



Responding to  
Climate Change  
in the NWT  
ANNUAL REPORT

RAPPORT ANNUEL  
La lutte contre  
le changement  
climatique aux TNO

2022-2023

Le présent document contient la  
traduction française du sommaire

Government of Northwest Territories  
Gouvernement des Territoires du Nord-Ouest



If you would like this information in another official language, call us.

English

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Si vous voulez ces informations dans une autre langue officielle, contactez-nous.

French

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Kīspin ki nitawih̄tīn ē nīh̄yawih̄k ōma ācimōwin, tipwāsinān.

Cree

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Tłıchq̄ yatı k'èè. Dı wegodi newq̄ dè, gots'ō gonede.

Tłıchq̄

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ʔerih̄t'is Dēne Sųfıné yatı t'a huts'elkēr xa beyáyatı theʔá ʔat'e, nuwe ts'ēn yóltı.

Chipewyan

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Edı gondı dehgáh got'ıe zhatıé k'ée edat'éh enahddhę nıde naxets'é edahıı.

South Slavey

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K'áhshó got'ıne xədə k'é hederı ʔedjht'é yerıniwę nıde dúle.

North Slavey

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Jii gwandak izhii ginjik vat'atr'ıjähch'uu zhit yinothtan jı', diıts'at ginohkhii.

Gwich'in

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Uvanittuaq ilıchurisukupku Inuvialuktun, ququaqluta.

Inuvialuktun

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Ĉ'đĎ ħħ'ḄΔĈ ĀʔLJΔʔĈ ΔḄ'ĦĬĈ'ḄʔLĬĦ'Ḅ, ĐĈ'ĦḄĈ Đ'ḄĈ'ḄḄ'ḄĬĦ'Ḅ.

Inuktitut

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Hapkua titiqqat pijumagupkit Inuinnaqtun, uvaptinnut hivajarlutit.

Inuinnaqtun

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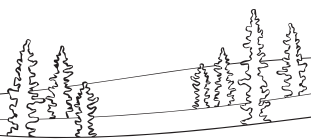
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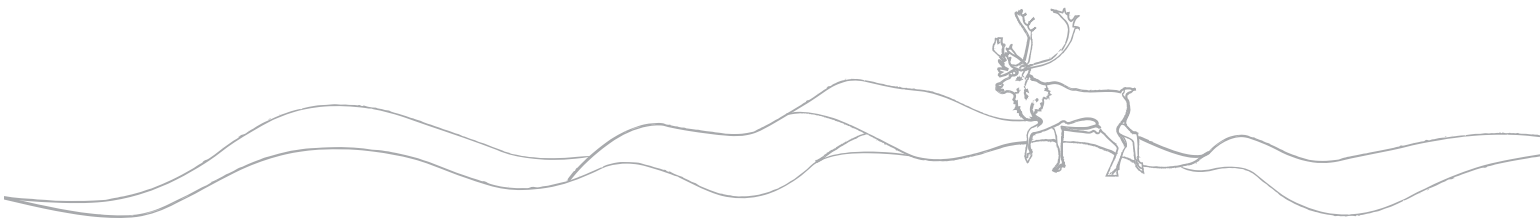
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# Minister's Message



**The Honourable  
Jay Macdonald**  
*Minister of Environment  
and Climate Change*

Climate change is the challenge of our time — and Northerners know that better than anyone.

We're experiencing climate warming up to four times faster than other places in the world, putting strain on our social, cultural, and economic well-being. Our government takes these challenges seriously, and in response, has developed coordinated actions on climate change to support a strong, resilient territory for future generations.

This work is guided by the *2030 NWT Climate Change Strategic Framework* released in May 2018, the *2030 NWT Climate Change Strategic Framework 2019-2023 Action Plan* released in April 2019, and is implemented in tandem with the *2030 Energy Strategy* and the NWT's carbon tax. Together, they are the pillars of our government's approach to lowering emissions, improving our knowledge of climate change impacts, and adapting to the changing climate.

I am pleased to say that we continue to make progress on the Action Items within the Climate Change Action Plan. Of the 132 Action Items that comprise our Climate Change Action Plan, 81 Actions have been completed and the other 51 are on track.

Highlights from implementation this year include a 25% reduction in greenhouse gas emissions as compared to the 2005 baseline, a strengthened carbon pricing regime that is compliant with federal requirements, and completion or initiation of major climate change adaptation-related projects. This includes funding for the development of fuel breaks in 29 communities and building 60 new homes in 19 communities featuring fire-resistant construction materials and design, as well as specialized foundations resistant to permafrost thaw.

As with many complex societal issues, the key to success is partnership. Together, alongside Indigenous and community governments, co-management boards, academia, industry, non-governmental organizations, and the Government of Canada, we are collectively delivering on a shared vision of a healthy and resilient territory in the face of this generational challenge. You will find examples of collaboration and partnership throughout this report.

I look forward to continuing this work to build on our existing knowledge, take action to tackle this immense challenge, and build a sustainable future for all Northerners.

**The Honourable Jay Macdonald**  
*Minister, Environment and Climate Change*

# Message du ministre



**L'honorable Jay Macdonald**  
*Ministre de l'Environnement et  
du Changement climatique*

## Le changement climatique est la grande préoccupation de notre époque, et une évidence pour tous les habitants du Nord.

Le réchauffement climatique est jusqu'à quatre fois plus rapide dans le Nord que partout ailleurs dans le monde, ce qui met à mal notre bien-être social, culturel et économique. Notre gouvernement prend cet enjeu très au sérieux, et a par conséquent mis au point des mesures concertées sur le changement climatique pour laisser un territoire fort et résilient aux générations futures.

Ces efforts sont guidés par le *Cadre stratégique sur le changement climatique des TNO pour 2030* publié en mai 2018 et le *Plan d'action 2019-2023 relatif au Cadre stratégique sur le changement climatique des TNO pour 2030* (ci-après le Plan d'action) publié en avril 2019, et sont mis en œuvre en même temps que la *Stratégie énergétique 2030* et la taxe des TNO sur le carbone. Ensemble, ces outils forment les piliers de l'approche gouvernementale visant à réduire les émissions, à renforcer nos connaissances sur les répercussions du changement climatique et à nous adapter au climat changeant.

Je peux dire avec assurance que nous continuons de faire avancer les mesures de suivi contenues dans le Plan d'action. Sur les 132 mesures à prendre énoncées dans le Plan d'action, 81 ont été mises en place et 51 autres sont en voie de l'être.

Il convient de souligner certaines des avancées de cette année : une réduction de 25 % des émissions de gaz à effet de serre comparativement à la référence de 2005, une tarification du carbone renforcée qui est conforme aux exigences fédérales et l'achèvement ou le lancement de projets d'envergure liés à l'adaptation au changement climatique. Il s'agit notamment de financer le développement de pare-feu dans 29 collectivités, de construire, dans 19 collectivités, 60 nouveaux logements conçus pour résister au feu et construits avec des matériaux y résistant, et de construire des fondations particulières résistant au dégel du pergélisol.

Dans la plupart des enjeux de société, la clé du succès réside dans les partenariats. C'est aux côtés des gouvernements autochtones, des administrations communautaires, des conseils de cogestion, du milieu universitaire, de l'industrie, des organisations non gouvernementales et du gouvernement du Canada que nous pouvons faire aboutir nos ambitions de santé et de résilience pour notre territoire confronté à ce défi générationnel. Le présent rapport contient de nombreux exemples de collaboration et de partenariats.

Je me réjouis de poursuivre ce travail pour développer nos connaissances, passer à l'action pour relever ce défi de taille, et bâtir un avenir durable pour tous les résidents du Nord.

**L'honorable Jay Macdonald**  
*Ministre de l'Environnement et du Changement climatique*

# Executive Summary

The *Mandate of the Government of the Northwest Territories (2019-2023)* prioritizes a strengthened commitment to responding to climate change. This includes building greater leadership and authority on climate change, formally considering climate change in all government decisions, and increasing the use of alternative and renewable energy solutions.

The GNWT seeks to achieve these Mandate priorities with guidance from key GNWT policies including the *2030 NWT Climate Change Strategic Framework* and *Action Plan*, which encompass components of the *2030 Energy Strategy* and the NWT Carbon Tax.

The implementation of these interconnected pieces is helping the NWT mitigate and adapt to the effects of climate change, reduce territorial greenhouse gas emissions, build resilience and transition to a lower carbon economy while prioritizing an affordable cost of living for residents.

Climate change is a complex problem that requires partnerships to develop solutions. The Department of Environment and Climate Change is the lead GNWT department for addressing climate change, but taking action is a shared responsibility of all GNWT departments. The GNWT works in partnership with Indigenous and community governments, the Government of Canada, co-management boards, non-governmental organizations, industry, and academic institutions to implement our approach together. All NWT residents have a part to play in mitigating and adapting to climate change in our territory.

This is the fourth Annual Report on the *Climate Change Strategic Framework – Action Plan 2019-2023*. This report provides progress updates on specific actions the GNWT and its partners are working on to realize the vision outlined in the *2030 NWT Climate Change Strategic Framework*. This report highlights climate action achievements during the 2022-23 fiscal year.

All 132 Action Items that comprise the *2019-2023 Climate Change Action Plan* are complete or on track. 81 Actions are complete and the other 51 are on track. To achieve the progress outlined in this report, the GNWT invested \$45 million dollars to respond to climate change between April 1, 2022, and March 31, 2023. This amount includes \$27 million dollars to advance low-carbon energy projects and initiatives under the *2030 Energy Strategy*.

# Sommaire

Dans son mandat pour 2019-2023, le gouvernement des Territoires du Nord-Ouest s'engage à faire de la lutte contre le changement climatique une priorité. Il compte notamment faire preuve d'un plus grand leadership et d'une plus grande autorité en matière de changement climatique, faire en sorte que le changement climatique soit pris en considération dans toutes les décisions gouvernementales et favoriser davantage le recours aux énergies de remplacement et aux énergies renouvelables.

Pour répondre aux priorités du mandat, le GTNO s'oriente à l'aide de ses politiques clés, dont le Cadre *stratégique sur le changement climatique des TNO* pour 2030 et son plan d'action, qui englobent les éléments de la *Stratégie énergétique 2030* et de la taxe sur le carbone des TNO.

La mise en œuvre de ces éléments, qui sont tous interreliés, permet aux TNO d'atténuer les effets du changement climatique et de s'y adapter, de réduire les émissions de gaz à effet de serre du territoire et d'assurer une transition vers une économie à faibles émissions de carbone tout en priorisant un coût de la vie abordable pour les résidents.

Le changement climatique est un dossier complexe qui nécessite des partenariats pour mettre au point des solutions. Si le ministère de l'Environnement et du Changement climatique (MECC) est celui qui est responsable de la lutte contre le changement climatique, tous les ministères du GTNO se partagent la responsabilité de passer à l'action. Le GTNO collabore avec les gouvernements autochtones, les administrations communautaires, le gouvernement du Canada, les conseils de cogestion, les organisations non gouvernementales, l'industrie et les établissements d'enseignement pour mettre en œuvre une approche concertée. Tous les Ténéois ont un rôle à jouer pour atténuer les effets du changement climatique et encourager l'adaptation à celui-ci.

Il s'agit du quatrième rapport sur le Plan d'action. Il fait le point sur les progrès accomplis concernant les mesures mises en place par le GTNO et ses partenaires pour réaliser les ambitions énoncées dans le Cadre stratégique. Ce rapport souligne les réalisations en matière de lutte contre le changement climatique durant l'exercice 2022-2023.

Sur les 132 mesures énoncées dans le Plan d'action, 81 ont été mises en place et les 51 autres sont en voie de l'être. Pour accomplir les progrès détaillés dans ce rapport et lutter contre le changement climatique, le GTNO a investi 45 millions de dollars entre le 1<sup>er</sup> avril 2022 et le 31 mars 2023. Ce montant comprend 27 millions de dollars consacrés à des projets et à des initiatives énergétiques à faibles émissions de carbone entrepris en vertu de la *Stratégie énergétique 2030*.



IHPW at Night, NTCP.

# Accomplishments in 2022-2023

## Partnerships – Working Together

Collaborative efforts and partnerships are the key to achieving the vision outlined in the NWT Climate Change Strategic Framework. While the GNWT continues to lead work to address climate change in the Northwest Territories, it is a joint effort that is not possible without the important contributions of many partners.

The collaborations between the GNWT and its partners ensure that our response to climate change is coordinated and comprehensive.

Key highlights of climate change actions from these partnerships in 2022-23 included:

- A partnership with the Hamlet of Tuktoyaktuk and Natural Resources Canada (NRCan) to research coastal erosion dynamics along the Beaufort Sea. A local Tuktoyaktuk Climate Change Community Liaison Monitoring Position was created which supports a community-led monitoring program focused on ground thaw, bathymetry collection, contaminant measurement, air quality, and coastal erosion.
- Working with NRCan and NWT communities such as Hay River and Fort Simpson to develop updated flood maps for the NWT's flood-prone communities. This project will help communities identify flood vulnerabilities and inform land use planning and development.
- A collaboration between the NWT Geological Survey and the GNWT, Crown-Indigenous Relations and Northern Affairs Canada, and NWT communities to advance hazard mapping and geo-surficial mapping for communities. The mapping of features such as permafrost sensitivity will help communities plan for adaptation to permafrost thaw and other climactic changes.
- The GNWT and the NWT Association of Communities were successful together in their federal funding application for wildfire mitigation measures including fuel breaks. This collaborative request for funding resulted in \$20 million being made available for this work in the NWT's 29 forested communities.
- A partnership with SmartICE, Tuktoyaktuk Community Government Council, the Tłıchǫ Government, and Łutsël K'é Dene First Nation to provide equipment and training to 20 Indigenous operators/Guardians to monitor sea and lake ice thickness on traditional trails and winter roads for their communities to promote safe travel on the land as environmental conditions shift due to climate change.
- Through Natural Resources Canada funding, the Arctic Energy Alliance (AEA) offers Community Energy Planning services to NWT community governments as part of *2030 Energy Strategy* initiatives. In 2022-23, the AEA, in partnership with the Hamlet of Ulukhaktok, the Ka'a'agee Tu First Nation in Kakisa, and the Village of Fort Simpson, initiated community energy planning processes. Each community hired a local Community Energy Champion to guide the engagement process, help with planning activities, and ensure the project was grounded in Indigenous community traditions and that local governance and protocols were respected. All three communities successfully developed their Energy Plans, which are expected to be published in 2023-24.

Many more examples of key partnerships on climate action can be found throughout **Appendix A** of this report.



## Investments

From April 1, 2022, to March 31, 2023, the GNWT and its partners invested approximately \$45 million dollars to carry out Year 4 of the *2019-2023 Climate Change Action Plan*.

Last year, significant capital costs were incurred to develop clean energy projects in the NWT, such as Inuvik Wind. In 2022-23, these projects progressed to phases that required less GNWT investment.

The \$45 million dollars includes:

- Capital operations and management expenses to implement climate change projects, policies, and programs, including \$27 million dollars for actions and initiatives advanced under the *2030 Energy Strategy*.

- Funding received and distributed by the GNWT for climate change knowledge production, climate change adaptation, and lower carbon energy projects.
- Time spent developing and implementing climate change policies and programs, measured in employee salaries.

These investments are a key component of the GNWT's work to address climate change and generate the results summarized in **Appendix A** of this report.



Alexandra Falls, Don Wilson.

