



Yukon Water Strategy

Five-Year Report

November 2019

Yukon



Coal River Springs Territorial Park

Cover photo: Kluane Lake; credit: dhughes9

Backcover photo: Lapie Canyon, near Ross River



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Minister's message



Clean water is essential for a healthy environment and healthy people. Without clean water, our communities and environment are not sustainable, and people cannot thrive. Water is central to all that we are and all that we do.

For five years, the Yukon Water Strategy and Action Plan has brought together water managers from all levels of government – including federal, First Nation, municipal and the Government of Yukon – as well as experts and stakeholder groups – such as researchers, consultants, industry and community organizations – to work toward shared goals and priorities. This level of partnership and collaboration has helped make sure we can maintain this vital resource, now and into the future.

I am proud of the milestones we have achieved together. This includes formalizing a Government of Yukon groundwater program, establishing a regular Yukon Water Forum, increasing our water monitoring capabilities with several new monitoring stations, and partnering on a variety of research projects and baseline studies to enhance our understanding of Yukon's water resources.

Over the past five years, we have worked hard to improve our work with First Nations. We now have four water monitoring partnerships with First Nations, which not only expands our water monitoring capacity, but also strengthens relationships and provides training opportunities. First Nations recognize the importance of water, and working together to protect, monitor, and manage our water is a priority.

While the past years have been successful, our work is not over. With our partners, we will continue to work toward achieving goals and priorities focused on preserving Yukon's freshwater resources.

Key priorities for the future include developing a Yukon wetland policy, advancing our transboundary water management agreements with First Nations, and coordinating efforts to monitor surface and groundwater quality and quantity. As our climate changes, we will face increasingly complex decisions around water. We are preparing for this. We are continually increasing and improving flood forecasting abilities and developing flood maps to help ensure that Yukon communities are more resilient to climate change.

I am extremely proud of the work that has been done to enhance water quality, protection and monitoring in Yukon. Thank you to everyone who helped implement the water strategy. I look forward to working with you as we continue to advance our shared goals and priorities.

A handwritten signature in black ink, appearing to read "Pauline Frost".

Honourable Pauline Frost
Minister of Environment

Executive summary

The Yukon Water Strategy and Action Plan: Water for Nature, Water for People (the strategy) was released in June 2014. The ambitious five-year plan set out 6 priorities and 13 specific goals aimed at maintaining the quality, quantity and health of Yukon's ground and surface water, in order to support both people and nature in the territory.

The Government of Yukon worked together with partners to implement the strategy. This report provides a summary of the key achievements, outreach, and activities over the last five years. These successes have built a strong foundation for water management in Yukon. Moving forward, several initiatives established under the strategy will continue and grow, while new projects and partnerships will help make sure Yukon's water remains central to our healthy environment and communities – now and for future generations.

The Government of Yukon recognizes that water is essential for maintaining healthy, vibrant communities and a resilient natural environment.

Key milestones

- Established a permanent groundwater unit for Yukon;
- Yukon-specific reports on drinking water management and protection;
- More than 200 presentations for Canada Water Week;
- Created a regular Yukon Water Forum;
- Updated Yukon's Water Data Catalogue.
- Established water monitoring partnerships with four First Nations;
- Increased monitoring capabilities: 26 new hydrometric stations, five new water quality monitoring stations, 38 new groundwater wells;
- Flow forecasting in four flood-prone communities; and,
- Enhanced research partnerships with First Nations, other governments and academic institutions.

Priorities moving forward

- Strengthening legislation and guidance around groundwater reporting and well drilling;
- Improving and releasing advice around sustainable water use;
- Continuing the development of a Yukon wetland policy;
- Advancing agreements with First Nation governments and other jurisdictions regarding transboundary waters;
- Continuing collaboration and research with academic institutions;
- Coordinating efforts to monitor water quality; and
- Floodplain mapping for 13 Yukon communities.

Acknowledgements

The flow of water does not follow administrative boundaries, and many aspects of water stewardship extend beyond the roles and responsibilities of Government of Yukon. This strategy is only one of many initiatives that contribute to the conservation and protection of water. A special thank you to all individuals, organizations, governments and others who strive to advance water protection in numerous ways every day. Water stewardship is a collaborative effort.

