



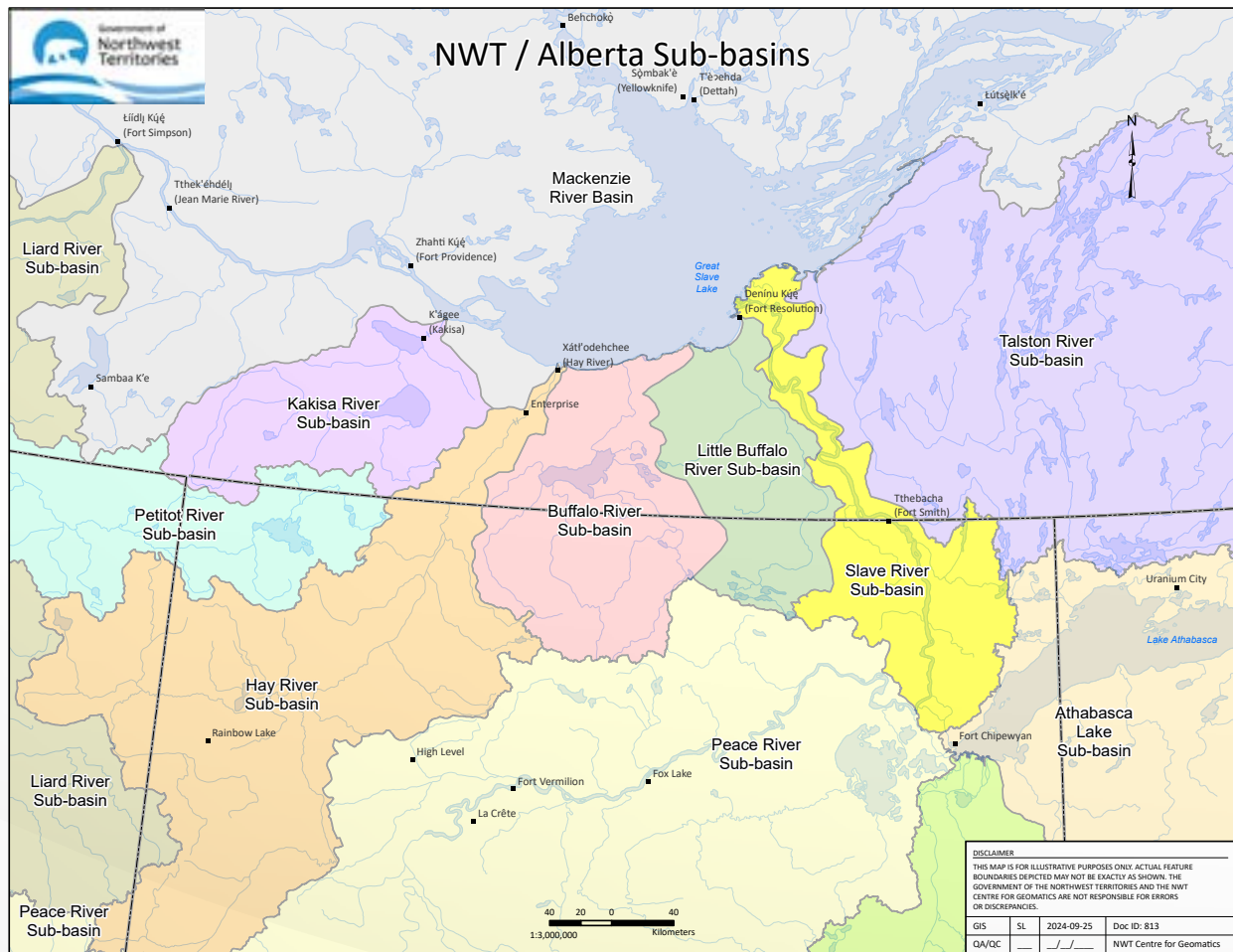
Implementation Activities 2021-2022

Alberta-Northwest Territories Bilateral Water Management Agreement

The governments of Alberta (GOA) and the Northwest Territories (GNWT) signed the Alberta-NWT Bilateral Water Management Agreement (the Agreement) in 2015 to cooperatively manage shared waters. A Bilateral Management Committee (the Committee) is responsible for implementing and reporting on the Agreement. The Committee, along with Indigenous partners, federal partners, and research associates, continued to advance the work of protecting the aquatic ecosystems shared by Alberta and the NWT.