## Actions

Highlights of key climate actions taken by the GNWT and its partners from April 1, 2022 – March 31, 2023, include:

- Ongoing work to upgrade the ground temperature sensor network along NWT highways and near building foundations. This data is used to inform the maintenance and development of public infrastructure, particularly as it is impacted by permafrost thaw due to climate change.
- Completing the first NWT Climate Change Risk and Opportunity Assessment with input from the NWT Climate Change Council, Indigenous and community governments, the Government of Canada, co-management boards, the NWT Climate Change Youth Council, non-governmental organizations, academia, industry, and Hunters and Trappers Committees.
- Making substantial progress towards the completion of the Inuvik Wind Turbine Project, which began producing clean electricity in November 2023. Inuvik Wind is a key project of the *2030 Energy Strategy*.
- The NWT's overall greenhouse gas (GHG) emissions were 1,287 kt of carbon dioxide

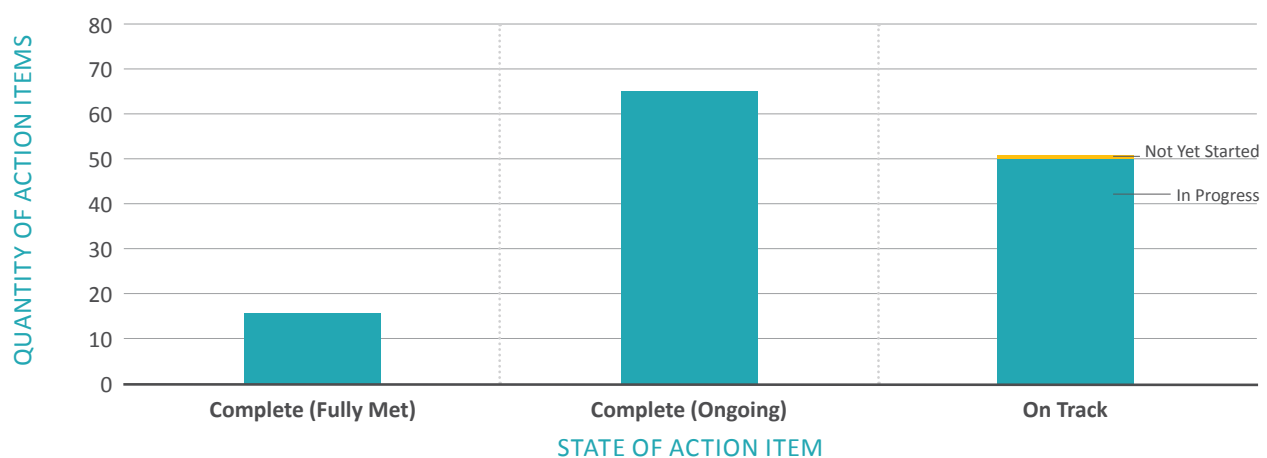
equivalent (CO<sub>2</sub>e) in 2021, the most recent year for which data is available. This corresponds to a 25% reduction in NWT emissions since 2005. This reduction is both a reflection of numerous actions taken by individuals, businesses, organizations, and governments across the NWT, as well as a reduction in industrial activity, such as mining, during this period. The current GNWT target is to reduce GHG emissions by 30% below 2005 levels by 2030.

- Strengthening the carbon pricing regime to \$50/tonne to comply with federal requirements.
- Completing Phase One of a Forest Vulnerability Assessment in partnership with the Canadian Forest Service to monitor changes to forest growth, productivity, health, and regeneration after natural and human-caused disturbances in the context of the changing climate.

There are 132 action items in the *2019-2023 Climate Change Action Plan*. The following status categories describe progress to date on the Plan's Action Items:

- Completed (Fully Met)
- Completed (Ongoing)
- On Track (In Progress)
- On Track (Not Yet Started)

### ACTION PLAN IMPLEMENTATION PROGRESS AS OF MARCH 31, 2023



Progress details for all 132 Actions in the *Climate Change Action Plan* can be found in **Appendix A**.



# Priorities for Next Year

The Climate Change Strategic Framework, Energy Strategy and NWT Carbon Tax will continue to be implemented by the GNWT and its partners. Specific areas of focus for 2023-24 will include:

- Continue to implement planned climate mitigation, knowledge, and adaptation actions to reduce greenhouse gas emissions and build resilience to climate change in the NWT.
- Increase access to Northern climate-related information and resources through the launch of an online NWT Climate Change Library.
- Facilitate an independent evaluation of the NWT Climate Change Strategic Framework and current Action Plan.
- Engage with NWT partners, including the Climate Change Council, to develop the 2025-2029 Climate Change Action Plan.
- Use the NWT Climate Change Risk and Opportunity Assessment and the independent evaluation to inform development of the 2025-2029 NWT Climate Change Action Plan.

# Appendix A:

## Status of all Climate Change Actions

The table on the following pages provides progress updates for all actions identified in the *2030 Climate Change Strategic Framework Action Plan 2019-2023* as of March 31, 2023. Progress updates for all actions

identified under the *2030 Energy Strategy Action Plan 2019-2022* and the NWT Carbon Tax are available in the *Energy Initiatives Annual Report 2022-23* and the *Carbon Tax Annual Report 2022-23*.



Pingos During Winter, ©SmartICE

## Appendix A

# Goal 1: Transition to a Lower Carbon Economy

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
1.1 Transitioning to a lower carbon economy	A. Implement the actions and initiatives outlined in the <i>2030 Energy Strategy: Energy Action Plan 2019-2022</i>	INF, AEA, NTPC, Housing NWT, ECC, Federal Departments, Indigenous governments, Indigenous organizations, Community governments, Industry, NGOs	Detailed reporting for 2022-23 on the actions and initiatives advanced to achieve the objectives of the <i>2030 Energy Strategy</i> is provided in the 2022-23 Energy Initiatives Report.	Completed (fully met)
	B. Implement NWT carbon pricing	FIN	To comply with federal requirements, the NWT implemented a Carbon Tax on September 1, 2019. In 2022-23, the price of pollution was increased to \$50 per tonne of carbon dioxide equivalent. More information can be found in the 2022-23 NWT Carbon Tax Annual Report.	Completed (ongoing)
1.2 Addressing climate change in environmental assessment and licensing/permitting of resource development and other projects	A. Collaborate on policy development, information requirements and tools to integrate climate change considerations	ECC, ITI, <b>Regulatory Boards</b> , Industry, NGOs	<p>In 2021-22, ENR (now ECC) led the development of draft GNWT guidelines to integrate climate change into environmental assessments in the Mackenzie Valley. In 2022-23, ECC assisted the regulatory boards (Environmental Impact Review Boards, and Land and Water Boards) in hosting a workshop to discuss and review the climate change and environmental assessment processes. The workshop included a presentation on the Strategic Assessment of Climate Change (SACC) protocol developed by Environment and Climate Change Canada (ECCC). The SACC provides a process for consideration of climate change under the federal Impact Assessment Act including considerations of greenhouse gas emissions of a project, and an approach for assessing how the project is resilient to, and at risk from, current and future climate impacts.</p> <p>Building on the ECCC SACC, the GNWT and the Mackenzie Valley Environmental Impact Review Board are planning in 2024 to clarify and advance next steps for Guidelines for the Consideration of Climate Change in Environmental Assessment in the Mackenzie Valley.</p> <p>The Mackenzie Valley Resource Management Act Climate Change Workshop Report is available online <a href="#">here</a>.</p>	On Track (in progress)
	B. Include climate change considerations in GNWT submissions to regulatory boards	ECC, GNWT	<p>The GNWT made several submissions to regulators/co-management boards containing specific climate change recommendations in 2022-23. ECC provided climate change consideration for the following submissions in 2022-23:</p> <ul style="list-style-type: none"> <li>ECCC Guidebook: Assessing Climate Change Resilience – Technical Guide Related to the Strategic Assessment of Climate Change</li> <li>Mackenzie Valley Highway – Developers Assessment Report</li> <li>Dehcho Land Use Plan</li> <li>Climate Lens Assessment for the Proposed Slave Geological Province</li> <li>Diavik Closure Plan</li> </ul>	On Track (in progress)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
1.3 Determining the potential value of natural carbon sinks	A. Undertake work to estimate carbon stored in NWT ecosystems	ECC, FIN, Academia, NRCan (CFS), NGOs	<p>The GNWT continued to act as a partner on Can-Peat, a research partnership led by the University of Waterloo that is developing a national database of peatland carbon stocks.</p> <p>In 2022, the GNWT worked with the Canadian Forest Service to produce a <a href="#">report on climate change and NWT forests</a> including a chapter on carbon balance that summarized the measurement and modeling of peatland carbon, and the impact of fire, insects, and temperature on carbon balance.</p> <p>In 2023, the GNWT supported researchers in re-establishing the carbon-flux tower that had previously been destroyed in a forest fire at the Scotty Creek Research Station. Flux towers measure the amount of carbon (greenhouse gases) in gases emitted into the atmosphere from ground soils including in permafrost areas.</p> <p>ECC's Climate Change Unit contributed funding to a master's student researcher at the University of Calgary who identified a sustainable framework for community-based peatland environmental monitoring. The research examined new, emerging funding methods for supporting citizen science monitoring of peatlands.</p> <p>Ducks Unlimited Canada (DUC) have developed detailed wetlands maps for the NWT. Using these maps as input, DUC has developed a peatland carbon model that estimates the amount of carbon stored in wetland peat for all types of NWT wetlands. This allows peatland carbon to then be mapped for wetlands in the NWT.</p>	On Track (in progress)
1.4 Improving GHG emissions tracking and reporting	A. Improve GNWT emissions tracking	ECC, INF, ECCC	In 2022-23, the GNWT developed an Inventory Management Plan that documents an approach for enhancing the GNWT corporate GHG emissions inventory.	On Track (in progress)
	B. Refine GNWT and NWT reporting methods	ECC, INF, FIN, ECCC	<p>Environment and Climate Change Canada (ECCC) produces (with GNWT input) <i>Canada's National Inventory Report (NIR)</i> which reports greenhouse gas emissions by province and territory to the United Nations.</p> <p>The GNWT reviews ECCC numbers and supports improvements to the calculation methodology.</p> <p>The GNWT compared GNWT 2021 fuel tax data and NIR GHG emissions in February 2023 and found an increased and acceptable alignment which was a significant improvement from previous years.</p>	On Track (in progress)

Action Areas	Lead, Partners	Summary of Progress in 2022-2023	Status
<p><b>6.1</b> Determining the potential value of natural carbon sinks</p> <ul style="list-style-type: none"> <li>Determine the potential economic value of stored carbon in the ecosystem</li> </ul>	<p>ECC, FIN, Academia, NRCan (CFS), NGOs</p>	<p>Progress is first being made on Action Item 1.3A (undertake work to estimate carbon stored in NWT ecosystems), which will be a required precursor to determining the economic value of the carbon stored in ecosystems. Completion of Action Area 6.1 will be possible once Action Item 1.3A is complete.</p> <p>In 2024, the GNWT will undertake a literature review of landscape carbon in the NWT. The review will summarize:</p> <ol style="list-style-type: none"> <li>1) current knowledge of terrestrial landscape carbon in the NWT including major sources and sinks of carbon and how they may change with climate change;</li> <li>2) landscape carbon monitoring currently underway or recently completed (tower, airborne, and satellite monitoring) as well as modelling; and 3) gaps in related knowledge. This literature review will be used to inform research taking place under the 2025-29 Climate Change Action Plan, environmental assessments, and the potential for carbon offsets in the NWT. ECC continues to explore the opportunity for carbon offsets and determine the next steps with its partners.</li> </ol> <p>In addition, the Department of Industry, Tourism, and Investment is assessing possible locations in the NWT where anthropogenically produced carbon dioxide may be safely stored, to potentially reduce net GHG emissions in the territory.</p>	<p>On Track (not yet started)</p>
<p><b>6.2</b> Implement composting in small to medium-sized communities to reduce greenhouse gas emissions from community landfills</p> <ul style="list-style-type: none"> <li>Undertake planning and feasibility work</li> <li>Provide support for projects</li> </ul>	<p>ECC, Community governments</p>	<p>In 2022-23, the GNWT Waste Reduction and Recycling Initiative (WRRRI) funded the expansion of a composting program in the Hamlet of Tulita. The WRRRI provided funding to five other projects that prioritized reducing waste in the NWT. These included clothing swaps, providing reusable dishware to schools, swapping paper towels for reusable cloths, and researching the use of shredded tires. Each of these projects contributed to conserving and reusing resources already in the NWT, which inherently reduces transportation greenhouse gas emissions.</p> <p>One standard and five guidelines relating to composting are in development. These documents may impact compost facilities across the NWT.</p>	<p>On Track (in progress)</p>

## Appendix A

# Goal 2: Improve Knowledge of Climate Change Impacts

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
2.1 Supporting the GNWT Knowledge Agenda – climate change research	A. Leverage existing research programs to incorporate community-based participation through the development of community and academic partnerships	GNWT, Indigenous governments, Indigenous organizations, Academia, Community governments, NGOs	<p>The Canadian Mountain Network (CMN), NWT Environmental Studies Research Fund (ESRF), the GNWT Wilfrid Laurier University (WLU) Partnership, and NASA Arctic-Boreal Vulnerability Experiment (ABOVE) all supported research programs significantly tied to community-based and co-led research, that resulted in over ten publications and reports.</p> <p>Summaries of at least eight projects are available in the annual reports of the Canadian Mountain Network, the ESRF, and the WLU partnership. See Action Item 2.1C. NASA's ABOVE Project Publications are available <a href="#">here</a>.</p> <p>An updated Knowledge Agenda is in development; it explores a series of guides for researchers focused on climate change. The renewed Knowledge Agenda is due to be publicly released before the end of the 2023-24 fiscal year.</p> <p>Eight projects collecting baseline data that involve local communities were supported by the GNWT's Knowledge Agenda (KA) Unit through research networks, directly with funds from the NWT ESRF, or by Contribution Agreements led by KA staff. Several key activities included broad support for community-focused research including impacts of climate change on natural resources in the NWT.</p>	Completed (ongoing)
	B. Support additional interdisciplinary research addressing economic, health, social and environmental change related to climate change	GNWT, Indigenous governments, Indigenous organizations, Academia, Community governments	<p>In 2022-23, ENR (now ECC) contracted PlanIt North to develop an NWT research and monitoring summary document. Once completed, climate change research and monitoring priorities and gaps can be identified, including those within the NWT Climate Monitoring Network. Interviews with key internal and external stakeholders took place to identify research priorities.</p> <p>In addition, interdisciplinary research under this Action Item was supported through membership in the Territorial Science Advisors Forum and membership in the Research Management Committees of two large academic research funding networks - CMN and ArcticNet. ArcticNet funded three research positions in the NWT via Aurora College as well as four projects in the western Arctic and the Dehcho.</p> <p>The Collaborative Barren-Ground Caribou Research Initiative will also result in an NWT Cumulative Impact Monitoring Program (NWT CIMP)-led comprehensive synthesis report including Indigenous and scientific knowledge.</p>	Completed (ongoing)



Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	<p>C. Link traditional and local knowledge holders with researchers in discussions or research about climate change</p>	<p><b>ECC, Indigenous governments, Indigenous organizations,</b> Academia, Community governments</p>	<p>Numerous programs and projects were underway in 2022-23 linking traditional and local knowledge holders with climate change research in the NWT.</p> <p>The NWT Cumulative Impacts Monitoring Program (CIMP) funded six projects with a Traditional and Indigenous Knowledge focus in 2022-23. See Action Item 2.3B for more information. Seven community presentations, two videos, and four NWT Environmental Research Bulletins informed by Indigenous Knowledge were produced. NWT CIMP annually hosts a regional workshop to facilitate the sharing of project results and ideas. This workshop is an opportunity to bring together community members, decision-makers, and researchers to discuss results and provide feedback; and it encourages the development of partnerships. In December 2022, NWT CIMP and the Tłı̨chǫ Government co-hosted a two-day workshop in Behchokǫ that focused on projects conducted in the Wek'èezhìi Region. A summary report of the workshop is available on <a href="http://www.nwtcimp.ca">www.nwtcimp.ca</a>.</p> <p>In December 2022, NWT CIMP released their <a href="#">Traditional Knowledge Monitoring and Research Results for 2016-2020 Report</a>. CIMP-funded projects in the Report include <i>CIMP189: Using traditional knowledge of Jean Marie River First Nation elders to better understand changes in the boreal caribou habitat</i> as well as <i>CIMP184: The Ka'a'gee Tu Atlas: Community-based monitoring of landscape change in Kakisa, NWT</i>. Find these, and other Traditional and Indigenous Knowledge focused-projects, on the <a href="#">NWT Discovery Portal</a>.</p> <p>In addition, a Traditional Knowledge Framework is being developed to inform the implementation of the <a href="#">Alberta-NWT Transboundary Water Agreement</a>. A Traditional Knowledge Advisory Circle has also been established to support the Agreement's implementation.</p> <p>Both Indigenous and western scientific knowledge is incorporated into the development of all five Boreal Caribou Range Plans. Climate change impacts and considerations are included in the Range Plans, as directed by community members at range planning Working Group meetings.</p> <p>See Action Item 3.8B for details on another Indigenous Knowledge-led initiative: The Berries Project.</p> <p>Indigenous Guardians supported work to re-measure forested areas in the NWT for the National Forest Inventory.</p> <p>Two major knowledge hubs in the NWT were supported via the Canadian Mountain Network (CMN). The NWT Environmental Studies Research Fund (ESRF) supported three projects that involved the participation of Indigenous NWT residents in the delivery of the program. The Wilfrid Laurier University (WLU) – GNWT partnership planning led to 40 research programs focused on climate change metrics, impacts of climate change on resources or communities in the NWT, and developing local capacity to lead research programs. The GNWT's Knowledge Agenda (KA) staff also supported at least 14 projects linking environmental change to community-based knowledge holders. GNWT Knowledge Agenda staff participated in more than 20 planning meetings focused on developing projects in the NWT that supported inclusion and recognition of Indigenous Knowledge and community participation in the planning and execution of research.</p> <p>The <i>CMN 2022-23 Annual Report</i> is available <a href="#">here</a>. The <i>ESRF 2022-23 Annual Report</i> is available <a href="#">here</a>. The <i>WLU Partnership 2022-23 Annual Report</i> is available by contacting <a href="mailto:ykoffice@wlu.ca">ykoffice@wlu.ca</a>. The <i>ArcticNet 2022-23 Annual Report</i> is available <a href="#">here</a>.</p>	<p>Completed (ongoing)</p>

