstable ground, thaw slumps.
 - Permafrost thaw is increasing groundwater flow and decreasing water quality.
 - Macro-invertebrates are affected by reduced water quality.
 - There is lots of variability in lake water levels (high and low).

2. Projected changes
 - Scientists use climate models with a range of emissions scenarios to project future climate change.

- Temperature and precipitation are both projected to increase Canada-wide. However, the north is projected to increase faster in both temperature and precipitation.
- Following a high emissions scenario, it could be about 7.4 degrees warmer, 25% wetter in Hay River; 9 degrees warmer, 31% wetter in Inuvik by 2100.
- There will be an increase in rain vs. snow, especially in fall/spring.
- Wildfires are projected to occur more often and will impact the water quality.
- Lake ice is predicted to decrease in both duration and ice thickness.
- Lake levels on Great Slave Lake/Great Bear Lake are predicted to drop due to increased evaporation, longer ice-free season, less damming of ice.
- River flow and frequency of high/low flow events are projected to increase.
- Beaufort Sea ice may decrease by 80% by the end of the century.
- Storm surges are projected to increase due to less sea ice.
- Sea level will rise by different amounts in different areas, but all NWT communities are expected to see a significant rise in sea level.
- Fish are very sensitive to temperature, so northern fish are predicted to move further north or deeper in the lake to colder temperatures.
- Areas outside the NWT can affect the NWT as well. For example, the Columbia Icefield is melting quickly, and all of its water flows through the NWT eventually. When it disappears, it will decrease water volumes flowing through the Mackenzie watershed especially in summer.

People are invited to share pictures of climate change impacts at Brian_Seiben@gov.nt.ca

4.3 Collaborating on Climate Change Adaptation

(Presented by Lindsay Vician, Adaptation Planning Specialist, Climate Change and Air Quality, ENR, GNWT)

The purpose of this presentation was to provide an overview of climate change adaptation in the NWT and to help facilitate a discussion on climate risks and what can be done to better adapt and take advantage of potential opportunities.

What is Climate Change Resilience and Adaptation?

Climate change resilience is the capacity of the land, people, and systems to absorb actual or expected climate change impacts and maintain function. Building resilience is finding ways to withstand the changes that are occurring or may occur. Adaptation means modifying decisions, activities, and ways of thinking to adjust and respond to negative and positive impacts of the changing climate. Adaptation planning and actions reduce the negative impacts of climate change and/or take advantage of the new opportunities.

Because the climate is changing so rapidly it is important that decision-making and actions shift away from being reactive to become more proactive. The impacts of climate change are not isolated and pose serious challenges to NWT systems and way of life. ENR recognizes responding

to a changing climate as a shared responsibility by all governments, communities, industry, and individuals.

The GNWT and climate change partners current actions to build resiliency and adapt are guided by two goals of the CCSF:

- The first goal is improving knowledge of climate change impacts. The NWT is experiencing numerous changes and impacts due to the warming climate and many knowledge gaps need to be filled to help inform planning and action.
- The second goal focuses directly on building resiliency and adapting to climate change.

Adaptation planning is guided by the adaptation planning cycle (Figure 1). GNWT is currently in the implement phase of the cycle, whereby GNWT and its partners are implementing actions via the current Action Plan. While work continues to implement those actions, ENR is also working to undertake a coordinated approach to assess NWT climate risks and opportunities in order to better identify new actions and priorities to inform the next Action Plan and ongoing adaptation work.



Figure 1: Adaptation Planning Cycle

What are Climate Change Risks and Opportunities?

A climate change risk is an event or scenario that could occur as a result of climate change. For example, climate change could result in an increase in extreme weather events. A climate change risk of this could be a flood event. A consequence or impact of the flood event could be destroyed homes. Climate change adaptation can also involve taking advantage of the new opportunities that may arise as a result of the changing climate. For example, climate change is resulting in increasing temperatures. The opportunity of this could be a longer growing season.

The first phase in outlining a plan for adaptation is to assess the risks and opportunities. This is an exercise of first identifying climate risks and opportunities and then rating them from lowest to highest. Knowing which risks and opportunities are the highest will inform the second phase of identifying and prioritizing actions. The rating of climate risks and opportunities involves understanding the likelihood of the risk to occur and the severity of the consequence or impact on various systems.

4.4 Breakout Room Discussions

Given this Day 2 session was hosted in conjunction with the NWT Water Stewardship Implementation Workshop the focus of the subsequent breakout discussions was on water-related climate risks. To help guide these discussions participants were asked prior to the workshop to respond to the following question: Based on your community and/or knowledge, what do you consider the highest water-related risk due to climate change?

Of all the responses collected, the highest water-related risks most frequently selected were:

- Permafrost thaw
- Flooding
- Water level changes of rivers, creeks, wetlands, and lakes
- Changes to water temperature and water quality
- Changes to animals, fish, and insects

These risks would become the basis of the following break-out discussion.

4.4.1 Breakout Discussion 1: Identifying Adaptation Actions and Priorities

Setting the Context for Breakout Session #1:

Breakout Discussion 1 was a collaborative exercise to identify and prioritize adaptation actions to respond to one of the water-related risks identified above. Breakout groups were assigned one of the risks and a subsequent list of potential impacts that may occur. Groups were asked to work together to share knowledge and expertise to identify actions that could be implemented to reduce or eliminate the impacts the risk might have on people (e.g. health, culture, and well-being), the environment, economy, buildings, and infrastructure. Groups were also asked to discuss and consider of list actions they identified which to be the highest priority.