Grateful thanks to the ongoing work of:

- Yukon First Nations
- Transboundary Indigenous groups
- Non-government organizations
- Researchers and academic institutions
- Consultants and industry
- Other governments: First Nation governments, the Government of Canada, the Government of Northwest Territories, the Government of British Columbia
- Individual water stewards

Within the Government of Yukon, thank you to those who participated in the development and implementation of the strategy. Your thoughtful contributions, passion, and work were instrumental in the success of the Yukon Water Strategy and Action Plan.

Thank you to the dedicated staff of:

- Department of Environment
- Department of Health and Social Services
- Department of Community Services
- Department of Energy, Mines and Resources
- Department of Economic Development
- Executive Council Office

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Introduction

This report outlines progress made by the Government of Yukon and partners over the past five years to implement the Yukon Water Strategy and Action Plan (the strategy). Throughout this report, we present the key outcomes and ongoing work introduced through the strategy. In addition, we will look ahead to water-related initiatives the Government of Yukon will continue to work on into the future.

History and development of the strategy

Between 2010 and 2013, we brought together governments and other organizations that work with water to make sure all diverse values and interests of Yukon's water were heard. These included Yukon First Nation governments, transboundary First Nations, other government agencies, the federal government, industry, municipalities and communities, boards and councils, non-government organizations, experts, researchers, consultants, and individuals. Community engagement workshops were held throughout the territory and in 2013 a Draft Yukon Water Strategy was released, followed by more than three months of public review. In 2014, the final strategy was released.

In Yukon, six territorial government departments share responsibility related to water management.

Along with several partners and collaborators, these departments sought to make progress in six priority areas. Over the past five years, we invested \$3.35 million and leveraged approximately \$2.7 million through strategic partnerships in order to accomplish targets and goals set out in the strategy.

Priority areas

- 1. Better understand Yukon's groundwater regime**
- 2. Maintain and improve access to safe drinking water**
- 3. Promote the sustainable use of water**
- 4. Improve the sharing of information about Yukon's water**
- 5. Improve water management programs**
- 6. Plan for water needs now and in the future**

Better understand Yukon's groundwater regime

Goals

- Enhance and formalize the existing groundwater program in Yukon.
- Develop a regulatory framework to manage groundwater.

Groundwater is the water located in the underground spaces between soil particles and rock fractures. Surface water and groundwater are interconnected systems; surface water often flows into the ground where it is stored, while groundwater is often drawn to the surface, and flows into lakes and rivers. In Yukon, groundwater is the primary source of drinking water. In order to protect Yukon's groundwater from contamination and overuse, improvements to our understanding and management of the quality and quantity of this resource is essential.

What we did

Formalizing a Government of Yukon groundwater program, expanding groundwater monitoring networks, improving partnerships, and strengthening regulation and guidance related to groundwater were all key in learning about and protecting this hidden resource. Over the course of the strategy, we:

- **Established a permanent groundwater unit within the Government of Yukon.**

The unit is made up of two groundwater professionals who monitor wells, contribute to environmental assessment and auditing processes, conduct research, and coordinate expansion of the Yukon Observational Well Network (YOWN). When applicable, staff partnered with researchers, other government departments, municipalities and First Nation governments to advance key projects. Significant outcomes have included:

- Improving ability to provide groundwater-related data and advice into the assessment and licensing processes.
- Inclusion of groundwater advice in technical review processes which allows us to provide more comprehensive and effective recommendations.
- Drilling of monitoring wells in partnership with Kluane First Nation and Champagne and Aishihik First Nations.
- Undertaking baseline studies in the Eagle Plains and Kotaneelee regions to assess the potential impacts that oil and gas extraction may have on groundwater resources.

Most quartz and mineral undertakings can affect groundwater quality. This can eventually impact surface water quality and aquatic life. We have been able to improve groundwater monitoring programs, hydrogeological models that detail flow of contaminants through the groundwater system, and sustainable yield estimates for groundwater withdrawal. We consider potential short- and long-term effects, and provide comments on monitoring plans, groundwater quality objectives, and potential impacts and mitigations.