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	D. Work with other jurisdictions, industry, and academia on climate change related research, development, and best practices for public infrastructure	INF	<p>INF continued to participate on the National Research Council National Codes Commission Standing Committee for Energy Conservation in Buildings, which is responsible for developing the National Energy Code of Canada and contributes to reducing energy and greenhouse gas emissions from buildings.</p> <p>INF's work on Northern Transportation Adaptation Initiative (NTAI) projects, funded by Transport Canada, was completed in late 2022.</p> <p>INF was engaged in research projects with Carleton University, the University of Manitoba, the Royal Military College, the University of British Columbia, and the University of Waterloo to study climate change related impacts on horizontal infrastructure design and construction. Research is ongoing into 2023-24.</p> <p>An example project is a multi-year partnership designed and established with the GNWT, BGC Engineering, the University of British Columbia, and Transport Canada (through the Northern Transportation Corridor Fund, NTCF) to broaden the permafrost monitoring and surveillance systems that focus on emerging stressors along highways. The outcomes of this project are two-fold: it will allow us to monitor and evaluate climate change risks to our existing infrastructure and will allow us to develop mitigation strategies to improve resilience and safety of new and existing highway alignments. This project is a five-year partnership, beginning in early 2022.</p>	Completed (ongoing)
	E. Collaborate with the Transportation Association of Canada and the Canadian Permafrost Association on climate change related initiatives	INF, ITI (NTGS)	<p>INF team members attended the Transportation Association of Canada Technical Meeting and Conference, and shared their knowledge at a national level. INF is applying this knowledge towards the preservation of permafrost and vegetation, as well as erosion and sediment control in the NWT. Work continues on the Tłı̄chǫ Highway Wildlife Effects Monitoring Program, with contract clauses in place to conserve and protect the environment.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
2.2 Supporting conservation network planning	A. Develop a renewed strategy for conservation network planning	ECC, EIA, Indigenous governments, Indigenous organizations, NGOs, Land Use Planning Boards	<p>ECC's Conservation Planning and Implementation Unit (CPIU) is renewing <i>Healthy Land Healthy People (HLHP): GNWT Priorities for the Northwest Territories Conservation Network 2016-2021</i>. The updated work plan will guide conservation network establishment, planning, management, operations, and associated conservation initiatives for the next five years (2023-2028). <i>HLHP 2023-2028</i> was developed based on outstanding items from the previous <i>Healthy Land, Healthy People 2016-2021 work plan</i>, new legislative requirements, engagement with Indigenous governments and Indigenous organizations, and input from a 2021 public survey. Five priority outcomes, 19 objectives, and 27 milestones have been identified. The work plan includes objectives to work with management boards to undertake climate change research and monitoring at the protected area- and network-level to help communities adapt to changes. The work plan was released in 2023.</p> <p>ECC CPIU continues to work with a variety of partners to establish an NWT Biodiversity Monitoring Program (NWTBMP). Presently, ECC CPIU collaborated with the Dehcho First Nations, Smbaa K'e First Nation, Łutsel K'e Dene First Nation, North Slave Métis Alliance, Tłı̨chǫ Government, Government of the Northwest Territories, Canadian Wildlife Service, University of British Columbia, Wilfrid Laurier University, and University of Alberta/Alberta Biodiversity Monitoring Institute in 2022-23. The NWTBM uses environmental sensors (remote cameras and audio recorders) to detect species' presence in various habitat types. While the focus is currently on protected areas, the program is expanding beyond protected areas to help monitor climate change's impacts on wildlife distribution and abundance and future conservation network planning across the NWT.</p> <p>ECC CPIU facilitated the development of a climate change story map entitled "<i>Present Lands, Future Climate</i>" (PLFC). The story map is being designed for the conservation network at the landscape-level. It introduces future climate shifts, the vulnerability of landscapes to rapid climate shifts and identifies climate refugia. The story map will be publicly posted once complete.</p> <p><i>Healthy Land Healthy People: GNWT Priorities for the Northwest Territories Conservation Network 2023-2028</i> and the climate change story map will both be completed in the next fiscal year (2023-2024). The NWTBM program will be on going.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
2.3 Enhancing the use of traditional and local knowledge	A. Build climate change education into the <i>Take a Kid Trapping</i> and hunter education programs	ECC, Indigenous governments, Indigenous organizations, MACA, HSS	Climate change is built into the <i>Take a Kid Trapping</i> program through experienced harvesters that share information about the behaviour of animals and safety in the field related to climate change. The hunter-education program has been updated to include a section on safe travel on the land which relates to climate change. The modified hunter education program for presentation in schools includes climate change considerations.	Completed (ongoing)
	B. Support the collection, analysis or synthesis of traditional knowledge through the NWT Cumulative Impact Monitoring Program to better understand environmental trends and cumulative impacts for use in decision-making	ECC, Indigenous governments, Indigenous organizations, Community governments, Co-management Boards, Academia	In 2022-23, the NWT Cumulative Impact Monitoring Program (NWT CIMP) funded six projects with a traditional and Indigenous Knowledge focus. Seven community presentations, two videos, and four NWT Environmental Research Bulletins informed by Indigenous Knowledge were produced. The 2022-23 NWT CIMP Annual Report is in development and will be released by the end of 2023.  NWT CIMP annually hosts a regional workshop to facilitate the sharing of project results and ideas. This workshop is an opportunity to bring together community members, decision-makers, and researchers to discuss results and provide feedback; and it encourages the development of partnerships. In December 2022, NWT CIMP and the Tłı̄chq Government co-hosted a two-day workshop in Behchokq that focused on projects conducted in the Wek'èezhii Region. A summary report of the workshop is available on <a href="http://www.nwtcimp.ca">www.nwtcimp.ca</a> .  All deliverables to date for any projects funded by NWT CIMP are available on the <a href="#">NWT Discovery Portal</a> . The easiest way to find NWT CIMP project results is to search using the NWT CIMP project number (e.g. CIMP191) in the Portal.	Completed (ongoing)
2.4 Improving management and use of data/information	A. Inventory and evaluate NWT environmental data and data products to support climate change actions	ECC, ISSC, ITI (NTGS)	The GNWT continued its work in 2022-23 with the ECCC Northern Climate Data Working Group to produce and inventory northern climate data. The GNWT and ECCC are drafting an article on northern climate data.	Completed (ongoing)
	B. Develop and implement a central online resource to share climate change knowledge and information	ECC, ISSC	In 2022-23, ECC continued to respond to requests to provide climate change data and resources. Development of an online NWT Climate Change Library continued in 2022-2023 and the Library is set to launch in 2024.  The Climate Change Library will be an online central repository to house resources for users of climate change information. A Climate Services Specialist position was created and, once staffed, will support users of this online Library.  <a href="#">The NWT State of the Environment Report</a> , for which twelve climate change indicators were developed, was completed in 2022. It is published every four years.	On Track (in progress)
	C. Improve dissemination of climate change results and products	ECC	In 2021-22, the GNWT developed an annotated literature review of climate change science known as the <i>Compendium of Climate Change Knowledge</i> .  In 2022-23, more knowledge was added to the <i>Compendium</i> including a high-level climate change literature review as well as separate compendiums of climate change resources from Wilfrid Laurier University, the Aurora Research Institute, and the NWT Cumulative Impacts Monitoring (CIMP) database. These additions provide a greater breadth of academic literature relevant to climate change in the NWT. The <i>Compendium</i> will be publicly available in 2024 through the NWT Climate Change Library.	On Track (in progress)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
2.5 Climate and weather	A. Evaluate monitoring network requirements, potential monitoring redundancies and prioritize monitoring gaps	ECC, ECCC (Meteorological Service of Canada)	In 2021-22, ENR hosted an interdepartmental working group meeting to evaluate progress and strategies for this Action Item. Numerous departments and divisions from the GNWT were in attendance, including: CCAQ, FMD, NTGS, Conservation Planning, ITI, CIMP, INF, and Water Research and Monitoring.	On Track (in progress)
	B. Continue, and develop options to enhance, climate monitoring at NWT monitoring sites	ECC, ECCC, PCA, Industry, Academia	In 2022-23, the GNWT partnered with a researcher from the University of Saskatchewan on an environmental data sharing agreement for five weather stations in the Mackenzie Mountains. ECC continues to collaborate on monitoring with mines and academia.  The GNWT continued to implement the rollout of its small air quality sensor (also known as PurpleAir) program. These sensors complement the larger, existing GNWT air quality stations, and provide real-time, low-cost air quality monitoring and data.  A meeting was held with the NWTAC on February 3, 2022, to discuss this community-based air quality monitoring initiative, which received positive feedback and support. The program provides PurpleAir sensors free of charge to hosts across the NWT who are able to install the sensor and cover its minimal operation cost. Live air quality data from the sensors is available online <a href="#">here</a> .	On Track (in progress)
	C. Develop a plan for a northern climate hub to support delivery of climate services and products	ECC, ECCC (CCCS)	ECC worked with ECCC and the governments of Nunavut and Yukon to develop a proposal for the development of a Northern Climate Services Hub.  Ultimately, funding for the Hub was not budgeted for by the federal government. Federal funding has instead been provided to assist with the development of an NWT Climate Change Library. The Climate Change Library – an online central repository to house any resources useful for technical climate change users – is in development. It will be a publicly available resource. A Climate Services Specialist position has been created and, once staffed, will support users of this online library.  The GNWT will continue to work with other territorial governments and the federal government to identify how the delivery of northern climate services and products can occur linked to the implementation of the National Adaptation Strategy.	On Track (in progress)
	D. Develop climate projections and climate indices	ECC, ECCC, NRCan (CFS), Academia	ECC hired a consultant (Climalogik) specializing in climate services to develop climate projections for the NWT. The projections developed will be for 2050 and include many climate variables for the NWT. The results of these projections will allow the GNWT to better model future landscape change.  Regional summaries of the NWT climate projections will be available to the public through the NWT Climate Change Library once it is launched.  Results will also be shared in the NWT Climate Change Risk and Opportunity Assessment summary report, available in 2024.	On Track (in progress)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	E. Continue to monitor rates and dynamics of coastal erosion along the Beaufort Sea	NRCan (Geological Survey of Canada), Community governments, Federal Departments, Aurora Research Institute	<p>NRCan continued to lead research and monitoring of dynamics of coastal erosion along the Beaufort Sea. NRCan, in conjunction with Northumbria University and the Hamlet of Tuktoyaktuk, are leading the Nuna Project – a joint Canada-UK project focused on coastal erosion in and around Tuktoyaktuk.</p> <p>This has funded a local climate change community monitoring liaison position within the Hamlet of Tuktoyaktuk. The community-led monitoring program focuses on ground thaw, bathymetry collection, contaminant measurement and sampling, air quality, and coastal erosion.</p> <p>The GNWT worked with NRCan and the Hamlet to install two coastal erosion monitoring cameras in Tuktoyaktuk. This information is critical for the community to understand the impacts of waves and increased water levels on natural and constructed shorelines. Research from this work was published in eight journal articles.</p>	Completed (ongoing)
2.6 Permafrost	A. Collect existing ground temperature data along the Dempster and Inuvik-Tuktoyaktuk highways	ITI (NTGS), INF, NRCan (Geological Survey of Canada [GSC])	<p>This action item was completed in 2020-21 as the ground temperature monitoring network along the Dempster and Inuvik-Tuktoyaktuk (ITH) Highways has been established. Ground temperature data were collected at 120 monitoring sites and made publicly available by the Northwest Territories Geological Survey (NTGS).</p> <p>Six NWT Open Data Reports have been published making accessible ground temperature data from the Dempster-ITH corridor. Several public presentations and training workshops to Indigenous partners have been provided. Permafrost monitoring and collection of ground temperature data along the Dempster-ITH corridor is ongoing.</p>	Completed (fully met)
	B. Develop a plan to undertake regional terrain sensitivity and geohazard mapping and monitoring	ITI (NTGS), ECC, ISSC, NRCan (GSC), Academia	<p>An overarching plan to map permafrost geohazards is being implemented through the <i>NWT Thermokarst Mapping Collective Project</i>. A journal paper on this plan was prepared and reviewed for publication in <i>Arctic Science</i>. <a href="#">Read it here.</a></p> <p>The plan is complete and being published through a project overview paper and a series of Open Reports describing project methodologies. Two of the supporting plans (Hydrological Features, Organic Terrain Open Reports) are complete and three others are in progress (Slopes and Mass Wasting, Periglacial Features, Oblique Inventories).</p> <p>A plan to map geohazards at fine scales has been developed and published with collaborators at the GSC. The permafrost team and collaborators have provided several presentations to the public, at northern forums and for student outreach on the topic of community geohazards.</p>	On Track (in progress)
	C. Compile ground temperature and geotechnical datasets for the NWT	ITI (NTGS), INF, ECC, NRCan (GSC), Academia	<p>12 existing ground temperature and geotechnical datasets for the NWT have been compiled and published in Open Data Reports. One paper was published this year reporting new permafrost geotechnical data (<a href="#">Paul et al., 2021</a>) and another, describing a method for extracting information from Geotechnical reports is also available now (<a href="#">Castagner et al., 2021</a>). The data from these reports will be available through the NWT Permafrost Database, which is currently being developed.</p>	Completed (fully met)
	D. Undertake community terrain mapping through a pilot study of two communities	ITI (NTGS), ECC, Academia	<p>Desktop surficial maps were completed at scales of 1:30000 and 1:10000 for Whati, Fort McPherson, and Aklavik through a contract with Palmer Environmental. Similarly, scaled surficial maps were initiated for Tulita through collaboration with the University of Alberta, in addition to geotechnical and geophysical investigations.</p>	On Track (in progress)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	<b>E.</b> Undertake permafrost related research along the Dempster and Inuvik-Tuktoyaktuk highways	<b>ITI (NTGS), INF, NRCan (GSC), Academia</b>	<p>NTGS actively generates knowledge about permafrost and the impacts of permafrost thaw due to climate change. Six collaborative research projects have been initiated along the Dempster-Inuvik Tuktoyaktuk Highway (ITH) corridor, with various partners. Ongoing projects include assessing impacts of the highway on hydrology and permafrost, assessing and developing geohazard monitoring tools, investigating effects of snow compaction on ground temperatures, and assessing embankment thermal conditions</p> <p>NTGS produced two technical reports for INF on the Dempster-ITH corridor.</p> <p>NTGS has also collaborated with the Aurora Research Institute and the Inuvialuit Land Administration to develop permafrost training courses for Inuvialuit partners. The training focuses on ITH permafrost monitoring.</p>	Completed (fully met)
	<b>F.</b> Collaborate and advise on academic permafrost research in NWT	<b>ITI (NTGS), Academia</b>	All NTGS research projects are collaborations or advisory partnerships. NTGS has ongoing collaborations with 12 universities and serves as an advisory committee member for five graduate students. While this action item is marked as complete, the activity is ongoing because it reflects an important element of how NTGS delivers its programs.	Completed (ongoing)
	<b>G.</b> Work to increase human resource capacity to enable progress on permafrost-related actions	<b>ITI (NTGS), INF, ECC, NRCan (GSC)</b>	NTGS has grown its permafrost science team from one to four full-time positions. In addition, permafrost capacity in partner organizations includes the Department of Environment and Climate Change (one full-time position), the Department of Finance – Geomatics (one part-time position), Aurora Research Institute (one full-time position), and Wilfrid Laurier University (one full-time position).	Completed (fully met)
<b>2.7</b> Water and wetlands	<b>A.</b> Continue NWT water quality and water quantity monitoring which can contribute to the assessment of climate-related changes in quality and flow over time (including community-based water monitoring programs)	<b>ECC, ECCC, Indigenous governments, Indigenous organizations</b>	<p>The GNWT maintains baseline monitoring programs across the NWT to ensure appropriate data are available for the assessment of water quality and quantity. In 2022-23, all core monitoring programs were carried out, including long-term water quality monitoring programs at various locations throughout the NWT. These data have been validated through the Lodestar data management system for quality assurance and are publicly available through the <a href="#">Mackenzie DataStream</a>. All data from these monitoring programs is publicly available. Most data are available on the DataStream, for those that aren't, requests can be sent to <a href="mailto:Robin_Staples@gov.nt.ca">Robin_Staples@gov.nt.ca</a>.</p> <p>The community-based monitoring (CBM) program involves Indigenous partners from 21 communities across the NWT and is a collaborative initiative to assess the long-term trends in water quality.</p> <p>Engagement for water monitoring programs and initiatives with water partners is ongoing throughout the year, ranging from the Water Stewardship Strategy annual workshop, Indigenous Steering Committee meetings, Community-Based Monitoring engagement, training, and reporting, Great Slave Lake research and monitoring engagement, and meetings and reporting for the Transboundary Bilateral Agreement and the Mackenzie River Basin. The need to consider climate-related changes is frequently discussed, particularly with Indigenous partners, and climate change is incorporated into the department's work.</p> <p>The annual water and sediment quality report has been generated for the Slave and Hay Rivers as part of Transboundary Water commitments. Spring Break-up reports incorporate community information through break-up.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	<b>B.</b> Continue to support the snow survey network to contribute to a better understanding of climate-related change in winter precipitation	ECC	<p>The GNWT maintains a long-term snow monitoring network across the territory. Data from this network serves several different purposes, including assessment of potential water availability in the spring for both flood and fire outlooks, hydroelectricity generation, trend assessment, etc. The information collected is critical to carry out any climate change assessment. Baseline programs were carried out in 2022-23, although some stations in the South Slave region were inaccessible for safety reasons.</p> <p>Summary snow survey data are available through the GNWT's website. The NWT <i>Snow Survey Bulletin &amp; Spring Water Level Outlook 2023 – Technical Report</i> was published and is <a href="#">available online</a>.</p>	Completed (ongoing)
	<b>C.</b> Undertake NWT Wetland Inventory Mapping	<b>Ducks Unlimited Canada</b> , Indigenous governments, Indigenous organizations	Ducks Unlimited completed satellite-based wetland classification for 39,300 kms of Tłı̨ch̨ Land classifying them in the five classes of the Canadian Wetland Classification System (open water, marsh, fen, bog, and swamp). The mapping found that approximately 40 percent of the Tłı̨ch̨ region is wetland with open water being most common followed by fens, bogs, marshes, and swamps, with wetlands being more common in the Taiga Plains than the Shield region.	Completed (ongoing)
	<b>D.</b> Assess cumulative impacts to water, including climate change, as reflected in the NWT Cumulative Impact Monitoring Program Water Blueprint	ECC, Academia, ECC, Indigenous governments, Indigenous organizations, Community governments	<p>In 2022-23, ECC's NWT Cumulative Impact Monitoring Program (NWT CIMP) funded ten research projects with a focus on water. Results were communicated through 18 community presentations, eight scientific presentations, five peer-reviewed publications, six videos, and five NWT Environmental Research Bulletins. Read the Bulletins <a href="#">here</a>.</p> <p>The NWT CIMP initiative <i>Monitoring Cumulative Effects to Water Quality</i> aims to develop, test, and implement an approach to monitoring water quality that is informed by cumulative effects. The project's pilot study (2020-2023) is based in the Upper Coppermine River Basin. Monitoring campaigns in 2022-2023 collected water quality information from lakes that span a range of predicted cumulative effect risks. Ultimately, this tool can be used to direct impact monitoring at specific at-risk locations and to inform management decisions.</p>	Completed (ongoing)
<b>2.8</b> Forests and vegetation	<b>A.</b> Monitor changes to forest growth, productivity, health, and regeneration after natural and human-caused disturbances in the context of the changing climate	ECC, NRCan (CFS), Academia	<p>Forest health surveys are completed and reported on annually, including in 2022-23. ECC's NWT Forest Health Reports are available <a href="#">online</a>. This work includes assessments of forest insect and disease infestations along regular survey corridors as well as surveys of abiotic disturbances.</p> <p>National Forest Inventory permanent monitoring plots are remeasured every year and incorporated into the National Inventory Report. This is done by way of analysis of change over time at the forested plots, which represents forest change in the NWT. 20 plots were remeasured in 2022-23. These plots are located throughout the Taiga Plains ecoregion, randomly selected from a 20 km grid, only in forested stands.</p>	Completed (ongoing)
	<b>B.</b> Conduct vulnerability assessments for forest landscape areas of interest	ECC, NRCan (CFS)	<a href="#">Phase One of the Vulnerability Assessment</a> , developed in partnership with the Canadian Forest Service, was completed for forest landscape Areas of Interest. ECC plans to follow up this project by creating public engagement materials such as story maps.	Completed (fully met)



Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	C. Improve understanding of changing wildfire regimes	ECC, NRCan (CFS), Academia	In 2022-23, ECC's partnership with the Canadian Forest Service on this project continued and the final year of work was completed in 2022-23. Reporting will be underway in 2023-24. Field work on this project consisted of collecting wood samples from trees scarred by wildfire. The tree ring patterns in the samples are analyzed to provide data for the last 200 years of fire activity on the landscape. This provides insight into when, where, how often, and how severe NWT fires have burned. The final report on this research undertaken at the Fort Smith and Hay River transects will be published in 2024.	On Track (in progress)
	D. Produce baseline NWT-wide vegetation classifications	ECC, ISSC, NRCan (CFS)	The Multi-Source Vegetation Inventory (MVI) project is on track to produce a complete NWT-wide vegetation classification product in 2023-24. The MVI detailed permanent monitoring plots that were established in 2022 and are used collectively with the other MVI permanent sample plots to build a modeling platform. This platform allows for the use of airborne LiDAR to impute forest vegetation inventory attributes across harmonized Landsat/Sentinel imagery. In 2022-23, thousands of calibrations and validation data points were collected to inform the vegetation classification. Airborne LiDAR data was collected by the University of Lethbridge.	On Track (in progress)
	E. Complete forest health surveys and reporting	ECC, NRCan (CFS)	The 2021 Forest Health Survey was completed in 2022. The Forest Health Newsletter is available <a href="#">here</a> . Approximately 14 million hectares of forested land in the NWT were also surveyed in 2022.	Completed (ongoing)
2.9 Wildlife	A. Conduct wildlife climate change vulnerability assessments	ECC, Indigenous governments, Indigenous organizations, Resource Management Boards, ECC, Academia	A climate change vulnerability assessment was completed for the 46 species-at-risk in the NWT designated under the <i>Species at Risk (NWT) Act</i> or the federal <i>Species at Risk Act</i> . The <a href="#">report</a> is now publicly available. Further analyses of known and predicted impacts of climate change on wildlife and their habitats are ongoing.  There is much external research being conducted in the NWT (often involving GNWT collaborators) to address wildlife- and habitat-related climate change vulnerabilities, impacts, and adaptation that applies across multiple Action Items, including 2.9A, 2.9F, 2.9G, 7.6. Two open access examples from the past year:  - Stewart et al. (2023) published an <a href="#">analysis forecasting changes in boreal caribou habitat</a> .  - Liu et al. (2023) published an <a href="#">analysis of past and forecasted changes in shrub coverage in the Arctic tundra</a> .	Completed (ongoing)
	B. Continue monitoring invasive and non-indigenous species and assess impacts from range shifts on wildlife	ECC, Resource Management Boards, Indigenous governments, Indigenous organizations, ECC, Academia	Invasive and non-indigenous species are tracked by the NWT General Status Program and NWT Council on Invasive Species, Pests, and Pathogens. An updated list of alien species was published in the <a href="#">NWT Species 2021-2025 Report</a> . Growing citizen science initiatives (e.g., iNaturalist) and projects deploying environmental sensors cameras across the NWT, like the <a href="#">Biodiversity Monitoring Program</a> , will provide ongoing opportunities for detecting and monitoring invasive and non-indigenous species.  The <a href="#">2022 NWT State of Environment Report</a> was published online. A <a href="#">report on aerial monitoring of wild pigs</a> was also published.	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	C. Establish the NWT Pests, Pathogens, and Invasive Species Council	ECC, NWT PPISC, Indigenous governments, Indigenous organizations, Resource Management Boards	<p>The Northwest Territories Council on Invasive Species, Pests, and Pathogens (CISPP) was formally established in 2021. The Council's Bylaws were adopted at the first Annual General Meeting in 2021. External funding was received for the start-up of the Council, and ECC is working with partners to identify long-term funding to support the Council's operation.</p> <p>There are seven Action Items in the 2019-2023 CCSF Action Plan related to monitoring and managing invasive species, pests, and pathogens. Tracking changing wildlife distributions is considered a high priority for wildlife-related climate change adaptation.</p>	Completed (fully met)
	D. Utilize the NWT Pests, Pathogens, and Invasive Species Council to support rapid response programs and educational materials on future pests, pathogens and invasive species issues due to the changing climate	ECC, NWT PPISC	<p>The Northwest Territories Council on Invasive Species, Pests, and Pathogens was formally established in 2021.</p> <p>Website updates and educational materials continue to be developed and delivered (see <a href="https://nwtcispp.ca/">https://nwtcispp.ca/</a>).</p> <p>The <a href="#">Field Guide to Alien Plants in the Northwest Territories</a>, a visual guide and checklist of all 75 known alien plant species was published in 2022-23.</p>	Completed (ongoing)
	E. Disseminate current and new information on the health and distribution of wildlife, including diseases and parasites	ECC	<p>The Wildlife Veterinarian provided multiple media interviews and delivered public presentations regarding the rabies virus, Chronic Wasting Disease, mosquito abundance and vector-borne diseases, ticks and climate change, avian influenza, brucellosis, and general wildlife health and disease.</p> <p>Internal wildlife health monitoring protocols for various species, including caribou, bison, black bears, wolves, and moose, were developed. These protocols included monitoring for various infectious diseases of interest with potential for emergence or changing prevalence due to environmental pressures.</p> <p>Strategic plans on wildlife health issues which incorporate the indisputable role of climate change on wildlife disease exposure, immunity, stress, and overall health continue to be developed.</p>	Completed (ongoing)
	F. Continue using remote sensing techniques to assess wildlife habitat and impacts due to climate change	ECC, ECCC (CWS)	<p>Remotely sensed environmental data products of relevance to the NWT are continually being developed, updated, and made available by researchers from Canada and around the world. These spatial data products are used on an ongoing basis to understand and monitor current and future drivers of the distributions and abundance of NWT wildlife. Examples from 2022 include (i) a NWT <a href="#">CIMP-funded project with Queen's University</a> assessing habitat changes on the Bathurst caribou range and (ii) an <a href="#">analysis of shrub expansion</a> in the Beaufort Delta region. See also examples provided under Action Item 2.9A.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	<b>G.</b> Enhance the knowledge of species presence, distribution and status to determine future needs based on a changing climate	ECC, Resource Management Boards, Indigenous governments, Indigenous organizations, ECCC, DFO	The <a href="#">NWT Species 2021-2025 Report</a> was completed. To enhance the state of knowledge of NWT's biodiversity, the promotion and growth of citizen science initiatives (e.g., iNaturalist), and wildlife monitoring using environmental sensors, like the <a href="#">Biodiversity Monitoring Program</a> , will continue on an ongoing basis. Other monitoring initiatives, along with publications and other communication products stemming from these initiatives will also continue.	Completed (ongoing)
	<b>H.</b> Assess cumulative impacts to caribou, including from climate change, as reflected in the NWT Cumulative Impact Monitoring Program Caribou Blueprint	ECC, Academia, Indigenous governments, Indigenous organizations, Community governments	In 2022-23, ECC's NWT Cumulative Impact Monitoring Program (NWT CIMP) funded six projects with a focus on caribou. Results were communicated through ten community presentations, four scientific presentations, two peer-reviewed publications, three videos, and four NWT Environmental Research Bulletins. Read the Bulletins <a href="#">here</a> .	Completed (ongoing)
<b>2.10</b> Fish and marine mammals	<b>A.</b> Continue to improve baseline monitoring of species health and distribution with an emphasis on priority species of marine, anadromous and freshwater fishes, and marine mammals	<b>DFO (Fisheries and Oceans Canada),</b> ECCC, NRCan, Indigenous governments, Indigenous organizations, Resource Management Boards	<p>In 2022-23, DFO continued to contribute to improving the collection of baseline conditions and ecosystem monitoring through a series of Western Arctic sampling programs, community-based monitoring throughout the Inuvialuit Settlement Region, and monitoring of fisheries and ecosystem conditions in Great Slave Lake. Some examples of these programs include:</p> <ul style="list-style-type: none"> <li>• Canadian Beaufort Sea – Marine Ecosystem Assessment Program (CBS-MEA) that conducts ship-based integrated ecosystem sampling at stations throughout the Canadian Beaufort Sea</li> <li>• Joint Ocean Ice Study (JOIS) and Beaufort Gyre Project – a ship-based program that monitors oceanographic conditions in the Beaufort Sea</li> <li>• Beluga Health Monitoring Program – combined community-based monitoring with the Fisheries Joint Management Committee and DFO sampling program that examines the health of Beluga whales harvested in the Inuvialuit Settlement Regions that includes assessment of changes in body condition, harvest, and mercury levels</li> <li>• Ring Seal Monitoring Program – a long-term community-based monitoring program conducted in collaboration with the Fisheries Joint Management Committee, examining ringed seal population health near Ulukhaktok, NWT</li> <li>• The Great Slave Lake Stock Assessment Monitoring Program examines changes in population dynamics of Lake Trout, Lake Whitefish, and Inconnu in Great Slave Lake</li> <li>• The Arctic Salmon Program works with communities throughout the NWT to report the occurrence of Pacific salmon captured during subsistence fishing</li> <li>• The Department conducts other episodic programs to document baseline conditions and monitors conditions to support the marine conservation efforts in the regions</li> </ul> <p>In addition, twelve climate change-related primary publications related to marine mammals and anadromous fishes were published in 2022-23. DFO is also in the process of updating the <i>Arctic State of the Ocean Report</i> with publication anticipated in 2024.</p>	On Track (in progress)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	<b>B.</b> Continue monitoring temperature-dependent contaminants in subsistence species	<b>DFO, ECCC, Indigenous governments, Indigenous organizations, Health Canada (guidelines)</b>	<p>DFO leads a community-based monitoring program for mercury (Hg) and persistent organic pollutants (POPs) in Beluga whales at Hendrickson Island (Beaufort Sea/Amundsen Gulf). The program is conducted collaboratively with local Inuit, the Fisheries Joint Management Committee (FJMC) and the Northern Contaminants Program (Crown Indigenous Relations and Northern Affairs Canada). This work continued in 2022-23. Results are reported through the <a href="#">Arctic Monitoring and Assessment Programme</a>.</p> <p>The Arctic Monitoring and Assessment Programme (AMAP) has produced scientific assessments of mercury in the Arctic since 1998. The latest assessment (AMAP Assessment 2021: Mercury in the Arctic) was finalized and published in December 2021. The assessment includes the latest information on mercury, POPs, and human health in the Arctic. It was found that warmer temperatures may enhance methylmercury production in thawed permafrost and nearshore marine or lake sediments.</p>	On Track (in progress)
	<b>C.</b> Continue to monitor impacts of diseases and parasites on species	<b>DFO, Health Canada, Indigenous governments, Indigenous organizations</b>	<p>DFO continues to monitor impacts of diseases and parasites on species. In 2022-23, DFO coordinated a community-based annual monitoring program of viruses and other diseases in Beluga at Hendrickson Island (Beaufort Sea/Amundsen Gulf). The program is conducted collaboratively with Inuit and the Fisheries Joint Management Committee (FJMC). Results are published episodically in the primary scientific literature.</p> <p>A thorough assessment of disease and parasites in Eastern Beaufort Sea Beluga was conducted in 2022-2023 and considered in a Canadian Science Advisory Secretariat process to evaluate the contributing factors that resulted in the unusual death of beluga in 2019. The research document and science advisory report will be published in 2024.</p>	On Track (in progress)
	<b>D.</b> Assess cumulative impacts to fish, including climate change, as reflected in the NWT Cumulative Impact Monitoring Program Fish Blueprint	<b>ECC, Academia, DFO, Indigenous governments, Indigenous organizations, Community governments</b>	In 2022-23, ECC's NWT Cumulative Impact Monitoring Program (CIMP) funded six climate change-related projects with a focus on fish, provided 12 community presentations and four scientific presentations, and produced two peer-reviewed journal articles, five annual reports, publications, and four NWT Environmental Research Bulletins.	Completed (ongoing)
<b>2.11</b> Human health and well-being	<b>A.</b> Communicate alerts and develop advisories related to extreme weather, natural disasters impacting health, zoonotic diseases and poor outdoor air quality	<b>HSS, ECC, MACA</b>	<p>In 2022, the Department of Health and Social Services (HSS) issued five heat alerts and nine air quality advisories. With climate change, it is expected that the need for such advisories due to extreme weather events may increase.</p> <p>The GNWT's PurpleAir initiative is being implemented and will increase publicly available, real-time data on air quality in the NWT – a necessary initiative as air quality deteriorates during NWT wildfire seasons which are growing longer and more intense. See Action Item 2.5B for more information.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
2.12 Public safety	A. Ensure residents, first responders, communities and the GNWT are better prepared to deal with the impacts of climate-related hazards	MACA, Community governments, Indigenous governments; Indigenous organizations, NWTAC, PSC, NRCan (GSC)	<p>Distribution of GNWT Emergency Management Organization preparedness brochures continued in 2022-23.</p> <p>The annual “Be Ready” campaign ran March-May to ensure NWT residents: (1) are aware of risks such as flooding and wildfires and (2) undertake personal preparedness activities. Additions to the campaign include an online video to educate residents about flooding in the NWT.</p> <p>A “Be Ready Workbook” is intended to help individuals and households develop their own emergency plans.</p>	Completed (ongoing)
	B. Update community emergency plans and incorporate methods for identifying and monitoring climate change related hazards and adapting to the increase in frequency and severity of such hazards	MACA, Community governments, Indigenous governments, Indigenous organizations, GNWT	<p>In 2022-23, MACA worked with four NWT communities to review and update their emergency plans. MACA continues to offer Community Emergency Planning Workshops and Tabletop Exercise Workshops to all community governments. In 2022-23, MACA updated and distributed the template for “Community Emergency Plan” as a self-directed tool that community governments can use to facilitate the development and review of community emergency plans.</p> <p>In March 2023, MACA launched an Emergency Management Organization (EMO) portal for community governments to access all tools and templates developed by the EMO to assist with community emergency management programs. The EMO Portal has a Community Flood Preparedness Package to guide community governments in locations at elevated risk of flooding with their preparedness activities.</p> <p>As of March 2023, an after-action review of the 2022 Hay River flood was underway and engagement on the recovery phase was planned for late 2023.</p>	Completed (ongoing)
2.13 Culture and heritage	A. Continue research to assess impacts to heritage resources from climate-driven landscape disturbances	ECE, Indigenous governments, Indigenous organizations	<p>Coastal erosion risk assessments continue to be developed by the Cultural Places Program (ECE), using the Landsat Long-term Change Detection product and high-resolution satellite imagery (both provided by the NWT Centre for Geomatics). Archaeological site surveys carried out in September 2022 also yielded important observations at six substantial Inuvialuit ancestral villages, establishing a baseline understanding of site conditions for more protracted work at each site in 2023-24. Preliminary results of the Banks Island archaeological site review process were shared with the community of Sachs Harbour and the Sachs Harbour Hunters and Trappers Committee (HTC). Archaeological site survey results from the 2022 field season have been shared with the Tuktoyaktuk HTC.</p> <p>Archaeological site locations are kept confidential in accordance with territorial laws and land-use regulations.</p> <p>The NWT Climate Change Archaeologist (GNWT) was interviewed by CBC for a story on climate change impacts to Canadian archaeological sites.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
2.14 Public and community infrastructure	A. Complete community infrastructure risk assessments and high-level adaptation options	MACA, ECC, NWTAC, Community governments, Indigenous governments, Indigenous organizations	<p>MACA led a high-level climate change vulnerability assessment of impacts on public and community infrastructure within the boundaries of all 33 communities in the NWT. Risk maps were provided for every community to illustrate the spatial extent of hazards and the locations of infrastructure at risk, as well as a list of medium/high risks identified, proposed adaptation measures (including maintenance and inspection procedures), and recommendations for future work to address identified data gaps.</p> <p>The findings of this assessment will support communities in making informed decisions about their existing and future infrastructure. The report titled: <a href="#">Assessment of Climate Change Impacts in all NWT Communities</a> was published in 2021.</p>	Completed (fully met)
	B. Seek funding to fill community infrastructure gaps	MACA, INF Canada, NWTAC, Community governments, Indigenous governments, Indigenous organizations	<p>MACA supports community governments as they continue to plan their infrastructure priorities through the capital planning process, as well as with project implementation and applications for funding. Community governments continued to develop land use plans and strategic plans that consider climate-related risks and priorities, which influence the priorities that are represented in community government capital plans.</p> <p>In 2022-23, the GNWT approved \$833,000 in community government funding to support the reduction in the municipal funding gap to meet municipal core needs. Though this is not a requirement, it is anticipated that some of this funding will be put toward infrastructure impacted by climate change. The federal Investing in Canada Infrastructure Fund for community governments continues to target community roads and solid waste sites.</p>	Completed (ongoing)
	C. Improve documentation of GNWT infrastructure stability via more rigorous asset management activities on both vertical (i.e. buildings) and horizontal (i.e. highways and runways) infrastructure	INF	<p>Snow load and foundation systems inspection and management is scheduled and tracked via INF's internal computerized maintenance management software, which then informs supplemental maintenance activities and produces quarterly reports. Building maintenance inspections also account for climate change impacts associated with movement and resulting signs of stress in buildings.</p> <p>Annual inspections and resulting reports were produced for INF's Bridge Management Systems. Inspections were conducted at airports in accordance with the Airport Pavement Management System, producing reports that inform maintenance and project planning. All of these internal reports track potential effects of climate change and inform resulting infrastructure management requirements.</p> <p>INF is in the design stage for an improved Highway Surface Management System, that translates existing vehicle telemetry data from the GNWT fleet to surface deviation data. This would result in a significant temporal and linear dataset that can be used to track trends and identify focus locations for further investigation. This in turn may highlight areas affected by climate change and informs highway maintenance and design adaptation. It is anticipated this will be a three-year process, having commenced in 2022.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	D. Update climate change risk assessments for both vertical and horizontal GNWT infrastructure	INF	<p>INF continues to conduct asset inspections across NWT infrastructure for safety and regulatory compliance as part of standard asset management, including inspections of buildings, runways, roads, highways, culverts, bulk fuel facilities, and bridges. These inspections capture the effects associated with climate change.</p> <p>Risk assessments on roof snow loads and wood-pile foundation systems are on five-year cycles, with the next scheduled for 2023-24. Risk assessments are conducted during the design phase for all major projects, including climate change risk components, with an outlook over the design life of the asset. Bridge and structural culvert projects also incorporate climate change assessment into all projects in the design phase.</p> <p>For existing assets, INF collaborated with MACA to commence a study design for an infrastructure portfolio vulnerability assessment. This will assess existing buildings, highways, structures, and airport assets in the GNWT's inventory against predicted climate impacts. This will help assign risk rankings to these assets to create the basis for adaptation planning for existing assets against the effects of climate change. The first phase of the project is expected to be completed in 2023-24, to be followed by the scoping of Phase 2.</p>	Completed (ongoing)
	E. Collect and analyze ground temperature data to support the general knowledge base for GNWT infrastructure planning, design, construction and climate change impact monitoring	INF	<p>Data from INF's extensive network of thermistors in highway infrastructure (including Highways 1, 3, 4, and the Inuvik-Tuktoyaktuk Highway) and building foundation systems was collected and analyzed, included in annual internal database reports, and used to inform ongoing asset maintenance and management. Upgrades to the thermistor networks' hardware are ongoing to maximize data coverage.</p> <p>Data logger and acquisition systems have been upgraded in the Beaufort Delta, while improvements in the Sahtú are ongoing into 2023-24. Thermistor data is now being transmitted to a single database, housed at the Northwest Territories Geological Survey (NTGS), for improved data access and ease of analysis. While this monitoring and the resulting reports are used to manage infrastructure, they are inherently tracking the effects of climate change.</p>	Completed (ongoing)
	F. Continue to explore the potential for remote sensing and other technology to acquire data to allow monitoring and analysis of settlement and movement of GNWT infrastructure	INF, ISSC	<p>Continuing to build on the remote sensing and other technology put in place in 2019-20, satellite information has been obtained and continues to be processed for select infrastructure, including Oil Handling Facilities, highways (Dempster and Inuvik-Tuktoyaktuk), and airports (Inuvik, Norman Wells, Yellowknife, Hay River) to monitor vertical displacement. This technology is an additional tool to help with early identification of impacts to infrastructure and to enable proactive maintenance, in response to climate change impacts.</p> <p>Development of the data output is ongoing. Outputs are informing actions for the Dempster Highway slope stability, while outputs and analysis for other infrastructure are being refined.</p>	Completed (ongoing)