The tables below display a summary of what discussed and heard during Breakout Discussion #1.

Summary of Priority Actions for Permafrost Thaw
<ul style="list-style-type: none">● Permafrost research, modelling, and hazard mapping<ul style="list-style-type: none">○ Incorporate traditional knowledge and traditional land-user observations into research
<ul style="list-style-type: none">● Monitor permafrost thaw hazards
<ul style="list-style-type: none">● Improve infrastructure standards to prevent damage
<ul style="list-style-type: none">● Assess and upgrade critical infrastructure
<ul style="list-style-type: none">● Communicate the dangers of permafrost thaw hazards<ul style="list-style-type: none">○ Improve community awareness○ Outreach and awareness materials and tools○ Educate residents on what they can do to maintain homes to prevent damage from permafrost thaw
<ul style="list-style-type: none">● On the land safety

Summary of Priority Actions for Flooding

<ul style="list-style-type: none"> • Conduct floodplain mapping to better inform infrastructure planning
<ul style="list-style-type: none"> • Enhance community flood preparedness (emergency committees, early warning systems, training) <ul style="list-style-type: none"> ○ Household flood preparedness and protection ○ Access and awareness of flood response funding ○ Outreach and awareness tools and materials
<ul style="list-style-type: none"> • Address food security concerns that arise from flooding (disruption to harvesting season, damage to food storage, limited food availability)
<ul style="list-style-type: none"> • Relocation of critical infrastructure and communities
<ul style="list-style-type: none"> • Water treatment system upgrades
<ul style="list-style-type: none"> • Mental health supports for communities impacted by flooding

Summary of Priority Actions for Water Quality and Temperature Changes
<ul style="list-style-type: none"> • Continue to support and enhance community-based monitoring and training <ul style="list-style-type: none"> ○ Increase water quality sampling
<ul style="list-style-type: none"> • Research and knowledge building <ul style="list-style-type: none"> ○ Understanding and awareness of the impacts ○ Incorporate traditional knowledge and land observations ○ Address knowledge gaps
<ul style="list-style-type: none"> • Infrastructure and water treatment upgrades <ul style="list-style-type: none"> ○ Ensure clean drinking water across all communities
<ul style="list-style-type: none"> • Raise awareness of on-the-land safety <ul style="list-style-type: none"> ○ Education and awareness of water treatment options while on the land

Summary of Priority Actions for Changes to Animals, Fish, and Insects
<ul style="list-style-type: none"> • Continue and enhance research and monitoring <ul style="list-style-type: none"> ○ Incorporate traditional knowledge and land-user observations
<ul style="list-style-type: none"> • Address food security concerns <ul style="list-style-type: none"> ○ Build awareness of country foods ○ Explore new species/harvesting opportunities
<ul style="list-style-type: none"> • Raising awareness and monitoring of invasive species
<ul style="list-style-type: none"> • Raise awareness of on-the-land safety
<ul style="list-style-type: none"> • Support harvesting and on-the-land programs <ul style="list-style-type: none"> ○ Take a Kid trapping, Take a Family Trapping ○ On-the-land education
<ul style="list-style-type: none"> • Establish conservation areas

Summary of Priority Actions for Water Level Changes
<ul style="list-style-type: none"> • Conduct floodplain mapping
<ul style="list-style-type: none"> • Complete risk assessments
<ul style="list-style-type: none"> • Relocate critical infrastructure along flood risk rivers and lakes
<ul style="list-style-type: none"> • Continue and enhance water level monitoring
<ul style="list-style-type: none"> • Build community awareness of water level changes and hazards

- Educate residents on what they can do to protect their homes and community
- Knowledge sharing between communities
 - Lessons learned
- On-the-land safety
 - Build and maintain on-the-land trails
 - Explore alternative routes

4.4.2 Breakout Discussion 2: What is needed to adapt?

Setting the Context for Discussion:

Understanding the ability of our systems to actually implement the adaptation actions is an important piece to adaptation planning. The adaptive capacity needs to be in consideration of our resources, funding, time, and the overarching barriers. Prior to the workshop, participants were asked to identify at least one challenge that hinders their organization’s ability to do work to adapt to climate change. A summary of the responses was collected and highlighted below.

Challenges with capacity were most frequently identified. Some participants noted not having enough staff or staff inconsistencies hindering their ability to carry out projects, monitoring activities, and apply for funding. Also linked to capacity was the need for more staff that have specialization and expertise in climate change.

Knowledge and data gaps were also frequently identified. Participants made note of the lack of NWT-specific climate change data and the limited availability of regional climate change information. This is also linked to gaps and inconsistencies in monitoring activities.

Funding accessibility and gaps are a well-known barrier but something participants continued to raise within this forum. This was in addition to barriers raised regarding time constraints and the changing of work priorities which can link back to the need for effective planning and prioritization of activities and actions.