- **Expanded the Yukon Observation Well Network (YOWN) over the past five years, and plans for additional wells are in development.** YOWN is a long-term monitoring network that measures groundwater quality and quantity. Started in 2001 and renamed in 2014, the network has been instrumental in understanding groundwater in the territory. Since the inception of the groundwater unit, we have expanded the network from eight to 46 wells. To date, we have focused on finding

opportunities to equip existing wells with monitoring tools. Taking advantage of existing wells has been cost-effective and has increased geographic coverage.

Ongoing work

Although significant progress has been made, additional work is necessary to ensure that groundwater monitoring is comprehensive and makes use of advanced mapping and modelling technologies. Additionally, it is vital that groundwater-related information and legislation is accessible, informative and clear. Key steps moving forward include:

- Improving the groundwater regulatory framework, through required water well information submissions, and standardizing well drilling practices and construction standards. We envision development of a groundwater regulation that improves groundwater protection, standard construction guidelines, documentation and reporting as the next step.
- Improving surface water-groundwater models through: identification of regional key indicators of groundwater conditions; understanding aquifer storage evolution; evaluating groundwater flow and storage; assessing rates of withdrawals (pumping) including domestic, agriculture and industry; translating scientific results into fact sheets for the general public; and increasing public understanding of groundwater.
- Expanding the geographic coverage of groundwater wells for the YOWN through drilling of new wells in strategic locations and through obtaining borehole logs from other organizations.



Groundwater Program staff assess a water well core.

By the numbers

2	New groundwater positions
38	New wells added to YOWN network
4	Wells drilled in partnerships with Kluane First Nation and Champagne and Aishihik First Nations to monitor groundwater
1800+	Well logs in groundwater database

- Engaging in a pilot project with the Government of Northwest Territories to conduct regional groundwater mapping in the Liard River Basin. Once refined, a similar approach will be applied to the Whitehorse area, which is much smaller, relatively data-rich, and more groundwater-dependent.

Maintain and improve access to safe drinking water

Goals

- Foster stronger working relationships with other governments and agencies involved with drinking water sources in Yukon.
- Enhance opportunities for education, training and access to information.
- Evaluate drinking water use and efficiency.
- Ensure regulatory programs meet public need for safe drinking water.

Yukoners need drinking water supplies that are safe, secure and reliable. Drinking water is typically delivered by piped conveyance systems, bulk water trucks or individual wells. Since 2014, we have done a lot to support accessibility of drinking water.

What we did

In order to advance water protection, a [Yukon-wide source water protection study](#) and [online mapping tool for public drinking water systems](#) was developed. The study involved collaborating with stakeholders to compile, review and collate information with respect to public water supplies and community source water protection. Key outcomes of the study included:

- Water system summaries for 60 water systems that supply drinking water to the public.
- A platform for source water and source water protection data collection and sharing.
- Fostering information and knowledge sharing partnerships between communities and governments.
- Promotion of source water protection planning.
- Developing a source of useful information for the Government of Yukon, other governments, planners, engineers and scientists for future planning.

In March 2017, we held a water and wastewater system operator workshop in Whitehorse. Attendees came from Yukon's water and wastewater sector and the workshop focussed on water system operators. Several presentations and interactive sessions gave participants the opportunity to learn, interact and network, as well as earn continuing education credits. In addition, facilitators were able to gain valuable input from operators, and others associated with the sector. Feedback was then incorporated into the [Yukon Water and Wastewater Sector Profile Report](#). Input from participants was also useful in determining topics for the development of an online drinking water course.

In collaboration with municipalities and other partners, we published the [Cost of Water](#) report in 2017. The publication and accompanying brochure presented the first territory-wide assessment of water use and the cost of providing drinking water for Yukon communities. Both documents were presented at the Yukon Water Forum and water and wastewater system operator workshop. Additionally, an updated water system inspection model was developed for large public drinking water systems with standard methods of documentation.

Over the course of the strategy, we delivered various educational initiatives to build public awareness around water use, conservation and source water protection. These included visits to Yukon schools for Canada Water Week activities, outreach with the Medical Officer of Health, and community-based conferences.

In order to build capacity and support community members in learning more about water, courses and training opportunities were developed and delivered. This included the operator training initiative, which involved course development and an annual contribution of \$75,000 for the Yukon Water and Wastewater Operator Program (YWWOP). Additionally, we provided presentations courses and participated on the YWWOP Governing Council. An online drinking water course for key decision makers was also funded and developed. It can be accessed online.