Action Areas	Lead, Partners	Summary of Progress in 2022-2023	Status
<p><b>7.1</b> Enhancing the use of traditional and local knowledge</p> <ul style="list-style-type: none"> <li>Document, use and transfer climate change related knowledge as prioritized by Indigenous governments to support decision-making pertaining to action areas</li> </ul>	<p><b>Indigenous governments, Indigenous organizations, GNWT, NGOs</b></p>	<p>In 2021-22, ENR (now ECC) established the NWT Climate Change Council which is comprised primarily of members from 13 Indigenous governments and Indigenous organizations. The Council informs work and priorities to support this Action Item. In 2023, the Council's NWT Climate Change Youth Council was formed to provide input from younger Northerners on climate issues.</p> <p>In 2023, a series of workshops were held to inform the NWT Climate Change Risk and Opportunity Assessment (ROA), which supports the development of the 2025-2029 NWT Climate Change Action Plan. Participants represented a wide breadth of organizations including the NWT Climate Change Council, Indigenous government and Indigenous organizations, land, water, and renewable resource boards, the NWT Climate Change Youth Council, environmental non-governmental organizations, the GNWT, the federal government, industry, and Hunters and Trappers Committees. The ROA findings will be shared in 2024 and will inform future climate change knowledge and adaptation actions and priorities.</p>	<p>Completed (ongoing)</p>
<p><b>7.2</b> Climate and weather</p> <ul style="list-style-type: none"> <li>Undertake further climate modeling to predict future landscape change</li> <li>Implement a northern climate services hub</li> </ul>	<p><b>ECC, ECCC, Academia, NRCan (CFS)</b></p>	<p>ECC hired a consultant (Climalogik) specializing in climate services to develop climate projections for the NWT. The projections developed will be up to 2050 and include a large number of climate variables for the NWT. The results of these projections will allow the GNWT to better model future landscape change.</p> <p>Funding for a northern climate services hub was not budgeted for by the federal government. Federal funding has instead been provided to assist with the development of an NWT Climate Change Library. The Climate Change Library – an online central repository hosting resources useful for technical climate change users – is in development. A Climate Services Specialist position has been created and once staffed, will support users of this online library.</p>	<p>On Track (in progress)</p>
<p><b>7.3</b> Permafrost</p> <ul style="list-style-type: none"> <li>Establish a permafrost monitoring network for the NWT</li> <li>Establish a permafrost data management system</li> <li>Analyze collected ground temperature data</li> <li>Assess sensitive permafrost terrain and inventory permafrost-related geohazards</li> <li>Interpret future permafrost behaviour across natural and built environments</li> </ul>	<p><b>ITI (NTGS), ECC, INF, Federal Departments, Regulatory Boards, Industry, Indigenous governments, Indigenous organizations, Community governments, NRCan (GSC, CCMEQ), Academia</b></p>	<p>Permafrost monitoring programs have been implemented and are being sustained in the North Slave region in collaboration with the Geological Survey of Canada, and along both the Inuvik-Tuktoyaktuk and Dempster Highways in collaboration with the Aurora Research Institute (ARI), the GNWT Department of Infrastructure, and the Inuvialuit Land Administration.</p> <p>In 2022-23, more than 20 media and outreach-related activities were undertaken by the NTGS Permafrost Team including presentations to the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists, CBC interviews on permafrost field work activities, and training with Indigenous environmental monitors. The team recently produced a Story Map highlighting the impacts of permafrost thaw on northern rivers. This Story Map was highly viewed in 2022-23, which prompted the team to start working on an 'Introduction to Permafrost' Story Map. Media, public outreach, and conference presentations are available from NTGS upon request. The team also published eight scientific publications and reports related to baseline information on permafrost and climate change that are now accessible to the public. The team also contributed to the completion of Canadian standards on the development of community suitability maps, and the updating of a Permafrost Glossary.</p> <p>Lastly, NTGS is working with partners at ARI and PermafrostNET to define a permafrost data management system. Steps forward include the development of a database, as the first phase of user testing was completed in 2021-2022. A guide for site installation and data handling was also initiated.</p>	<p>On Track (in progress)</p>



Action Areas	Lead, Partners	Summary of Progress in 2022-2023	Status
<p><b>7.4</b> Water and wetlands</p> <ul style="list-style-type: none"> <li>Review monitoring networks to assess appropriateness for determining trends and/or impacts related to climate change</li> <li>Prioritize and enhance water monitoring networks to improve assessments of climate change impacts</li> <li>Undertake climate change vulnerability assessments on priority surface waterbodies to inform management decisions</li> <li>Identify and assess use of innovative technology for the remote assessment of water, snowpack, and ice to assess changes including those related to a changing climate</li> </ul>	<p>ECC, ECCC, ISSC, NRCan (CCMEO), Indigenous governments, Indigenous organizations</p>	<p>ECC maintains several long-term water and climate research monitoring programs across the territory that are necessary for effective water management and to assist in the development of water policy and decision making. High water flood potential reports are shared frequently with appropriate communities during spring freshet through MACA's Emergency Management Organization.</p> <p>ECC published an Open Data publication for climate research station data from the Peel Plateau region. Data from long-term water quality monitoring programs from numerous locations throughout the NWT have been validated through the Lodestar data management system for quality assurance and are publicly available through the Mackenzie DataStream. All climate research station and snow data are available upon request and all hydrometric network data are available online on the <a href="#">Mackenzie DataStream portal</a>.</p> <p>A vulnerability assessment is being initiated for Great Slave Lake in 2023-24, after engagement meetings and information surveys are completed with communities, Indigenous governments, Indigenous organizations, and other resource users around Great Slave Lake.</p>	<p>On Track (in progress)</p>
<p><b>7.5</b> Forests and vegetation</p> <ul style="list-style-type: none"> <li>Explore the use of remote sensing tools for inventory and update of vegetation cover</li> <li>Produce baseline NWT-wide vegetation classifications for remaining regions</li> <li>Update baseline vegetation land cover inventory (2001-2010 base) for fires, land use and other climate-related changes</li> </ul>	<p>ECC, NRCan (CFS), Academia</p>	<p>A LiDAR-based forest vegetation inventory was completed for the Multi-Source Vegetation Inventory project under Action Item 2.8D.</p>	<p>Completed (fully met)</p>
<p><b>7.6</b> Wildlife</p> <ul style="list-style-type: none"> <li>Assess indirect effects of climate change (such as parasites, diseases, and pathogens) on species at risk</li> <li>Conduct monitoring, including community-based monitoring, to track species as they extend their ranges and become established in the NWT and assess resulting long-term impacts</li> <li>Develop surveillance systems to support predictions of species distribution changes</li> <li>Enhance monitoring of invasive and non-indigenous species for ongoing assessment of impacts from range shifts on wildlife</li> </ul>	<p>ECC, ECCC, Resource Management Boards, Indigenous governments, Indigenous organizations</p>	<p>The NWT Council on Invasive Species, Pests and Pathogens and General Status Ranking Program contribute to tracking and monitoring invasive and non-indigenous species in the NWT in 2022-23. ECC, with multiple external partners, is expanding the use of environmental sensors to monitor wildlife and their habitat. Citizen science initiatives are promoted and growing (e.g., iNaturalist). Data from these monitoring activities contribute information toward all items in Action Item 7.6.</p>	<p>On Track (in progress)</p>