After sharing these initial challenges, workshop participants were placed back into their breakout groups to further discuss these challenges and more. During their discussions they were also asked to consider the different needs or supports required by their organizations or communities to undertake adaptation actions.

The table below displays a summary of what discussed and heard during Breakout Discussion #2.



Breakout Discussion #2 Summary	
Accessible Funding	<ul style="list-style-type: none"> • Path-finding and proposal writing support • Funding to support participation in regulatory meetings
Capacity	<ul style="list-style-type: none"> • Human resources • Climate change expertise and staff in communities/regions
Enhanced Monitoring	<ul style="list-style-type: none"> • Community-driven/based (Guardian Programs) • Equipment and training • Funding • Youth involvement • Peer-to-peer learning (Youth and Elders)
Northern-driven research, knowledge, and data	<ul style="list-style-type: none"> • NWT-specific data and models, maps, and knowledge • NWT knowledge accessible database • Knowledge and data path-finding support • Climate risk and vulnerability assessments • Incorporate traditional and local knowledge
Collaboration and Outreach	<ul style="list-style-type: none"> • Need for more of a coordinated and holistic approach to responding to climate change • More collaboration across government departments • Build partnerships with different levels of government and academia • Increase knowledge sharing • Improve youth engagement and involvement • Build a network of climate partners to engage with each other on more frequent basis • Support community climate champions

4.5 Wrap up of the day

(Aida Nciri, Senior Advisor, Climate Adaptation and Outreach, ENR, GWT)

This was the first gathering of the Climate Change Advisory Group and ENR would like thank participants for taking part and sharing their knowledge and expertise. This information will be shared with the Climate Change Council to help inform their priorities as well as inform ongoing and future GNWT adaptation planning work. Input from this session will also be used to inform the National Adaptation Strategy currently under development.

Overall, this session highlighted the importance of collaboration to strengthen our approach to respond to climate change.

Additional contacts and resources:

Questions and comments about GNWT Climate Change initiatives please contact [Aida Nciri@gov.nt.ca](mailto:Aida_Nciri@gov.nt.ca) or [Lindsay Vician@gov.nt.ca](mailto:Lindsay_Vician@gov.nt.ca)

To learn more about 2030 Climate Change Strategic Framework and 2019 to 2023 Action Plan <https://www.enr.gov.nt.ca/en/services/climate-change/2030-nwt-climate-change-strategic-framework>

If anyone knows youth ages 12-30 who would be interested in taking part in the establishment of the NWT Climate Change Youth Advisory Group please email ClimateChange@gov.nt.ca.

5.0 Day 3: Raising Awareness of Existing and Proposed Research and Monitoring Programs on Great Slave Lake

Day 3 consisted of three presentations and four live survey polls to provide knowledge around and interest in the Great Slave Lake (GSL) monitoring programs. Following this a facilitated open discussion was held that primarily focused on the importance of integrating Indigenous and local knowledge into GSL monitoring programs.

The overall purpose of the day's session was to:

- Raise awareness about existing and proposed research and monitoring programs on GSL.
- Gain feedback, respond to questions, and engage in discussion with our water partners about GSL research and monitoring.
- Discuss the rationale for expanding research and monitoring efforts on GSL.
- Inform our water partners about future engagement and program development.

5.1 Presentation: Great Slave Lake Research and Monitoring Program

(Presented by Jennifer Hickman and Robin Staples, ENR)

The first presentation of the day provided an introduction to ENR's proposed GSL Research and Monitoring Program. The presentation highlighted the goals of a GSL Research and Monitoring Program, which include:

- Collaboration with water partners on a research and monitoring program plan: identify program objectives, research and monitoring questions, and priorities.
- Looking forward: set priorities, create partnerships, and engage effectively with water partners on a continuing basis.
- Expand the existing NWT water quality monitoring network to enhance the collection of long-term data used for:
 - Tracking changes over time
 - Supporting sound decision making for managing water resources
 - Providing a foundation for research programs

The draft program objectives discussed in the presentation are detailed below. The objectives will not be finalized until meaningful engagement and input from water partners have been achieved.

Short-term objectives:

- Coordinate collection of baseline water quality
- Understand site-specific ranges of natural variability of baseline physical and chemical measurements
- Conduct a vulnerability assessment of GSL and its tributaries
- Begin engagement about proposed GSL long-term monitoring program

Some progress towards these short-term objectives has been made. Engagement about the proposed GSL program is underway, with this half-day session at the 12th Annual WSSI Workshop kicking things off. Further engagement will occur in 2022.

Some progress towards the collection of baseline water quality data has been made. The collection of baseline data can be considered as one of the starting points towards building a strong foundation for a research and monitoring program. A broad range of baseline data will be needed to understand the existing lake conditions and provide a reference point against which to compare future data. An example of why baseline data are needed and how the data could be used was provided in the presentation with regards to the larger sediment plume on GSL in 2020. It is helpful to have baseline data to help understand how short-term events, like the sediment plume, or longer-term changes, like climate change, may impact aquatic quality over time.

Long-term objectives:

- Establish a network of long-term monitoring sites on GSL
- Assess lake-wide long-term trends of water quality
- Expand the program beyond water quality to include other ecosystem components as they are prioritized and identified by water partners
- Create long-term research and monitoring partnerships with our water partners

To begin gaining feedback from water partners and better understand preferred communication methods and priorities, four live polls were presented to workshop participants throughout the presentation. The poll results are presented below.