This report provides an overview of the work completed between April 1, 2021, and March 31, 2022. This was a challenging period for all partners involved in the implementation of the Agreement, especially for Indigenous governments and Indigenous organizations, communities and community members as the COVID-19 pandemic and the associated travel restrictions delayed activities and projects and reduced partners' capacities to participate in planned project activities. In addition, the floodings of Spring 2021 impacted individuals and communities in the Hay River Basin. The consequences resulted in redeployment of resources to address urgent, immediate needs.

For additional reports and background information, please visit <https://mrbb.ca/bilateral-water-management-agreements/ab-nt/>



Governance

■ Classification of Water Bodies

The Slave and Hay rivers are Class 3 water bodies. According to the agreement, a Class 3 designation is for water bodies with current or planned development along with other factors, including known conditions or trends in water quality, water quantity or the aquatic ecosystem, significant traditional uses and other natural or human-made stressors. Class 3 rivers require specific commitments to assess and track the ecological integrity of the aquatic ecosystem, including setting triggers and objectives for water quality and water quantity. Interim triggers, objectives and/or thresholds have been developed for the Slave and Hay rivers. Other surface water bodies shared by Alberta and the NWT are Class 1.

For transboundary groundwater areas, the Hay River and Slave River groundwater areas were re-classified by the Committee as class 2 water bodies in 2019 and 2020, respectively.

■ Work Planning

The Committee maintains an annual work plan to set priorities and guide the Alberta and NWT teams' ongoing work. The Committee reviews, approves and updates the plan each year, as needed. The teams meet regularly to ensure coordination and partnership.

Notification & Information Sharing

The Committee and its teams regularly share information with each other. This includes information related to regulatory activities such as existing or proposed development and research, as well as monitoring results. The following is a summary of some information sharing and notification that took place in 2021-2022.

■ Suspension of Water Sampling

The Agreement has provisions for the ongoing monitoring of the Slave and Hay rivers as well as monitoring activities on other transboundary rivers that inform bilateral water management. While Environment and Climate Change Canada (ECCC) is responsible for the routine monitoring of the Slave and Hay rivers, the GOA and ECCC are responsible for broader monitoring of the region, including monitoring of the Peace and Athabasca rivers in Northern Alberta.

In 2020, due to COVID-19 public health restrictions, ECCC had to alter water quality monitoring activities in the Slave and Hay rivers resulting in fewer samples being collected. However, ECCC, GOA, and the GNWT worked together to minimize the disruptions at transboundary sites. ECCC resumed monitoring activities in July 2022. Water quality monitoring associated with regulatory and compliance activities was not affected by the COVID-19 restrictions.

■ Wood Buffalo National Park

The [Wood Buffalo National Park World Heritage Site Action Plan](#) (2019), led by the Government of Canada, outlines a long-term plan to stabilize the world heritage site for future generations. It identifies the construction of a water control structure at Dog Camp in the Peace-Athabasca Delta as one action. The water control structure will bring more water into the Peace-Athabasca Delta by flooding wetland areas more regularly. The aim is to improve the ecological health of the delta and help restore and support traditional ways of life of Indigenous communities in the region. At the same time, the water control structure might also impact flow rates, water levels and aquatic life of the Slave River.

The GOA and GNWT attended the June 2021 Wood Buffalo National Park Environmental Flows and Hydrology Working Group meeting and received updates about the work on control structures to increase water levels in the Peace-Athabasca Delta, work related to the potential for flow releases from BC Hydro operations, and work on an environmental flows framework and a model of the Peace-Athabasca Delta. These updates were shared with the Committee and partners.

Public Engagement

Reports completed as part of the implementation of the Agreement are published online. Both jurisdictions have general email addresses for the public to ask questions or provide information. The email address for the GNWT is nwtwaterstrategy@gov.nt.ca, and for the GOA TransboundaryWaters@gov.ab.ca.

The GNWT informs the NWT Water Strategy Indigenous Steering Committee about Agreement implementation activities through regular meetings and written communications. The committee consists of up to 12 representatives from NWT Indigenous governments and Indigenous organizations and provides guidance on the implementation of the NWT Water Stewardship Strategy and the NWT's transboundary water agreements. The GNWT also shared information related to Agreement implementation with NWT water partners at the NWT Water Stewardship Strategy Workshop in October 2021.