Action Areas	Lead, Partners	Summary of Progress in 2022-2023	Status
<p><b>7.7</b> Human health and well-being</p> <ul style="list-style-type: none"> <li>Support health vulnerability assessment(s) by external parties (e.g. consultants, researchers, etc.) to evaluate the impact of climate change on the physical and mental health and social well-being of northern communities</li> <li>Work with partners and the public to establish the requirements for a baseline surveillance and monitoring system for health-related climate change indicators such as mental health and social well-being, injuries, food and water security, environmental contaminants, extreme weather events, and natural disasters, zoonotic diseases, chronic diseases, and infectious disease</li> </ul>	HSS, ECC, MACA	<p>The HSS Climate Change Coordinator is developing an FAQ document for PurpleAir Monitoring Units to encourage the uptake of citizen science in the NWT. See Action Item 2.5B. The aim is to increase the number of air quality monitoring units in remote communities, to provide increased air quality surveillance data for public and government use across the territory. This will provide HSS and ECC with a better understanding of the air quality situation in each community during wildfire events. This information is useful from a risk assessment and communication context.</p> <p>HSS is working on an FAQ document for Flooding in Homes to provide information to home occupants and owners about what to do if/when their residences are impacted by flooding.</p> <p>The <i>HSS Climate Change Vulnerability Assessment of the Northwest Territories Report</i> was completed in March 2021 and is awaiting translation before it can be publicly released.</p> <p>HSS has also published an FAQ document for <a href="#">Radon Overview for Residential Dwellings</a>, as research indicates that radioactive radon gas could potentially be released from the ground due to thawing permafrost.</p>	Completed (ongoing)
<p><b>7.8</b> Public safety</p> <ul style="list-style-type: none"> <li>Update the NWT Hazard Identification Risk Assessment to better predict which hazards could occur more frequently or become more extreme in the future</li> <li>Develop disaster mitigation plans for communities potentially impacted by the adverse effects of climate change</li> <li>Evaluate approaches to improve flow monitoring, flood prediction and emergency planning</li> <li>Monitor the condition of community trails</li> </ul>	MACA, ECC, SmartICE, ECCC, Community governments, Indigenous governments, Indigenous organizations, GNWT, Academia	<p>Throughout 2022-2023, MACA has worked on updating the Hazard Identification and Risks Assessment (HIRA). The HIRA helps NWT communities understand the different risks they may face related to climate change. The document is expected to be available at the end of fiscal year (2023-2024).</p>	On Track (in progress)
<p><b>7.9</b> Culture and heritage</p> <ul style="list-style-type: none"> <li>Conduct vulnerability mapping for heritage resources at risk of destruction from coastal erosion in the Beaufort Sea Region</li> </ul>	ECE, Academia, Indigenous governments; Indigenous organizations	<p>The Department of Education, Culture, and Employment (ECE) continued assessing the vulnerability of NWT archaeological sites for locations throughout the Beaufort Delta Region, including locations which were highlighted as potentially at-risk due to an increase in cruise ship visits. Archaeological site vulnerability assessments have been shared with the Hunters and Trappers Committees in Sachs Harbour and Tuktoyaktuk. ECE is seeking guidance from the community of Tuktoyaktuk on planning for future field seasons.</p> <p>The Landsat Long-term Change Detection (LTCD) product was used to assess landscape changes at 25 archaeological sites on Banks Island and east of Paulatuk. In 2023-2024, imagery from the LTCD will be used to create detailed 'historical models of shoreline change' at seven additional sites.</p> <p>Staffing challenges have limited the extent of vulnerability mapping work completed in 2022-2023.</p>	On Track (in progress)
<p><b>7.10</b> Community infrastructure</p> <ul style="list-style-type: none"> <li>Prioritize community infrastructure gaps to mitigate the impacts of climate change</li> </ul>	MACA, Community governments	<p>In 2022-2023, INF and MACA continued to work on an in-depth study of climate change risks to infrastructure in the Northwest Territories, titled <i>Infrastructure Portfolio Climate Change Vulnerability Assessment</i>. Once complete, the Vulnerability Assessment will have identified key infrastructure asset vulnerabilities and assets that the GNWT should prioritize to focus adaptation efforts where they are most needed.</p>	On Track (in progress)

## Appendix A

# Goal 3: Build Resilience and Adapt to a Changing Climate

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
3.1 Implementing the GNWT Land Use Sustainability Framework	A. Integrate climate change adaptation and mitigation factors into GNWT decision processes affecting land, water and natural resources	ECC, GNWT	The Land Use Sustainability Framework (LUSF) was implemented in 2022 and sets out the vision, principles, and land interests to guide GNWT land use decision-making. An LUSF appraisal process was developed for GNWT departments to use on a voluntary basis to determine if GNWT-led projects or initiatives meet the values outlined in the LUSF.	Completed (ongoing)
	B. Develop climate change indicators	ECC, GNWT	Further review and refinement of the latest <i>NWT State of the Environment Report</i> was completed. Twelve climate change indicators were developed for this work. The report included description and analysis of all climate change indicators. The <a href="#">final report</a> was released in September 2022. The next <i>NWT State of the Environment Report</i> is scheduled for 2026.	Completed (fully met)
3.2 Completing/reviewing regional land use plans	A. Work collaboratively within regional planning processes to incorporate climate change considerations into land use plans	ECC, ITI, ECE, EIA, Indigenous governments, Indigenous organizations, Federal government, Land Use Planning Boards and Committees	<p>The Gwich'in Land Use Planning Board leads planning for the Gwich'in region, and the Sahtú Land Use Planning Board leads planning for the Sahtú Planning region. ECC coordinated GNWT input into land use plan reviews and amendments, including ensuring that the GNWT's interests related to climate change considerations were incorporated.</p> <p>In 2022-2023, the GNWT approved the Sahtú Land Use Plan (SLUP) five-year review Amendment and carried out Aboriginal Consultation on the Ts'udé Nǫlǫné Tuyeta amendment to the Sahtú Land Use Plan. The Plan encourages applicants and regulators to integrate an analysis of the effects of climate change into proposed land use activities, including in the design, planning, development, management, operations, and closure phases. As part of the approval of the Amendment package, the following new wording was also added to the SLUP: <i>Communities have raised climate change as potentially the most significant driver of change to the land, wildlife, and residents of the region. Work is underway within the Sahtú Land Use Planning Board to further reflect climate change in the SLUP. The GNWT is working to support dialogue across planning areas in response to concerns over climate change.</i></p> <p>The GNWT continues to work with the Gwich'in Land Use Planning Board and parties to the Gwich'in Land Use Plan toward completion of the Board-led plan review. In addition, in 2022-23, the GNWT completed internal work to update the climate change section of the draft <i>Interim Dehcho Land Use Plan</i> and provided this to the Dehcho Land Use Planning Committee. The Dehcho Land Use Planning Committee continues to work towards completing a draft <i>Interim Dehcho Land Use Plan</i>.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
3.3 Implementing the conservation network	A. Establish Thaidene Nënë candidate protected area	ENR, Indigenous governments, Indigenous organizations, PCA, ITI, EIA, DOJ	The GNWT established the Thaidene Nënë Protected Area in August 2019. The Thaidene Nënë Operational Management Board was formed in early 2021.  Substantial progress has been made on the development of the first management plan for Thaidene Nënë. The plan is on track to be completed in 2024.	Completed (ongoing)
	B. Establish Dinàgà Wek'èhodi candidate protected area	ECC, Indigenous governments, Indigenous organizations, EIA, ITI, ECCC (CWS)	Work toward the establishment of Dinàgà Wek'èhodi candidate protected area continued in 2022-23 and is ongoing. Preliminary work was completed on management planning. Dinàgà Wek'èhodi has not been established yet and thus the draft management plan will be advanced when establishment agreements are concluded.	On Track (in progress)
	C. Establish Ts'udé Niljné Tuyeta candidate protected area	ECC, Indigenous governments, Indigenous organizations, EIA, ITI, ECCC (CWS)	The GNWT signed an Establishment Agreement with the K'ahsho Got'inę in September 2019 to formally establish the Ts'udé Niljné Tuyeta Protected Area. The Ts'udé Niljné Tuyeta Management Board was formed.  Substantial progress has been made on the development of the first management plan for Ts'udé Niljné Tuyeta. The management plan is on track to being approved by all parties by 2024. Climate change considerations, including climate change impacts, monitoring changes, and adaptation activities, have been integrated into the draft management plan for Ts'udé Niljné Tuyeta.	Completed (ongoing)
	D. Conclude planning and decisions for remaining candidate areas	ECC, Indigenous governments, Indigenous organizations, EIA, ECCC (CWS)	ECC CPIU engaged with Dehcho First Nations (DFN), Ka'a'gee Tu First Nation (KTFN), Samba K'e First Nation (SKFN), Jean-Marie River First Nation (JMRFN), and Kátlódeeche First Nation (KFN). Preliminary discussions on advancing areas for protection took place. Climate change was an important topic raised during the discussions. Work on advancing candidate protected areas is being driven by these Indigenous governments and Indigenous organizations and will continue in 2023-2024.	On Track (in progress)
3.4 Applying permafrost expertise	A. Provide permafrost expertise for NWT projects and initiatives	ITI (NTGS)	The NTGS Permafrost team fields multiple technical client requests per week that range from provision of general technical advice, technical documents, participation in working groups, data, and publications, as well as requests for collaboration, research advice, reporting, and presentations.	On Track (in progress)
3.5 Implementing wildlife plans/ strategies (key species, species at risk, invasive species)	A. Finalize and implement the Bathurst Caribou Range Plan, including the conservation of key habitats where climate change impacts are expected to be pronounced	ECC, Resource Management Boards, Indigenous governments, Indigenous organizations, Industry, NGOs	The <i>Bathurst Caribou Range Plan</i> was finalized in August 2019 and work is ongoing to fully implement all recommendations in the plan. The <a href="#">Bathurst Caribou Range Plan</a> is publicly available.  A framework and operational guidance document were developed for implementing Mobile Caribou Conservation Measures. Work is ongoing in partnership with an industry partner to test the operational guidance onsite.  Two workshops were held with the Bathurst Caribou Advisory Committee (BCAC) to discuss areas of important habitat to be considered for conservation. The GNWT continues to support Indigenous governments to work with their communities to identify important habitats for protection. Two workshops were held to further develop the Caribou Guardians Coalition with funding support from Polar Knowledge Canada.  Maps and outputs of modeling undertaken during development of the <i>Bathurst Caribou Range Plan</i> are in the Plan and the <a href="#">NWT Species and Habitat Viewer</a> .  An annual review of the <i>Bathurst Caribou Range Plan</i> (Action Plan) is reported on by the GNWT and other members of the BCAC.	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	B. Finalize the Boreal Caribou Range Plans, including management of climate change impacts on the ecosystem	ECC, ECCC, Resource Management Boards, Indigenous governments, Indigenous organizations, Industry, NGOs	<p>The <i>Northwest Territories Framework for Boreal Caribou Range Planning</i> was finalized in August 2019. As indicated in the Framework, five regional range plans are currently being developed. Range planning that occurred this year included:</p> <ol style="list-style-type: none"> <li>1. Southern NWT – Five subregional meetings were held in Fall 2022 to encourage cross-community sharing of local and Indigenous Knowledge and land interests relating to boreal caribou and to begin development of a boreal caribou range management map. Southern NWT Working Group meetings took place in December 2022 and February 2023 to continue to refine the boreal caribou range management map.</li> <li>2. Wek’èezhìi – Working Group meetings took place in September and December 2022, and in February 2023. Indigenous Knowledge maps were verified by co-management partners and revised management classes for the full Wek’èezhìi Boreal Caribou Range Plan were established by the Working Group. An interim Range Plan was released in March 2022.</li> <li>3. Sahtú – Worked with Sahtú Renewable Resources Board on process for regional range planning.</li> <li>4. Gwich’in – Informational community meetings were held in Fort McPherson and in Tsiigehtchic in June 2022. Work was completed with the Gwich’in Tribal Council and Gwich’in Renewable Resources Board to undertake two habitat classification workshops in June 2022 and to initiate Indigenous Knowledge collection and mapping for boreal caribou. A Working Group meeting held in March 2023.</li> <li>5. Inuvialuit – Working Group meeting was held in March 2023.</li> </ol> <p>ECC initiated a collaborative research project with researchers from the State University of New York, Environment and Climate Change Canada, and Natural Resources Canada to investigate relationships between boreal caribou survival rates (adult females and calves), disturbances from wildfire and humans, and climate (weather).</p>	Completed (ongoing)
3.6 Capturing carbon in forests	A. Increase forest carbon sequestration by silvicultural practices including planting in areas that have not returned to forest after natural disturbances, and thinning in areas that are overly dense	ECC, INF, ECCC	The multi-year thinning project continued in 2022-23. Approximately ten hectares of 15-year-old post-fire regeneration were thinned. The project aims to increase carbon sequestration in naturally regenerating forests.	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
3.7 Responding to human health risks	A. Promote and support health and wellness activities to build community resiliency to climate change impacts	HSS, ECC, Community governments, Indigenous governments, Indigenous organizations	HSS climate change-related presentations in 2022-23: 1) Wildfires and Air Quality presented for the NWTAC's 2022 Climate Change and Asset Management Conference in Yellowknife, NT; 2) Climate Change and Public Health Impacts presented for Aurora College; 3) Climate Change and Public Health Impacts presented for the community of Behchokq.	Completed (ongoing)
	B. Work with communities to identify potential cleaner air shelters, and modifications required to reduce impacts of wildfire smoke on human health	HSS, Community governments, Indigenous governments, Indigenous organizations	See Action Items 3.7A, 3.9A, and 7.7 for updates.	Completed (ongoing)
3.8 Increasing local food security and production	A. Support country food-related research, including climate change impacts to community food security	ECC, HSS, ITI, Indigenous governments, Indigenous organizations	<p>The research project 'Indigenous Knowledge of Berries in the Northwest Territories' continued to determine local knowledge about NWT berries, changes that are being seen in berries, potential cause(s) of these changes, and identify what further information needs to be collected. Harvesting berries is an important part of the culture and diet of northern Indigenous communities.</p> <p>The Berry Research Project is implemented through collaborative knowledge gathering to improve understanding of the NWT's environment, inform environmental stewardship actions, and contribute to an increase in Indigenous Knowledge-led research in the territory.</p>	Completed (ongoing)
	B. Implement a sustainable livelihoods action plan to support country food research and programs	ECC, HSS, ITI, Indigenous governments, Indigenous organizations	<p>Numerous actions of the <i>Sustainable Livelihoods Action Plan 2019-2023</i> were advanced in 2022-2023. Climate change is one of the Plan's guiding principles.</p> <p>One example of work being undertaken in this area is The Indigenous Knowledge of Berries in the NWT Project. This project's objective is to complete an NWT-wide Indigenous Knowledge study of berries, to determine what we do and don't know about berries, identify changes that are being seen in berries, the potential causes of these changes, including climate change, and identify further information that needs to be collected.</p> <p>Rather than fitting Indigenous Knowledge into scientific research, this project proposes that Indigenous Knowledge serve as the starting frame of reference, providing important information in its own right, and the specific scientific questions may then emerge from this process. Work undertaken in 2022-23 and throughout the project's life includes Indigenous Knowledge holders, academia, and the GNWT.</p>	Completed (ongoing)
	C. Implement the NWT Agriculture Strategy to increase local food production	ITI, Indigenous governments, Indigenous organizations, Community governments	<p>Attention to food security and the role that local food production can play in meeting the related objectives of economic diversification, environmental stewardship, and climate change resiliency is increasing in the NWT. This is demonstrated through the number of individuals, businesses and organizations engaged in local food production. 45 food production and processing projects were funded in 2022-2023.</p> <p>NWT food production was significantly impacted by the Hay River flood in May 2022, which affected approximately 40% of the NWT's commercial food producers. The framework for environmental farm planning remains in a developmental stage and will be piloted in 2023-2024.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
3.9 Improving capacity and resilience of health and social services	A. Assess if essential services can be provided during extreme weather and climate-related events	HSS	In 2022, a new study on climate change and permafrost thaw indicated that permafrost thaw may potentially expose people in the north to higher concentrations of indoor radon gas. Radon gas is radioactive. Hence, this is a possible environmental change scenario for northerners living in the NWT. As a result, HSS developed and released the FAQ – Radon Overview for Residential Dwellings with information on radon and to encourage testing for indoor radon levels every five years, or as living or environmental conditions change.	Completed (ongoing)
3.10 Updating community emergency plans and operations and maintenance procedures	A. Address climate-related hazards and adaptation measures in updated community emergency plans and operations and maintenance procedures (e.g., floods, blizzards, wildfires, permafrost thaw, coastal erosion)	Community governments, MACA, Indigenous governments, Indigenous organizations, ECC, NRCan	In 2022-2023, MACA worked with four NWT communities to review and update their emergency plans. MACA continues to offer Community Emergency Planning Workshops and Tabletop Exercise Workshops to all community governments. Information provided in the HIRA update will inform future updates to community emergency plans including climate-related hazards.	On Track (in progress)
3.11 Enhancing wildfire disaster mitigation	A. Update and implement community wildfire protection plans	Community governments, ECC, MACA	All 29 forested communities in the NWT have recently updated their Community Wildfire Protection Plans (CWPP), and recommendations are being implemented in communities as part of ECC's standard business operations. Work in this area, including updating CWPPs, is ongoing. Regional ECC staff will be meeting with communities in early 2024 to discuss their Wildfire Protection Plans prior to the upcoming 2024 wildfire season. This may result in some changes to individual CWPPs and/or discussions on implementation.	Completed (ongoing)
	B. Support the implementation of FireSmart principles and consider the use of FireSmart programs for all communities	ECC, MACA, Community governments	In 2022-23, the NWT Association of Communities (NWTAC) and the GNWT received approximately \$20 million in funding from the federal Disaster Mitigation and Adaptation Fund for projects across the territory that will increase protection from wildfires in the 29 fire-prone communities.  This funding will allow the NWTAC and the GNWT to work with small and remote communities to create fire breaks and implement fire fuel reduction strategies for over 1,200 hectares of land. The contract for establishment of these fire breaks is being managed by the NWTAC, with the GNWT providing subject matter guidance and support.	Completed (ongoing)
3.12 Community hazard mapping	A. Design a hazard mapping program, including permafrost, flooding, wildfire, erosion, and other climate-related impacts	ECC, MACA, ITI, NWTAC, Community governments, NRCan, Academia	An interdepartmental working group for Community Hazard Information was established in 2022-23 to share information and better coordinate GNWT work aimed at advancing community hazard information.  Funding was secured by multiple GNWT departments from the federal government's Flood Hazard Identification Program to advance flood and geo-surficial mapping in NWT communities and to compile a library of geotechnical resources to support climate change-related hazard mapping. Funding was also secured to create a new position within NTGS to lead this work; the position will be staffed in 2023-24.	On Track (in progress)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
<b>3.13</b> Safely accessing land, water and ice	<b>A.</b> Pilot community focused ice information products to support on-ice travel and travel in ice filled waters	<b>ECCC (Canadian Ice Service and Canadian Centre for Climate Services),</b> Academia, ECC	The project was temporarily paused in 2022-23 and will be continued at a later date.	On Track (in progress)
	<b>B.</b> Implement the SmartICE monitoring and information service in select NWT communities to facilitate safe passage over ice	<b>Indigenous governments, Indigenous organizations, Community governments</b>	SmartICE is an Indigenous-led, climate change adaptation project that empowers Northern communities to monitor their own ice travel conditions. It integrates traditional knowledge of ice travel with autonomous and operator-run monitoring technology.  In 2022-2023, in partnership with Tuktoyaktuk Community Council, Tłı̄ch̄q Government, and Łutsel K'é Dene First Nation, SmartICE provided equipment and trained 20 Indigenous operators/Guardians to monitor sea and lake ice thickness on traditional trails and winter roads for their communities. The ice monitoring data were made available to communities on local media and online through <a href="#">SIKU</a> , the Indigenous Knowledge Social Network.	Completed (ongoing)
	<b>C.</b> Incorporate extreme weather warnings into public alerting system	<b>MACA, ECCC</b>	The public alerting system, NWT Alert, was publicly launched in 2021-2022. It warns residents about public safety, weather risks, major emergencies, air and water quality, evacuations, and other threats. The system continues to be used with weather alerts issued by federal entities.	Completed (fully met)
<b>3.14</b> Supporting the Northern Infrastructure Standardization Initiative (NISI)	<b>A.</b> Continue active participation in the development of additional standards for northern infrastructure (NISI Phase II)	<b>INF, MACA, SCC, ECC, NWT Housing, NWTAC</b>	INF continues to contribute to the development of the Standards Council of Canada (SCC) Northern Infrastructure Standardization Initiative (NISI) Standards, which focus on protecting infrastructure under a changing climate. INF serves as a member of the Northern Advisory Committee (NAC) and on working committees for NISI standards. Since 2011, new standards and a series of guidebooks have been created. INF and other departments reference these in infrastructure contracts for planning, design, construction, risk management, maintenance, and decommissioning of assets, as applicable.  Phase III of NISI is underway, with the GNWT represented by INF, MACA, and NWT Housing. This will include the development of new standards and the updating of existing ones. Potential pilot project opportunities for the NISI standard are being explored.	Completed (fully met)
<b>3.15</b> Adapting infrastructure to a changing climate	<b>A.</b> Construct the Tłı̄ch̄q All Season Road	<b>INF</b>	The Tłı̄ch̄q Highway was substantially completed and opened to the public on November 30, 2021. The full completion date was April 2023. This has resulted in the closure of 97 km of ice roads.	Completed (fully met)
	<b>B.</b> Construct the Great Bear River Bridge	<b>INF</b>	The purpose of this project is to construct a 487-metre long, two-lane, six-span bridge over the Great Bear River near the community of Tulita.  The project is at the land reserve and permitting phase.	On Track (in progress)
	<b>C.</b> Complete permitting and construct the Mount Gaudet All Season Road	<b>INF</b>	Permitting and construction of the 15 km Mount Gaudet Access Road is now contingent upon the completion of the Mackenzie Valley Highway environmental assessment, subsequent permitting, and ultimately, a final construction decision in that regard.	On Track (in progress)