Poll #1 Results: Effective Information Exchange

In your experience, what has been the most effective way to deliver or receive monitoring and research results?

- **Websites / Online Portals – 37%**
- Results Workshops – 26%
- Individual Community Meetings – 17%
- Plain Language Reports – 21%

Poll #2 Results: Priorities for GSL Monitoring

In addition to water quality and fish, which valued ecosystem component do you believe should be a priority for monitoring and research in the Great Slave Lake Basin?

- Waterfowl – 4%

- Aquatic Insects – 22%
- **Water levels / flow – 44%**
- Sediment quality – 18%
- Vegetation – 4%
- Mammals - 5%
- Other – 3%

Poll #3 Results: Observations of Change on GSL

What changes have you observed on Great Slave that have you most concerned?

- **Water levels – 32%**
- Water clarity – 11%
- Fish health – 11%
- Fish abundance – 17%
- Algal blooms - 6%
- Ice conditions – 6%
- Bird and Mammal health - 0
- Bird and Mammal abundance - 0
- Extreme weather effects (e.g., wind, erosion) - 8%
- Other – 8%

Poll #4 Results: Options Information Exchange

To explore setting research and monitoring priorities for Great Slave Lake, what is your preferred method for providing input?

- A public or targeted online survey – 20%
- **Annual or Bi-annual Workshops – 46%**
- Community meetings – 20%
- Individual / User group engagement – 13%

Follow up comment from Tulita: Would like to see research and monitor but to engage with the youth and elders to communicate the research and especially research results.

Highlights from the discussion that followed are captured in section 5.4 below.

Contacts and additional resources:

Questions or inquiries about the Great Slave Lake Research and Monitoring Program can be directed to: Jennifer_Hickman@gov.nt.ca and Robin_Staples@gov.nt.ca

For information about other monitoring activities of ENR Water Management and Monitoring, please visit <https://www.enr.gov.nt.ca/en/services/water-management-and-monitoring>

5.2 Presentation: Arctic Research Foundation – A Community-Led Approach to Science on Great Slave Lake, the Mackenzie River and the Beaufort Sea

(Presented by Adrian Schimnowski, CEO/Operations Director, Arctic Research Foundation, Donald McLennan, Chief Scientist, Arctic Research Foundation, Eddy Carmack, DFO, Senior Research Scientist Emeritus)

This joint presentation was intended to provide some context on the work of the Arctic Research Foundation (ARF), and highlight the past, present, and future work of the Nahidik II. Looking forward: setting priorities, creating partnerships, and engaging effectively.

Based on the premise that “everything is connected” the ARF is mandated to coordinate and catalyze scientific, cultural and economic research, partner with governments, universities and other research institutions, provide innovative infrastructure and to build relationships with Indigenous communities to co-generate knowledge. The ARF is a private, non-profit organization creating a new kind of scientific infrastructure that includes operation of five efficient, cutting-edge research vessels and the development of self-powered mobile research labs.

Contacts and additional resources

Telling Northern Stories at www.arcticfocus.org

Curating Northern Data at www.arcticfocus.org/database

5.3 Presentation: Research and Monitoring on the GSL - Fisheries and Ocean Canada

(Presented by David Boguski – Aquatic Science Biologist, DFO)

David and his colleagues presented an overview of the research and monitoring being conducted on Great Slave Lake by DFO in collaboration with Indigenous partners. This work is guided by the *Fisheries Act* to sustain healthy and productive fisheries. Research and monitoring projects on Great Slave Lake include, but are not limited to:

- Index gillnetting and cumulative impact monitoring program known as the *Fisheries-Independent Gillnet Study (FIGS)*
- Various local monitoring projects:
 - Buffalo River – Spring monitoring
 - Slave River – Fall monitoring of Inconnu
 - Łutselk'e – Lake Trout monitoring
- Commercial fish plant sampling
- The *Fostering Indigenous small-scale fisheries for health, economy and food security (FISHES)* project that attempts to bridge genomic information with traditional knowledge
- The *Great Slave Lake Telemetry Program* that explores fish movement and habitat use
- Environmental (e)DNA in Great Slave Lake

Contacts and additional information:

David Boguski at David.Boguski@dfo-mpo.gc.ca

5.4 Panel: Working Together on Great Slave Lake - seeking feedback on research and monitoring priorities and advancing local Indigenous collaboration and engagement

(Panel members: Donald McLennan (ARF), Eddy Carmack, David Boguski (DFO) and Nathen Richea (ENR))

The intention of this panel session was to begin an initial dialogue among water partners through a facilitated question and discussion period. Questions and comments were in the format of four poll surveys (poll results from earlier in the session were presented and discussed here), chat room, and verbal exchanges. A summary of these discussions and comments is provided below. Due to time constraints, the discussion was not able to address each of the proposed questions, but a rich information exchange was held with a focus on the importance of partnership and Indigenous knowledge transfer.

Facilitated questions for the panel and participants

- 1. What are your most important research needs 1) immediately and 2) over the long term? (to everyone)**

Jessica Smart – NSMA: NSMA has several important research areas of interest, such as erosion and water level changes, cumulative impacts (from climate change, development), heavy metals/contamination and invasive species. I think a very important first step before beginning any research is co-designing the project together to identify priorities areas from both sides (science and Indigenous group).