In Alberta, the public, stakeholders, government partners, and Indigenous communities are engaged through land-use and water planning processes. Indigenous working groups are engaged throughout the development, implementation, review, and potential amendment of land-use plans.

Alberta and NWT representatives provide annual updates to the Mackenzie River Basin Board which are published [online](#).

Indigenous Knowledge

The Committee acknowledges the sacredness of water for Indigenous peoples and its importance in sustaining diverse traditional values, practices, and treaty rights. The Alberta-NWT transboundary water basins have connected Indigenous communities for thousands of years. The Committee recognizes the importance of ongoing dialogue and collaboration with Indigenous partners in implementing the Agreement. Along with Indigenous communities, the Committee continues to explore how to support meaningful inclusion and application of traditional knowledge in the implementation of the agreement.

Activities undertaken to advance this work include:

■ Traditional Knowledge Framework

Under the Agreement, a commitment was made to create a Traditional Knowledge Framework to enhance respectful relationships and support meaningful inclusion and application of Traditional Knowledge in the implementation of the agreement (see Appendix C2 of the Agreement).

A Traditional Knowledge Working Group (TKWG) was established in 2018 with membership from GNWT, GOA, and Indigenous governments and Indigenous organizations within the geographic area of the Agreement. The TKWG members co-created terms of reference describing the TKWG roles and responsibilities towards the objectives articulated in Appendix C of the Agreement. The work of the TKWG is guided by the recommendations provided in the report, [A Review of Traditional Knowledge Frameworks for Bilateral Water Agreement Decision Making](#) published in March 2020.

In 2021-2022, the TKWG hired a third party to support the development of a Traditional Knowledge Framework that supports meaningful inclusion and application of Traditional Knowledge in the implementation of the Agreement. A workplan was developed and approved with plans to establish an Advisory Circle to guide the development of the framework.

■ Kát'odeh/Hay River Indigenous Community-Based Monitoring Project

Since 2020, the Committee has supported an Indigenous Community-based Monitoring Pilot Project for the Hay River Basin (the ICBM project). The purpose is to explore Indigenous community interests and concerns and to collaborate to address questions about aquatic ecosystem health in the Hay River basin.

Through this project, the Committee supports the ICBM project to use Indigenous knowledge and identify culturally relevant indicators as well as to advance Indigenous community-based monitoring projects, including knowledge co-production approaches. This work reaffirms the importance of Indigenous, provincial, and territorial governments working collaboratively to prioritize and honour Indigenous knowledge while respecting cultural practices and Indigenous self-governance.

The first meeting among the GOA, GNWT and Indigenous governments and Indigenous organizations in the Hay River basin occurred on May 7, 2021, with four subsequent meetings during the fiscal year. These initial meetings were important to build relationships and trust between partners, and also to

support the sharing of information between communities. One of the proposed activities included a four-day Dene Tha First Nation (DTFN)/Kátłodeeche First Nation (KFN) Elders gathering to discuss traditional values and traditional perspectives on the health and future of the Hay River watershed. Unfortunately, due to the pandemic public health restrictions and subsequent high-water levels on the river and flooding, the gathering, along with other activities, was cancelled.

KFN held an elders and harvesters gathering in March 2022 where local Traditional Knowledge specialists were contracted to design and carry out a three-day workshop to document the traditional use of Kátłodeé Tsé Tu Yanlı and to acquire direction on what the focus of guardians work should be in this part of KFN's traditional territory. In addition to reviewing KFN Traditional Use and Knowledge of the KFN Kátłodeé Tsé Tu Yanlı and lands, this workshop also developed KFN Watershed Guardianship Guidelines, and recorded Dene Terminology for Kátłodeé Tsé Tu Yanlı.

DTFN received funding to enhance their community-based environmental monitoring activities and were able to purchase water quality monitoring sondes and undertake winter fieldwork. As well, discussions began with all partners and the University of Alberta about undertaking water quality focused work in the Hay River basin.

Water Quality

Water quality monitoring is integral to the implementation of the Alberta-NWT Bilateral Water Management Agreement. Each year, staff review the water quality data of water samples collected from the Slave and Hay rivers by Environment and Climate Change Canada and analyzed for nutrients, major ions, and metals.

First, the Committee's water quality team compare the data to season-site-specific interim thresholds, called triggers. Since triggers are derived from the historical data from each river, they are highly sensitive and effective at flagging unusual results. Flagged values are examined further to assess possible sources, and whether there is risk to downstream water uses. Additional steps may include:

- comparing flagged values to historical data to determine if those levels have occurred before,
- reviewing water quality data from nearby sites,
- reviewing water quantity data,
- making comparisons to available aquatic life guidelines, and
- assessing the data for trends.