Action Areas	Lead, Partners	Summary of Progress in 2021-2022	Status
<p><b>8.1</b> Habitat management, biodiversity, and restoration</p> <ul style="list-style-type: none"> <li>• Undertake a gap analysis for the NWT Biodiversity Action Plan</li> <li>• Develop strategies to prevent, as well as adapt to, invasive and non-indigenous wildlife, fish, marine mammal, insect, and plant species</li> </ul>	ECC, NWT CISPP, ECC, NGOs, Indigenous governments, Indigenous organizations	A new biodiversity action plan for the NWT may follow the development and publication of the <a href="#">new national biodiversity strategy</a> which is taking place over the 2023-24 fiscal year. Activities related to preventing and adapting to invasive and non-indigenous species are led by the NWT Council on Invasive Species, Pests, and Pathogens.	On Track (in progress)
<p><b>8.2</b> Supporting regional priorities</p> <ul style="list-style-type: none"> <li>• Support communities experiencing impacts through focused resilience and adaptation initiatives</li> </ul>	GNWT, Indigenous governments, Indigenous organizations	In 2022-2023, ENR (now ECC) partnered with MACA and the NWTAC to organize a two-day Climate Change and Asset Management Conference. ECC Climate Change also staffed a booth and hosted roundtable sessions at the NWTAC AGM and Local Government Administrators of the NWT (LGANT) AGM in Yellowknife as part of the engagement on the NWT Climate Change Risk and Opportunity Assessment.	On Track (in progress)
<p><b>8.3</b> Applying geohazard expertise</p> <ul style="list-style-type: none"> <li>• Increase technical capacity for addressing climate change-related geohazards in development applications and public and community infrastructure</li> </ul>	ECC, ITI (NTGS)	In 2022-2023, the Department of Lands (now ECC) continued to research geohazards in the NWT and apply broader geohazard science to inform tenure instruments for activities on public land. This includes the development of a work plan for incorporating geohazard knowledge into daily decision-making within Land Administration.  Climate change affects how sites with disturbed terrain from past resource development evolve on the landscape. Understanding these processes complements other research on geohazards on natural terrain and is especially relevant for contaminated sites. Work in 2022-2023 in this field also included logistical and scientific support to graduate students.	On Track (in progress)
<p><b>8.4</b> Permafrost research coordination and application</p> <ul style="list-style-type: none"> <li>• Ensure permafrost research conducted by Canadian and international agencies is coordinated and communicated to inform NWT decision-making</li> </ul>	ITI (NTGS)	In 2022, NTGS completed its Permafrost Strategic Plan outlining its vision, values, and goals including those related to coordination and leadership. NTGS staff serve in leadership roles on the Canadian Permafrost Association. Participation in these national organizations helps inform permafrost research being undertaken in the NWT. NTGS staff played an instrumental role in delivering the 2022 Canadian Permafrost conference in Dawson City, Yukon, which focused on collaboration between northerners and Indigenous partners, and knowledge generation for decision-making.	Completed (fully met)
<p><b>8.5</b> Implementing wildlife plans/strategies (key species, species at risk, invasive species)</p> <ul style="list-style-type: none"> <li>• Work with wildlife co-management partners to consider and address climate change impacts on habitat for all barren-ground caribou herds within the NWT</li> <li>• Implement an overall climate change adaptation strategy for wildlife management</li> <li>• Consider regulatory amendments (seasons, conditions, and areas) to the Wildlife Act depending on changes in species distribution</li> </ul>	ECC, ECC, Resource Management Boards, Indigenous governments, Indigenous organizations, Industry, NGOs	GNWT Wildlife Management works with wildlife co-management partners on issues impacting wildlife, including climate change, on an ongoing basis. Examples of 2022-23 activities include the continued development of Range Plans for boreal caribou; submitting to the Sahtú Renewable Resources Board (SRRB) Public Listening Sessions focused on caribou conservation; and contributing to the review of the <i>Mackenzie Valley Highway Developer's Assessment Report</i> . In addition, eight workshop sessions were delivered on climate change adaptation for wildlife. This continued engagement with co-management partners will inform climate change adaptation planning and action for wildlife in the NWT.  A discussion paper outlining ideas and approaches for adapting wildlife conservation and management to climate change in the NWT will be available soon for public feedback.	On Track (in progress)

Action Areas	Lead, Partners	Summary of Progress in 2021-2022	Status
<p><b>8.6</b> Responding to human health risks</p> <ul style="list-style-type: none"> <li>Develop and deliver educational and outreach materials to support communities in building resiliency and adapting to human health concerns</li> </ul>	HSS, ECC, NWTAC	See Action Item 3.7A for update.	On Track (in progress)
<p><b>8.7</b> Increasing local food security</p> <ul style="list-style-type: none"> <li>Building on the priorities to be identified in a sustainable livelihoods action plan, work collaboratively with partners to identify and secure funding to support projects</li> <li>Invest strategically in food production opportunities that address climate change risk mitigation through the implementation of the NWT Agriculture Strategy and Canadian Agriculture Partnership between the GNWT and the federal government</li> </ul>	ECC, ITI, HSS, EIA, Indigenous governments, Indigenous organizations, Community governments, Academia	<p>In 2022-2023, ITI funded investments throughout the NWT in local food production and infrastructure that contribute to climate change mitigation and adaptation objectives. Forty-five local food production/processing initiatives were funded in 2022-2023.</p> <p>In 2022-2023, ECC continued funding the Take a Family on the Land program to support land-based activities and food security. The Berry Research Project is implemented through collaborative knowledge gathering to improve understanding of the NWT's environment, inform environmental stewardship actions, and contribute to an increase in Indigenous Knowledge-led research in the territory. See Action Item 3.8 for more information.</p>	Completed (ongoing)
<p><b>8.8</b> Enhancing wildfire disaster mitigation</p> <ul style="list-style-type: none"> <li>Establish modified community fuel breaks based on a risk-management approach</li> </ul>	ECC, Infrastructure Canada	In 2022-23, the NWT Association of Communities (NWTAC) and the GNWT received approximately \$20 million dollars in funding from the federal government's Disaster Mitigation and Adaptation Fund for projects across the territory that will increase protection from wildfires in the 29 fire-prone communities. This funding will allow the NWTAC and the GNWT to work with small and remote communities to create fire breaks and implement fire fuel reduction strategies for over 1,200 hectares of land. The contract for establishment of these fire breaks is being managed by the NWTAC, with the GNWT providing subject matter guidance and support.	Completed (ongoing)
<p><b>8.9</b> Community hazard mapping</p> <ul style="list-style-type: none"> <li>Develop outstanding components of the hazard mapping program, including permafrost, flooding, wildfire, erosion, and other climate-related impacts.</li> <li>Provide information and training to communities to use hazard maps</li> </ul>	ECC, MACA, ITI, NWTAC, Community governments, Academia	As severe weather events and climate change hazards (flooding, wildfire, permafrost thaw, coastal erosion, premature ice road melt, etc.) continue to worsen in the NWT, there is a greater need for Community Hazard Maps to support sound economic, social, and environmental decision-making in the face of a changing climate. Numerous GNWT departments continued to conduct hazard mapping activities in 2022-23 including ECC (Waters and Forest Management), ITI (Northwest Territories Geological Survey [NTGS]), and the NWT Centre for Geomatics. See Action Item 3.12 for more information on progress towards community hazard mapping.	On Track (in progress)

Action Areas	Lead, Partners	Summary of Progress in 2021-2022	Status
<p><b>8.10</b> Protecting threatened heritage resources</p> <ul style="list-style-type: none"> <li>Conduct detailed studies/ excavations of significant heritage resources at threat of destruction from climate-driven processes</li> <li>Develop remote sensing based monitoring protocols for heritage resources at risk of impact</li> </ul>	<p>ECE, Academia, Indigenous governments, Indigenous organizations</p>	<p>Results from the 2022-2023 field season were shared with the Tuktoyaktuk Hunters and Trappers Committee, and additional meetings in June were held to discuss the 2022 field program results and plans for 2023. A series of public meetings in June provided an opportunity to discuss culturally appropriate site management protocols with the Inuvialuit community who identifies with the surveyed sites.</p> <p>During the 2022 field season, six Inuvialuit ancestral villages were visited, and assessed for stability and risk of further impacts. ENR (now ECC) was directed in 2022 to refrain from collecting artifacts. 'Recovery' of material from archaeological sites is only undertaken at the direction of Inuvialuit communities.</p>	<p>On Track (in progress)</p>
<p><b>8.11</b> Upgrading public and community infrastructure</p> <ul style="list-style-type: none"> <li>Prepare and submit a federal funding application for planning and environmental studies for the Slave Geological Province Road</li> <li>Development of a collaborative GNWT and Yukon Government climate research network using existing and additional monitoring instrumentation and coordinating new research and development projects along the Inuvik-Tuktoyaktuk and Dempster highways</li> <li>Undertake improvements, as needed, to respond to specific climate change related impacts to infrastructure</li> </ul>	<p>INF, Yukon Government, Community governments, MACA</p>	<p>Replacing seasonal, climate-vulnerable ice roads with permanent, all-season roads is one way the Department of Infrastructure is upgrading public infrastructure and adapting to climate change. Federal funding was secured in 2019 under Transport Canada's <i>National Trade Corridors Fund</i> to advance: environmental assessment of the first phase of the proposed Slave Geological Province Corridor project, the Lockhart All-Season Road from Tibbitt Lake to Lockhart Lake, and additional planning for Lockhart Lake to the Nunavut border.</p> <p>As funding becomes available, the Department of Infrastructure continues to advance engineering assessment work on the NWT portion of the Dempster Highway to align with Yukon Government work on the Yukon portion of the highway. Once this work is complete, the two territorial governments may explore collaboration on a joint funding effort from the Government of Canada for additional upgrades to the Dempster Highway.</p> <p>Mitigating the impacts of climate change is incorporated during the design and construction of NWT highways and infrastructure, for example as the Department of Infrastructure considers raising embankment heights and installing additional water drainage culverts for NWT roads in response to climate change. In addition, a monitoring program to install instruments at KM 28.5 of the Dempster Highway to monitor permafrost thaw slumps as a result of climate change was implemented in 2021-22. Community engagement consultation was done to inform communities about the purpose of the project.</p>	<p>Completed (ongoing)</p>