Andrew Cassidy – GNWT ITI: There is a lot of ongoing research around the lake. A more coordinated approach should be a priority. Lots of different levels of government and departments involved and research may duplicate or contradict each other.

Grace Osted – DKFN: Most of our priorities are around reliable baseline aquatics data. We need both immediate and long-standing priorities and go directly to the region we agree on.

- 2. We would like to utilize both science and traditional knowledge for our research - what is the best way to do that? (to our Indigenous partners)**

Tim Heron: Region and especially to the community. You have to talk to communities. They would want to have the report back as well. *It's vital to go back to the community; this commitment is often put into the agreement

Phoebe Rabesca: Community approach including purpose, reporting and outcome to share what is going to be researched.

Leon Andrew: Talk to Indigenous people you are working with so you can be on the same page as the researcher.

Eugene Pascal - Aklavik: It is very important. Understanding and respecting Indigenous knowledge does not belong to the interviewer but belongs to the community.

Jessica Jumbo: Community approaches integrate it and monitor every activity that is happening around the research whether it be development, economic, utilizing lodge activities, changing engagement policies. Utilize the traditional harvesters before carrying out activities.

Mike Tollis – Akaitcho Gov't: Getting permission from the communities. Blend TK. Setting up research or TK ownership agreements up front are key to ensuring that interviewers are required to share the research back to communities. Treat TK like it is its own science; it runs deep and is very productive. The suggested approach could be used when entering a community to be open minded; “This is my background and how can I help your community?”
Acknowledge that while some TK has been shared for one project it may not translate to another.

Grace Martin: People can take courses to educate themselves around how to best protect the interests of the communities that they are working with. Data/knowledge control and ownership by Indigenous nations/communities is fundamental. It is a human right; it is part of UNDRIP. Details for more information are below.

Nathan Richea - ENR: One of the key areas is to participate in Water Stewardship Strategy and the Annual Workshops. Making sure research aligns with priorities. Braiding TK and science is challenging but it can be done. Speaking with the community on the research results. Getting back into the community to ensure trust and accuracy of all research findings.

Donald McLennan (ARF): We are in a revolution around how we do research in the North and it has been too long coming. There continues to be much learning on both sides. Proper co-generation of knowledge includes meaningful engagement with Indigenous partners from the onset of a project to its completion. Our recent proposal with the community of Tuktoyaktuk is an example of this approach.

Tim Heron, response: Not a revolution - this work has been a very long time coming, working closely with the federal government and Indigenous governments have set standards for how they want TK to be used. It is critical that information is captured and used accurately.

Question from Gordon – Tulita: To DFO: How can we as a community get more involved in the research and TK?

Due to time constraints the remaining questions were asked and answered and captured in the chatroom.

Highlights from the chatroom discussions are captured below:

1. How would you like to see the research be carried out?

Comment from Jessica Jumbo:

Create and carryout working with the land training programs for the western monitors to fully understand the traditional practices, traditional protocols, and concerns. Change community engagement and working policies to include these training programs and having a certificate of completion. Just as local community monitors attend monitoring training programs in the area of environment as when attending school or other western science training programs. This should be a requirement before coming out and working on the land.

Comment from Grace Osted – DKFN:

We would prefer to see research include community members in all levels to increase our knowledge.

2. We would like to engage youth in research - what is the best way to do that?

Comment from Grace Osted – DKFN

As a youth myself I think the best way to increase youth engagement is first ask them on how they want to be involved and then help them learn what is being done and how, using on the land/ water experience. There also needs to be room and people to hear the youth. I often feel like I am telling my ideas to a wall of "that won't work".

Comment from Jessica Jumbo

One of the ways my community is trying to engage youth at a young age is to create a curriculum into our local school to teach these practices early, spark interest and grow new traditional monitors.

Comment:

GNWT Community Based Monitoring Program is great; however, they don't provide enough capacity and rely too much on band infrastructure or band members' infrastructure. For effective programs to collaborate, expenses for taking care of boats. GNWT ENR needs to support First Nation and Metis community base funding with better infrastructure support funding. The Mackenzie DataStream is a good place for those with the ability to access online however when Elders ask where this information is, it's better to come to them and present.

Comment from Kevin Smith GNWT-ENR

ENR does have a grant program for youth aged 18-30 that can provide some funding to work on community projects. This has been implemented under direction from the ISC. More details are posted below.

Highlights from discussion that followed are captured below:

Question from Chris Spence

Has anyone ever measured the thermal structure of the lake?

Comment from Mike English

Cross-lake variation of physical limnological and climatological processes of Great Slave Lake, WM Schertzer, WR Rouse, PD Blanken - Physical Geography, 2000

Comment from Chris Spence

DFO did take some measurements in the 1950s and 1960s. Bill did his work twenty years ago. These were basically samples and did not always put them in the context of weather of the day. These new strings are an awesome idea.

Question from Lindsay Day

Chris, do you know if the data from 1950s/60s be accessed anywhere?

Comment from Chris Spence

I can do some digging. I've only seen the data plotted in journal articles and government reports. They also went to Great Bear Lake during the same campaign.