This analysis informs the overall assessment for water quality in the border regions of the Slave and Hay rivers and includes recommended next steps. Assessment of the data are reported on annually and can be found here: <https://mrbb.ca/category/bwma-reports/ab-nt/>.

■ Toxic, Bioaccumulative and Persistent Substances

Each year, GNWT staff collect water samples for the analysis of substances that are known to be toxic, bioaccumulative, persistent and primarily of human origin. While these substances are usually not found, monitoring and reporting are important as the information is useful for comparative purposes for other governments and/or jurisdictions.

■ Parameter Prioritization for Water Quality Objective Development

In 2021-2022 and in collaboration with the Mackenzie River Basin Board Water Quality Task Team (the Team), staff developed a standardized approach for data preparation and trend assessment. Next, the Team will apply the method to assess trends for nutrient, major ion and metals data of water samples collected from key monitoring sites throughout the Mackenzie River basin (MRB). This will help identify parameters that may warrant water quality objective development.

■ Hydrocarbon Prioritization for Water Quality Trigger Development

In 2021-2022, staff initiated a project to characterize hydrocarbons in the Slave, Hay, Liard and Peel rivers. This includes establishing current levels and determining if there are any spatial and/or temporal differences among the four transboundary rivers. This task helps to identify hydrocarbons that may warrant water quality trigger development.

Water Quantity

Water flow and climate variables, such as precipitation and temperature, are monitored by Environment and Climate Change Canada. Flow data are integral to the implementation of the bilateral agreement, and each year the Committee's water quantity support team ensure awareness of key transboundary flow monitoring stations within the GOA and GNWT's hydrometric agreements with Environment and Climate Change Canada.

The GOA and GNWT have committed to developing site-specific transboundary objectives for Class 3 waterbodies that ensure that the needs of the aquatic ecosystem are met before any water is taken for human use. The amount remaining for human use is referred to as "available water" and is shared equally between Alberta and the NWT. The available water includes water that may be withdrawn under existing licences.

Setting of the aquatic ecosystem needs, available water and the corresponding transboundary objective for the Slave River was deferred in the Agreement because the amount of water used for human use is very small relative to the amount flowing across the Alberta-NWT border. If specific conditions change in the flow and water use, it triggers further action or decision of the Committee. These condition triggers are tracked and reported on annually.

An interim amount of ecosystem water, available water and corresponding transboundary objective were set for the Hay River. The interim amount of ecosystem water is more than is likely necessary

for ecosystem needs. If specific conditions are reached, it triggers further action or decision of the Committee. These triggers are tracked and reported on annually.

Two main areas of data are required for the water quantity assessment: water allocation and use data from GOA's regulatory program, and environmental flow data. The Committee's water quantity support team uses these data to assess conditions and interim triggers.

Assessments are released as soon as they are completed and can be found here: <https://mrbb.ca/category/bwma-reports/ab-nt/>.

Biology

Changes in water quality and water quantity can affect living things that depend on a healthy aquatic environment. For Class 3 rivers such as the Slave River and the Hay River, the Agreement provides direction to monitor biological indicators. Biological indicators are living things such as benthic macroinvertebrates (aquatic worms, snails, mussels, and insects) and fish that we can monitor to track aquatic ecosystem health. Benthic macroinvertebrates and fish are sensitive to changes in water quality and quantity. If the benthic macroinvertebrates and fish are healthy, this is evidence that the aquatic ecosystem is healthy.

The biology team is currently working on developing monitoring triggers for benthic macroinvertebrates and fish. The biological triggers would work in the same way as the water quality triggers. However, prior to implementation of the Agreement there was no or limited historical data to use to develop biological triggers.

More information and monitoring results from those biological monitoring programs is available online at <https://mrbb.ca/category/bwma-reports/ab-nt/>. Biology analysis for this fiscal year is still underway and will be posted on the website when completed.