Action Areas	Lead, Partners	Summary of Progress in 2021-2022	Status
<p><b>8.12</b> Responding to risks to private infrastructure</p> <ul style="list-style-type: none"> <li>Provide guidance and information to the public regarding risks and management options for privately owned infrastructure affected by climate change</li> </ul>	<p>ECC, Community governments, GNWT</p>	<p>Several GNWT projects were underway in 2022-2023 to support the provision of guidance and information to the public:</p> <p>Throughout 2022-2023, MACA has worked on updating the <i>Hazard Identification and Risks Assessment (HIRA)</i>. The HIRA helps NWT communities understand the different risks related to climate change that they may face. The document is expected to be available in the next fiscal year (2023-2024).</p> <p>ECC's Climate Change Unit is conducting an NWT Climate Change Risk and Opportunity Assessment to build a shared understanding of key climate risks. Key findings from the assessment will be used to develop information materials. Additionally, the GNWT contributes to the development of NISI standards.</p> <p>ECC's Climate Change Unit participated in the Resources and Energy Development Information (REDI) session in Inuvik in October 2022 to provide information on climate change and adaptation to the public.</p> <p>HSS has also published an FAQ document for <a href="#">Radon Overview for Residential Dwellings</a>, as research indicates that radon gas, which is radioactive, could potentially be released from the ground due to thawing permafrost.</p> <p>MACA implements a flood preparedness campaign annually to provide guidance and information to the public regarding risks and management options for privately owned infrastructure affected by flooding.</p>	<p>On Track (in progress)</p>

## Appendix A

# Cross-Cutting: Leadership, Communication, and Capacity-Building

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
4.1 Reflecting climate change in governance and policy tools	<b>A.</b> Establish internal GNWT guidance mechanisms: <ul style="list-style-type: none"> <li>• Director-level Climate Change Working Group</li> <li>• Assistant Deputy Ministers Climate Change Committee</li> <li>• Deputy Ministers Energy and Climate Change Committee</li> <li>• Energy and Climate Change Committee-of-Cabinet</li> </ul>	GNWT	This action item was completed in 2019-2020 when all committees were established. The committees continued to meet regularly in 2022-2023. Climate change was a mandate priority for the 19th Legislative Assembly and of importance at all levels within the GNWT, hence the need to continue to use these committees to ensure an integrated response to climate change. In 2022-23, the GNWT also established a Climate Change Adaptation Working Group as well as a Community Climate Hazard Information Working Group to further support cross-departmental collaboration among GNWT staff on climate action.	Completed (ongoing)
	<b>B.</b> Coordinate GNWT climate change related project work	ECC, GNWT	<p>In 2022-2023, ECC tracked and coordinated the compilation of progress on all 132 Action Items in the Climate Change Strategic Framework Action Plan Annual Report for 2021-22. ECC is responsible for implementing approximately half of these 132 Action Items and continued to do so in 2022-23.</p> <p>ECC coordinated GNWT's input into numerous federal requests such as the Government of Canada National Adaptation Strategy (NAS) and Bilateral Action Plan. ECC also coordinates the distribution of federal Climate Change Preparedness in the North funding to the GNWT to enable our work on climate change adaptation projects.</p>	Completed (ongoing)
	<b>C.</b> Add climate change considerations to new / revised territorial legislation and policies	ECC	ECC developed the policy instrument <a href="#">Guide to Integrating Climate Change Considerations into GNWT Decision-Making Instruments</a> in Winter 2020. As of 2021, all GNWT Decision Papers, Financial Management Board submissions and Legislative Proposals need to consider climate change factors. These climate change factors include GHG mitigation, climate change impacts, knowledge, and adaptation.	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	D. Complete a jurisdictional scan of effective policy tools to support the Action Plan's implementation	ECC, GNWT	<p>A high-level jurisdictional scan of climate change policy tools in other jurisdictions was completed, which informed the implementation of the <i>Climate Change Strategic Framework Action Plan</i> and the development of <i>A Guide to Integrating Climate Change Considerations into GNWT Decision-Making Instruments</i>.</p> <p>ECC continued to participate in the Canadian Council of Ministers of the Environment committees, particularly the Climate Change Committee, and regularly provides input into work planning and the development of nationally relevant guidance.</p>	Completed (fully met)
	E. Include climate change content in existing community and Indigenous government training resources, and expand online governance training to include climate change	MACA, ECC, NGO	<p>MACA, through the School of Community Government, offers a regular series of webinars on a wide range of topics of interest to community governments. While various courses have been developed with a specific focus on climate change (see 4.6C for further details), other courses will include climate change considerations as appropriate when they are updated in the future.</p> <p>No new webinars on the topic of Climate Change were presented in 2022-2023. However, the School of Community Government continued to make previous webinars on the topic available for viewing on their Learning Management System, <a href="http://macalearn.ca">macalearn.ca</a>.</p> <ul style="list-style-type: none"> <li>• Mainstreaming Climate Change for Community Planning: 8 views</li> <li>• Climate Change for Councilors: 11 views</li> <li>• Climate Change: 15 views</li> </ul> <p>Overall, between April 2022 and March 2023, 34 people viewed MACA's climate change webinars.</p> <p>The School of Community Government continues to offer a course on the topic of Climate Change, "Climate Change and Community Planning". This is a renaming of the course previously known as "Integrating Climate Change Measures into Municipal Planning and Decision Making".</p>	Completed (ongoing)
4.2 Pursuing funding sources for climate change initiatives	A. Develop funding requests to address climate change priorities	ECC, GNWT, Indigenous governments, Indigenous organizations	<p>All GNWT Departments clarified their short-term climate change adaptation funding priorities to inform federal advocacy and help prioritize short-term funding applications.</p> <p>ECC works with the other territories through the Pan-Territorial Adaptation Partnership (PTAP). In addition to finding opportunities to share knowledge and coordinate efforts, PTAP informs shared approaches to advocate for northern programming and funding. Pan-territorial communication on northern considerations for the National Adaptation Strategy and its implementation have informed and advanced a northern approach to federal climate policy and programming.</p>	Completed (ongoing)
4.3 Establishing external guidance mechanisms to foster collaboration	A. Develop options for the establishment of a NWT climate change council or advisory body	GNWT, Indigenous governments, Indigenous organizations, NWTAC, NGOs, Industry	<p>In Spring 2021, ENR (now ECC) formally established the NWT Climate Change Council, following planning meetings throughout 2020-2021 and 2021-2022. Membership of the Council includes representatives from 13 Indigenous governments and Indigenous organizations, the NWT Association of Communities, and the GNWT Departments of Environment and Climate Change and Infrastructure. The Council met four times in 2022-2023 (quarterly). ECC provides capacity funding to members that are eligible.</p>	Completed (fully met)
4.4 Information sharing and education initiatives	A. Develop and implement a climate change outreach and communication plan	ECC	<p>The internal GNWT-wide <i>Climate Change Outreach Plan</i> and <i>Climate Change Communications Plan</i> were developed with input from various GNWT departments. Implementation is ongoing.</p>	Completed (ongoing)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
4.5 Supporting community-based monitoring efforts	A. Continue community-based monitoring and implement additional community-based monitoring sites on a priority basis	ECC, MACA, Indigenous governments, Indigenous organizations, Community governments, SmartICE	The GNWT has a pilot project underway in collaboration with the Hamlet of Tuktoyaktuk. This pilot project is part of an international research program to monitor coastal erosion and other environmental properties of the coastline at and around Tuktoyaktuk.  During the summer of 2022, two time-lapse cameras were installed.  This pilot project will help inform other community-based monitoring projects.	Completed (ongoing)
4.6 Training for Indigenous and Community governments	A. Ensure residents, first responders, communities and the GNWT are trained to be better prepared to deal with the impacts of all hazards, ranging from low through to very high risks	MACA, Community governments, NWTAC, Indigenous governments, Indigenous organizations, ECC	See 4.1E above.	On Track (in progress)
	B. Deliver workshops on adaptation, mitigation, and best practices	MACA, Community governments, Indigenous governments, Indigenous organizations	Since 2019-2020, MACA's School of Community Government has offered a course on the topic of Climate Change, "Climate Change and Community Planning". This is a renaming of the course previously known as "Integrating Climate Change Measures into Municipal Planning and Decision Making". In 2022-23, the course was made available online for community governments to take on-demand.	On Track (in progress)
	C. Deliver climate change training through School of Community Government programming and workshops	MACA, ECC, NWTAC, LGANT, Indigenous governments, Indigenous organizations, Community governments	Since 2019-2020, MACA's School of Community Government has offered a course on the topic of Climate Change, "Climate Change and Community Planning". The course was attended by three participants in 2022-23.  Additionally, the following webinars are available to watch online: <ul style="list-style-type: none"> <li>• Climate Change for Councillors</li> <li>• Mainstreaming Climate Change for Community Planning</li> <li>• Climate Change</li> </ul> Overall, between April 2022 and March 2023, 34 people viewed MACA's climate change webinars. No new webinars on the topic of Climate Change were presented in 2022-2023. However, the School of Community Government continued to make previous webinars on the topic available for viewing on their Learning Management System: <a href="https://macalearn.ca">macalearn.ca</a> .	Completed (ongoing)
4.7 Adaptation planning and support (regional and local level)	A. Integrate adaptation planning into emergency management, community plan and strategic plan workshop content	MACA, ECC, NWTAC, Community governments	Strategic and Community Plans are led by community governments. MACA provides support with these plans upon request. In 2022-2023, staff from MACA's School of Community Government worked with three community governments, Behchokò, Whatì, and Wekweètì, to review their Strategic Plans. Climate change considerations were discussed by two of the communities. Additionally, the communities of Sambaa K'e, Nahanni Butte, Behchokò, and Wekweètì initiated a Community Plan or Land Use Plan review. Usually, through the request for proposals scope of work, communities are expected to consider climate adaptation and mitigation measures as part of the review process.	On Track (in progress)

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
	B. Support regional or community adaptation planning and implementation of adaptation initiatives	ECC, MACA, NWTAC, Indigenous governments, Indigenous organizations, Community governments, Federal Departments	The second Climate Change Advisory Group (CCAG) Gathering was held in October 2022, in Dettah, and focused on the development of the first-ever NWT Climate Change Risk and Opportunity Assessment. Presentations and roundtables were provided by MACA, INF, HSS, and other divisions in ECC. ECC is involved in the NWT Climate Change Adaptation Committee and the development of new standards through the Northern Infrastructure Standard Initiative (NISI).	On Track (In progress)

Action Areas	Lead, Partners	Summary of Progress in 2022-2023	Status
<p><b>9.1</b> Climate change information sharing and education initiatives</p> <ul style="list-style-type: none"> <li>Develop education resources focused on different audiences</li> <li>Deliver regular workshops</li> <li>Strengthen traditional knowledge based initiatives to include a climate change component</li> </ul>	ECC, NWTAC, ECE, HSS, ITI, MACA, Indigenous governments, Indigenous organizations, Federal Departments	<p>In Fall 2022, ECC Climate Change staff hosted roundtable discussion groups on community adaptation needs at the NWTAC and LGANT AGM. Additionally, staff hosted a Lunch and Learn Session with LGANT to introduce the NWT Climate Change Risk and Opportunity Assessment initiative and discuss community adaptation priorities.</p> <p>In October 2022, the second Climate Change Advisory Group (CCAG) Gathering was organized in Dettah and focused on the development of the first ever NWT Climate Change Risk and Opportunity Assessment. Presentations and roundtables were provided by MACA, INF, HSS, and numerous divisions of ECC. A series of five thematic workshops was held in March 2023 to assess key climate risks for the NWT Climate Change Risk and Opportunity Assessment. The Assessment report will be publicly available in 2024.</p> <p>Through ECC’s partnership with Ecology North, a Climate Change Panel was held during Earth Week, several educational activities were implemented, and youth planning and engagement sessions were held in preparation for the 2023 Young Leaders Summit on Climate Change.</p> <p>A course for GNWT employees on <i>Climate Change in the NWT</i> was developed in partnership with Brock University. It will be piloted in 2023-2024.</p> <p>See Action Item 4.4A related to the Climate Change Outreach Plan for further information.</p>	On Track (in progress)
<p><b>9.2</b> Training for Indigenous governments and organizations to support climate change monitoring</p> <ul style="list-style-type: none"> <li>Support Indigenous Guardians Programs led by Indigenous governments in the NWT to monitor climate change using traditional, local, and scientific knowledge where requested</li> </ul>	Indigenous governments, Indigenous organizations, ENR, Federal Departments	<p>In 2022-2023, ECC CPIU continued to work with a variety of partners to establish an NWT Biodiversity Monitoring Program (NWTBMP) to help monitor wildlife, habitat and cultural areas, support conservation, and create employment opportunities. CPIU is collaborating with the Dehcho First Nations, Smbaa K’e First Nation, Łutsel K’e Dene First Nation, North Slave Métis Alliance, Tłı̨chq̓ Government, the GNWT, Canadian Wildlife Service, University of British Columbia, Wilfrid Laurier University, and the University of Alberta/Alberta Biodiversity Monitoring Institute. Partners are developing an environmental sensor training curriculum to support Indigenous Guardian and community-based monitoring programs.</p> <p>ECC’s On The Land Unit provided in-kind support and funding to the On The Land Collaborative supporting Guardian programming across the NWT.</p> <p>In 2022-2023, in partnership with Tuktoyaktuk Community Council, Tłı̨chq̓ Government and Łutsël K’édé Dene First Nation, SmartICE provided equipment and trained 20 Indigenous operators/guardians to monitor sea and lake ice thickness on traditional trails and winter roads for their communities. The ice monitoring data were made available to communities on local media and online through <a href="#">SIKU</a>, the Indigenous Knowledge Social Network.</p>	On Track (In progress)



## Appendix A

# Cross-Cutting: Economic Impacts and Opportunities

Action Areas	Action Items	Lead, Partners	Summary of Progress in 2022-2023	Status
5.1 Estimating the overall economic cost implications of the combined impacts that may occur in the NWT due to climate change	A. Undertake a study focusing on: <ul style="list-style-type: none"> <li>Impacts on infrastructure</li> <li>Impacts on quality of life</li> <li>Impacts on economic activities</li> <li>Cost-benefit analysis of adaptation measures</li> </ul>	ECC, FIN, HSS, ITI, NWTAC	The <i>Cost of Climate Change Report</i> and a plain language version have been developed and will be available next fiscal year. As the main partner, the NWT Association of Communities (NWTAC) will publish the Report.	On Track (in progress)
Action Areas	Lead, Partners	Summary of Progress in 2022-2023	Status	
10.1 Undertaking sectoral assessments and adaptation planning <ul style="list-style-type: none"> <li>Scope key sectors including, but not limited to, transportation, ice roads, mining, agriculture, forestry, tourism, and fisheries to determine economic impacts and opportunities</li> <li>Explore opportunities to collaborate with think-tanks, academics and international stakeholders regarding the costs and benefits of climate-related changes in the NWT</li> </ul>	ITI, ECC, Industry, NGOs	ITI's Economic Analysis Unit is collaborating with McMaster University and Econometric Research Limited on a series of research projects focused on assessing the economic effects of carbon pricing policies in the Northwest Territories under various climate change scenarios. A research paper on this topic was submitted for peer review in 2022-23 and subsequently published. <a href="#">Read it here.</a>  Additionally, ITI is supporting ECC and INF with the evaluation of the economy-wide impacts of NWT low-carbon pathways. ITI's Economic Analysis Unit also provided input and support on the exploration of an approach to cap and reduce greenhouse gas emissions in the oil and gas sector.	Completed (ongoing)	
10.2 Regional forest harvest that substitutes low biomass for imported fossil fuels <ul style="list-style-type: none"> <li>Assessment and implementation of community led harvesting for fuelwood for personal dwellings and district heating systems</li> </ul>	ECC, INF, Community governments	Work under this Action Item includes a project underway in Fort McPherson to harvest biomass from willows to supply energy to a district heating system. The harvesting of firewood for sale by individuals and companies for use in personal dwellings for home heating is also ongoing. In addition, there are currently two Forest Management Agreements (FMAs) in place in the NWT; these agreements allow for a partner to have long term rights to harvest wood from a defined area for the purposes of forest industry business development and growth.  The two agreements were signed with Timberworks Inc. in Fort Resolution, and Digaa Enterprises in Fort Providence. Both companies are Indigenous development corporations jointly owned by local Indigenous organizations. Timberworks is owned by the Deninu Kue First Nation and the Fort Resolution Métis Council. Digaa Enterprises is owned by the Deh Gah Got'ie First Nation and the Fort Providence Métis Council.	On Track (in progress)	