Contacts and additional resources:

Marlene Evans, Environment Canada: Environment Canada did some physical limnology studies and developed a circulation model for Great Slave Lake for surface waters. There are some publications. Schertzer et al. *Interannual Variability of the Thermal Components and Bulk Heat Exchange of Great Slave Lake*. https://link.springer.com/chapter/10.1007/978-3-540-75136-6_11

For more information data/knowledge control and ownership by Indigenous nations/communities as part of UNDRIP, visit: *The First Nations Principles of OCAP*® (Ownership, Possession, Access, and Control) <https://fnigc.ca/ocap-training/take-the-course/>

Lindsay Day, Gordon Foundation: CARE data principles for Indigenous data governance are another good resource: <https://www.gida-global.org/care>

Youth: ENR has a grant program for youth aged 18-30 that can provide some funding to work on community projects. This has been implemented under direction from the ISC. More details and the online application form can be found here: <https://www.nwtwaterstewardship.ca/en/nwt-youth-water-stewardship-and-mentorship-grant-program> Contact Kevin Smith: Kevin_Smith@gov.nt.ca for more information.

Robert Bouchard – Tu Cho Fishers Cooperative. We a group of fishers that will be running a new fish plant in Hay River. We are interested in water stewardship. Our contact is tuchoboard@gmail.com

For a continuation of this discussion and more, further engagement will occur in 2022. Although during this session, a workshop to be held in Yellowknife in February 2022 was discussed, recent restrictions related to Covid-19 will require this workshop to take place at a later date. Instead, smaller virtual meetings will be held with our water partners to advance the development of the GSL program. Additionally, a survey will be developed in partnership with ARF and DFO and widely distributed to our water partners to gain further input on into the development of the long-term GSL Research and Monitoring Program plan. For more information or to further discuss engagement activities, contact Jennifer Hickman; Jennifer_Hickamn@gov.nt.ca

5.5 Wrap up of the day

Nathen Richea, Director, Water Management and Monitoring, ENR provided a wrap up for the final day. The presentations over the three days highlighted the importance of the ongoing work throughout the NWT and detailed some of the existing and innovative approaches for how this work will continue. Programs like the GSL Research and Monitoring Program will help to increase understanding of current environmental changes, provide early warning of changes to the aquatic ecosystem health, and inform decision making. The panel and presentations on climate change also highlighted the importance of continued engagement. You are encouraged to share what you have heard and what you have learned with community members and leadership to continue water stewardship in the NWT.

Closing prayer delivered by Indigenous Steering Committee member, Leon Andrew, Sahtu Secretariat Inc.

Appendix 1: Full workshop agenda

DAY 1: 9AM TUESDAY NOVEMBER 16	
NWT Water Stewardship Strategy Implementation Workshop Session	
8:45	Sign-on
9:00	<p>Welcome - (Sherry Lovely) Review Meeting Protocols, Overview of the three-day session and Day 1 Agenda</p> <p>Opening Prayer from Indigenous Steering Committee Member Leon Andrew; Welcoming Remarks from Dr. Erin Kelly, Deputy Minister, Environment and Natural Resources</p>
9:15	<p>Workshop Purpose and Objectives (Kevin Smith, ENR) Water Stewardship Strategy Action Plan 2021-2025 (Meghan Beveridge, ENR)</p>
9:30	<p>Panel: Indigenous Steering Committee (ISC) Role of the ISC in strengthening collaboration for the next five-years.</p> <ul style="list-style-type: none"> • <i>Leon Andrew, Sahtu Secretariat Inc.;</i> • <i>Tim Heron, Northwest Territory Métis Nation;</i> • <i>Michelle Gruben, Inuvialuit Regional Corporation; and</i> • <i>Phoebe Rabesca, Tlicho Government</i>
10:00	<p>Panel: Collaborations in Water Management and Monitoring Water partners share their work to help meet the NWT Water Stewardship Strategy's Vision.</p> <ul style="list-style-type: none"> • Presentations & discussion
10:30	Break
10:45	<p>Session: Action Plan 2021-2025: Developing the Water Stewardship Strategy (WSS) Working Group (Meghan Beveridge, ENR)</p> <ul style="list-style-type: none"> • Short presentation and facilitated discussion with workshop participants
11:05	<p>A Brief Look at the Current State of Water Quantity (Shawne Kokelj and Ryan Connon, ENR)</p> <ul style="list-style-type: none"> • Short Presentation and discussion
11:30	10 Years of Community-Based Monitoring: A celebration (Gila Somers, ENR)
11:45	<p>Short recap of Day 1 (Kevin Smith) Conclusion and Tomorrow's Event (Sherry Lovely)</p>