Government of Yukon water treatment plant

By the numbers

- | | |
|----|--|
| 42 | Attendees at water and wastewater system operator workshop |
| 95 | Water systems operators certified in Yukon through the Environmental Operators Certification Program in 2019 |
| 60 | Public water system summaries completed |

Ongoing work

In order to ensure better protection of groundwater sources, which the majority of the territory relies on for drinking water, the draft Yukon water well construction guidelines are being developed.

Promote the sustainable use of water

Goal

- Provide further guidance and advice to water users.

Water is used by everyone. Over the past five years, programs, resources and written guidance has been introduced to provide support to a variety of water users in managing water sustainably and efficiently. This helps water managers maintain the health of aquifers and surface water systems and reduces impacts to the environment. Efficient and sustainable water use also means lower costs for water users, water providers and taxpayers.

What we did

We have developed a variety of resources to assist water managers and industry in water-related planning and decision making. Efforts have been made to **clarify roles and responsibilities** of the various agencies who work on water in Yukon. Key successes include:

- An updated **Preferred Practices for Work Around Water** was released in March 2019. The report is intended to help developers comply with environmental regulations and avoid the negative environmental impacts of development activities. It encourages a proactive and tailored approach to protect water resources. The report was downloaded more than 80 times during the first three months of its release.
- To promote greater clarity between the Government of Yukon and the Yukon Water Board, we signed a **Memorandum of Understanding** in 2018 to clarify the roles of each agency regarding regulatory processes and organization.
- To improve groundwater monitoring well construction, we developed a **protocol** under the Contaminated Sites Regulations.
- Over five years, several **web pages**, guidance documents and **fact sheets** related to water in the territory have provided short, informative summaries of ongoing work, Yukon's water history, water use, legislation, watersheds and monitoring efforts, and several other topics.

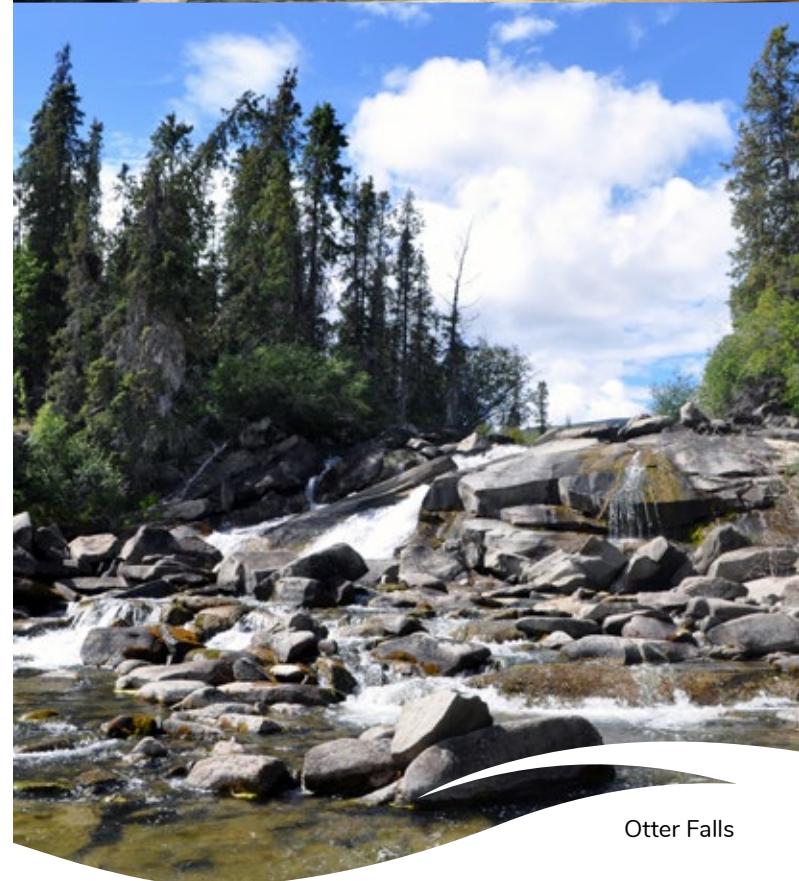
Ongoing work

Efficient and sustainable water use is integral to using and conserving Yukon's water. We have many projects, reports, and activities in development.