Implementation activities in 2021 included:

■ Large-bodied Fish Monitoring

In 2021, the team monitored fish on the Peace River at Peace Point and the Slave River at Fort Smith and near Fort Resolution. The species monitored were lake whitefish, walleye, northern pike, burbot, and longnose sucker, which were selected based on input from harvesters and because there is historical data that can be used for comparison. The data collected includes information about fish health and contaminants, such as:

- condition factor, liver size, gonad size, age and size-at-age,
- metals such as mercury in muscle,
- compounds such as polycyclic aromatic hydrocarbons (PAHs) in bile and muscle, that could be oil and gas, and/or forest fire related, and
- pulp and paper related compounds such as dioxins and furans in muscle.

Samples were analyzed through partnerships with the University of Calgary, Wilfrid Laurier University, and the University of Saskatchewan.

Reporting of these data, once completed, will include comparison of new results to historical data, such as the Slave River Environmental Quality Monitoring Program from the 1990s and the Slave Watershed Environment Effects Monitoring Program from the 2010s.

■ Macroinvertebrate Monitoring

Benthic macroinvertebrates were monitored in the Slave River in September 2021, which was the 5th year of the program. Unfortunately, the monitoring on the Hay River could not be done in 2021 because of high water levels and COVID-19 public health restrictions.

Macroinvertebrates were sampled in partnership with the University of New Brunswick and Smith's Landing First Nation for the Slave River and Kát'odeeche First Nation on the Hay River.

Groundwater

The Agreement states that transboundary groundwater between Alberta and the NWT will be protected from pollution and shared equitably. Groundwater is more difficult to locate and assess than surface water. The Committee, supported by groundwater scientists with the Alberta Geological Survey and the GOA and the GNWT, is working to learn more about the location, quality, and quantity of shared groundwater.

■ Identifying and Mapping Groundwater Aquifers

Aquifers in Alberta-NWT transboundary regions are mostly unknown. In 2020, the Committee, in collaboration with Alberta Environment and Parks and the Alberta Geological Survey, released the [State of Subsurface Knowledge to Support Aquifer Mapping Across the Alberta-Northwest Territory Border](#) report. The report summarized the state of subsurface information and knowledge to support aquifer mapping across the Alberta-NWT border, including knowledge gaps and recommendations for future work priorities. The production of the report was the first phase of a multi-year project that will delineate and characterize the Alberta-NWT shared aquifers.

A second phase of the project to conduct isotropic tracer sampling was supposed to start in 2021. Unfortunately, due to the absence of low-flow periods in the Hay River to conduct sampling and COVID-19 travel restrictions, this work was postponed to the following year.

Collaborative Research and Studies

Learning about the aquatic ecosystem of the shared waters and impacts of climate change is essential to implement the commitments of the Agreement. The Committee may direct collaborative research projects under the Agreement, and such projects may include reviewing and assessing existing data and information or collecting new data when necessary to support implementation.

■ Permafrost Thaw and Impacts on Water Quantity and Water Quality in Alberta-NWT Transboundary Basins

In previous work, permafrost was identified as a knowledge gap for groundwater assessment in the Alberta-NWT transboundary regions. The Permafrost Characterization and Impacts of Thaw on Water Quantity and Quality in Alberta-NWT Transboundary Basins report has been completed. It provides a review of the work on permafrost and hydrology that occurred in Alberta-NWT transboundary regions and presents the potential impacts of climate change and permafrost thaw on the quality and quantity of surface water and groundwater. This information will improve understanding of the aquifers and groundwater dynamics in the transboundary regions.

Other work completed includes identifying a site and installing a streamflow gauge in an area that drains permafrost peatland terrain to explore potential links between permafrost thaw and changing streamflows.

Conclusion and Next Steps

The GOA and GNWT worked collaboratively in 2021-2022 to improve our knowledge about the aquatic ecosystem and protect our shared waters. Once completed, separate reports will share water quality, water quantity, and biological monitoring results for the year 2021-2022 online. The reports can be found on the [Mackenzie River Basin Board](#) website and the governments' respective websites.

To further pursue the commitments in the Agreement, the Committee plans to:

- Continue learning and filling in gaps about groundwater in the Alberta-NWT region.
- Collect additional information about the aquatic ecosystem in the Slave River including fish and benthic invertebrates.
- Conduct additional water quality monitoring in the Hay River watershed and continue supporting the development of a Hay River Indigenous community-based monitoring program with KFN and DTFN.
- Work with the Traditional Knowledge Advisory Circle to develop a framework to meaningfully include Indigenous Knowledge in the implementation of the Agreement.

The Committee looks forward to continued cooperation, collaboration, and action to meet the commitments of the Agreement and sustain the spirit under which it was signed.