DAY 2: 9AM WEDNESDAY NOVEMBER 17

Climate Change Advisory Group Session

8:45	Sign-on
9:00	Welcome - (Sherry Lovely) Review Meeting Protocols, Recap of Day 1 and Overview of Day 2 Agenda
9:10	Setting the Context – (Cory Doll, ENR) <ul style="list-style-type: none">• Introduction to the NWT Climate Change Strategic Framework and 2019-2030 Action Plan, NWT Climate Change Council, and the <i>new</i> NWT Climate Change Advisory Group.
9:20	Overview of the State of Climate Change in NWT – (Brian Sieben, ENR) <ul style="list-style-type: none">• How the climate has changed and is projected to change.• Impacts on water: now and in the projected future.
9:40	Collaborating on Climate Change Adaptation in the NWT – (Lindsay Vician, ENR) <ul style="list-style-type: none">• What is adaptation?• Overview of the adaptation planning cycle.• Climate risks and opportunities.
9:55	Breakout Discussion 1: Identifying Adaptation Actions and Priorities – (Lindsay Vician, ENR) <ul style="list-style-type: none">• Identify adaptation actions to respond to water-related risks associated with a changing climate.• Identify priority actions
10:30	Break
10:45	Report Back on Breakout Discussion 1 – (Sherry Lovely)
11:00	Breakout Discussion 2: What is Needed to Adapt? - (Lindsay Vician, ENR) <ul style="list-style-type: none">• Identify needs required to undertake adaptation action.
11:30	Report Back on Breakout Discussion 2 - (Sherry Lovely)
11:45	Moving Forward Together – (Aida Nciri, ENR) <ul style="list-style-type: none">• Summary of session and next Steps Conclusion and Tomorrow’s Event - (Sherry Lovely)

DAY 3: 9AM THURSDAY NOVEMBER 18

Raising Awareness of Existing and Proposed Research and Monitoring Programs on Great Slave Lake

8:45	Sign-on
9:00	Welcome - (Sherry Lovely) Review Meeting Protocols, Recap of Day 1 and 2 and Overview of Day 3 Agenda
9:15	Great Slave Lake Research and Monitoring Program (Jennifer Hickman and Robin Staples, ENR) <ul style="list-style-type: none">• Introduction to the proposed GSL Research and Monitoring Program• Collaborating on a research and monitoring program plan: identifying program objectives, research and monitoring questions, and setting priorities• Looking forward: setting priorities, creating partnerships, and engaging effectively
9:45	Arctic Research Foundation – A Community Led Approach to Science on Great Slave Lake, the Mackenzie River and the Beaufort Sea (Adrian Schimnowski, Donald McLennan, and Eddy Carmack, ARF) <ul style="list-style-type: none">• Introduction to the Arctic Research Foundation• Highlighting the past, present and future work of the Nahidik II• Looking forward: setting priorities, creating partnerships, and engaging effectively
10:15	Break
10:30	Fisheries and Oceans Canada (David Boguski/Yamin Janjua/Xinhua Zhu/Kim Howland/Ross Tallman, DFO) <ul style="list-style-type: none">• Overview of Great Slave Lake Fisheries• Community-led Fisheries Research• Great Slave Lake Research and Monitoring Program: Past and Present
11:00	Panel: Working together on Great Slave Lake; Seeking feedback on research and monitoring priorities and advancing local Indigenous collaboration and engagement
11:45	Closing Remarks (Nathen Richea, ENR) Closing Prayer (TBA)

Appendix 2: List of attendees

Academia	
Bing Chen	Memorial University
Cory Savage	Wilfrid Laurier University
Fereidoun Rezanezhad	University of Waterloo
Homa Kheyrollah Pour	Wilfrid Laurier University
Jason Venkiteswaran	Wilfrid Laurier University
Jennifer Gast	MacEwan University
Jesse Vermaire	Carleton University
Julián Idrobo	Aurora Research Institute
Joanne Speakman	University of British Columbia
Lauren Nolan	Aurora Research Institute
Mike English	Wilfrid Laurier University
Mike Palmer	Aurora Research Institute
Olivia Melville	University of Victoria
Sarah Rosolen	Aurora Research Institute
Sherry Schiff	University of Waterloo
Sölmundur Pálsson	University of Manitoba
Stephan Schott	Carleton University
Suzanne Tank	University of Alberta
Xing Song	Memorial University
Federal Government	
Anita Gue	Environment and Climate Change Canada
Brittany Armstrong	Environment and Climate Change Canada
Brendan Malley	Department of Fisheries and Oceans
Chris Spence	Environment and Climate Change Canada
Dave Boguski	Department of Fisheries and Oceans
Emma Garden	Environment and Climate Change Canada
Fraser Neave	Department of Fisheries and Oceans
John Chetelat	Environment and Climate Change Canada
Josh Baller	Environment and Climate Change Canada
Kieron Sidney	Parks Canada
Lauren Wiens	Department of Fisheries and Oceans
Marijo Cyr	Crown-Indigenous Relations and Northern Affairs Canada
Marlene Evans	Environment and Climate Change Canada
Muhammad Yamin Janjua	Department of Fisheries and Oceans
Nicole Mischuk	Agriculture and Agri-Food Canada
Paula Siwik	Environment and Climate Change Canada
Sally Wong	Department of Fisheries and Oceans
Stephanie Strachan	Environment and Climate Change Canada
Taylor Connolly	Department of Fisheries and Oceans

TJ Little	Parks Canada
Dani Thompson	Parks Canada
Joseph Flesch	Environment and Climate Change Canada
Government of the Northwest Territories	
Aida Nciri	Environment and Natural Resources
Albert Bourque	Environment and Natural Resources
Andrea Czarnecki	Environment and Natural Resources
Anna Coles	Environment and Natural Resources
Annie Levasseur	Environment and Natural Resources
Brad Woodworth	Environment and Natural Resources
Brian Sieben	Environment and Natural Resources
Bruce Hanna	Environment and Natural Resources
Catherine Graydon	Environment and Natural Resources
Celena Hoeve	Environment and Natural Resources
Chris Cunada	Environment and Natural Resources
Claudia Haas	Environment and Natural Resources
Cory Doll	Environment and Natural Resources
Darin Bagshaw	Environment and Natural Resources
Erin Kelly	Environment and Natural Resources
Fritz Griffith	Environment and Natural Resources
Gila Somers	Environment and Natural Resources
Guylaine Ross	Environment and Natural Resources
Jennifer Hickman	Environment and Natural Resources
Katherine Manickum	Environment and Natural Resources
Kevin Smith	Environment and Natural Resources
Krista Chin	Environment and Natural Resources
Laura Krutko	Environment and Natural Resources
Lee Ross	Environment and Natural Resources
Lindsay Vician	Environment and Natural Resources
Lloyd Gruben	Environment and Natural Resources
Logan McKay	Environment and Natural Resources
Mary Drake	Environment and Natural Resources
Meghan Beveridge	Environment and Natural Resources
Meredith Seabrook	Environment and Natural Resources
Mike Palmer	Environment and Natural Resources
Nathen Richea	Environment and Natural Resources
Norman Snowshoe	Environment and Natural Resources
Ryan Connon	Environment and Natural Resources
Shawne Kokelj	Environment and Natural Resources
Robin Staples	Environment and Natural Resources
Ryan Gregory	Environment and Natural Resources
Tara Tompkins	Environment and Natural Resources

Tonya Makletzoff	Environment and Natural Resources
Allan Torng	Health and Social Services
Zoe Guile	Health and Social Services
Aileen Stevens	Infrastructure
Andrew Cassidy	Industry, Tourism and Investment
Calum Macpherson	Industry, Tourism and Investment
Dinah Elliott GNWT	Industry, Tourism and Investment
Jilaine Cumming	Industry, Tourism and Investment
Richard Moore	Industry, Tourism and Investment
L. Seale	Lands
Kyle Little	NWT Centre for Geomatics
Melanie Desjardins	NWT Centre for Geomatics
Indigenous Government and Organizations and Community Members	
Christina Martin	Gwich'in Tribal Council
Dieter Cazon	Łutsël Ke First Nation
Fort Good Hope Guardians	Fort Good Hope Guardians
Grace Osted	Denínu Kue First Nation
Iris Catholique	Łutsël Ke First Nation
Jessica	Tłı̨chǫ Government
Jessica Jumbo	Sambaa K'e First Nation
Jessica Smart	North Slave Métis Alliance
Joseph Gormaly	Kátł'odeeche First Nation
Leon Andrew	Sahtú Secretariat Incorporated
Lex Scully	Fort Good Hope Guardians
Lorne Napier	Fort Smith Métis Council
Michelle Gruben	Aklavik Hunters and Trappers Committee
Mike Low	Dehcho AAROM
Mike Tollis	Akaitcho Territory Government
Minnie Whimp	Denínu Kue First Nation
Paul Vecsei	Tłı̨chǫ Government
Phoebe Rabesca	Tłı̨chǫ Government
Rosy Bjornson	Nihadixa
Sam J Bullock	NWT Dene Nation
Shannon Cazon	Łutsël K'é Dene First Nation
Terrell Knapton-Pain	Tłı̨chǫ Government
Tim Heron	Northwest Territory Métis Nation
Industry, Non-for-profits, Non-Governmental Organizations, Other	
Alyssa Bougie	Sahtu Renewable Resource Board
Catarina Owen	Sahtu Renewable Resource Board
David Krutko	Gwich'in Land and Water Board
Eugene Pascal	Aklavik Renewable Resource Council
Gina Bayha	Sahtu Land and Water Board

Jasmine Plummer	Sahtu Renewable Resource Board
Jessie Yakeleya	Sahtu Renewable Resource Board
Justin Stoyko	Sahtu Land Use Planning Board
Alex Tassioulas	Sahtu Land Use Planning Board
Tulita Renewable Resources Council	Tulita Renewable Resources Council
Vince Deschamps	Gwich'in Land Use Planning Board
Sue McKenzie	Gwich'in Land Use Planning Board
Adrian Schimnowski	Arctic Research Foundation
Barrett Lenoir	Ducks Unlimited Canada
Brandon Pludwinski	Ecology North
Catherine Paquette	World Wildlife Federation
Dawn Tremblay	Ecology North
Donald McLennan	Arctic Research Foundation
Eddie Carmack	Arctic Research Foundation
Emily Smith	Northern Youth Leadership
Joanna Lehrer	Northern Youth Leadership
JoAnne Deneron	Mackenzie Valley Environmental Impact Review Board
Kate Mansfield	Mackenzie Valley Environmental Impact Review Board
Lindsay Day	The Gordon Foundation
Matt Miller	NWT Power Corporation
Miki Ehrlich	NWT Association of Communities
Robert Bouchard	Hay River Fisheries
Tom Henheffer	Arctic Research Foundation