- We use the Canadian Wetlands Classification System to help provide a consistent and practical framework for wetland characterization, allowing for more informed planning and decision-making. Work related to the mapping of select wetlands as part of the Ecological Land Classification inventory is currently underway.
- We are developing guidance for proponents on Adaptive Management Planning in order to assist quartz mining companies in reducing their risks associated with water use. The guidelines are currently in final stages of review, and are expected to be released in late 2019.
- Through the [Mine Licensing Improvement Initiative](#), we drafted guidelines for the development of water quality objectives for mine operations. These guidelines will be used to support proponents in quartz exploration and mining projects. Since 2017, the Draft Quartz Mine Water Quality Objectives and Standards Guide has been reviewed and refined, and will be shared with key stakeholders for comment in late 2019.



A youth enjoys the water during Conservation Action Team Camp.



Otter Falls

Improve the sharing of information about Yukon's water

Goal

- Improve communication, education and outreach regarding Yukon's water.
- Enhance tools for sharing water information with the public.

Better communication on available water information and data improves the ability of citizens, governments and partners to share knowledge and make informed management decisions. Water users require accessible, comprehensive and up-to-date information and tools to research and plan water use activities. Additionally, building awareness through education and outreach is key in advancing water stewardship and engagement in water-related activities.

What we did

Using a multi-pronged approach of improving communication, expanding education and outreach, and improving the accessibility to tools and data, we enhanced information sharing regarding Yukon's water resources.

Communication

To better communicate water-related findings and information, we published a variety of informative reports and set communication standards for others. Key initiatives included:

- Publishing a full **Yukon State of Environment Report** every three years, and interim reports in between those years. The report is available online, and new freshwater indicators have been tracked and added to the report. Specifically, we collect data about extreme high and low water in lakes and rivers, snow accumulation, and Yukon River breakup to make flood forecasts, assess early-season wildfire risk, and to track changes in climate, over time.
- We collect data and then report on the potential for spring flooding through our Yukon Snow Survey Bulletin and Water Supply Forecast, which has been published in **March**, **April** and **May** every year since 2006. Since the introduction of the strategy, new technologies and comments from partners have been incorporated into monitoring and reporting for the snow bulletin, and in 2019 a new format for reporting was introduced, which included translation into French.
- We have established communication standards for how water license holders communicate water quality data to allow for more efficient and consistent sharing of information.

Education and outreach

Awareness around protection of drinking water, aquatic ecosystem health, phases of water, and the variety of uses of water are all important to ensuring that Yukoners use water sustainably. Several courses, training opportunities and knowledge-sharing activities have focused on these topics, including:

- The operator training initiative and online course for key decision-makers, [Taking care of your drinking water system for key decision makers](#), offered through Yukon College.
- Guest-lectures by Government of Yukon staff on subjects such as water contamination, different types of water treatment and water stewardship.

Every year since 2011, we have worked together to deliver school outreach and presentations during Canada Water Week activities. Since the introduction of the strategy, we have delivered more than 200 interactive classroom and community presentations and activities. Fifteen topic areas were offered, ranging from water quality to watershed dynamics.

Tools

Modern and accessible tools have been improved to ensure up-to-date information is provided to water users. Innovative and illustrative methods to communicate data and ongoing work throughout the territory have been developed and released over the course of the strategy. Key successes include:

- Launch of an updated [Yukon Water Data Catalogue](#). This has been instrumental in presenting a variety of water-related data to the public and stakeholder groups. The interactive platform allows users to view different datasets from over 20 available water data networks, including the Indigenous Observation Network, the Yukon Observation Well Network, and the Yukon Hydrometric Network. In addition, filter functions on the map allows users to refine their search and export desired data.



Water week classroom presentation

By the numbers

203	Water week classroom presentations since launch of the strategy in 2014
15	Unique lessons presented at water week
20+	Available data networks on the Yukon Water Data Catalogue
780	Views of the updated Yukon Water Data Catalogue in the first three months of launch

- Communication of water licensing: the Yukon Water Board maintains and updates [Waterline](#), while geomatics specialists on our team have developed [maps](#) of current water licenses in the territory.

Ongoing work

The online Yukon Water Well Registry will allow the public, drillers, researchers, government officials and environmental consultants to access and analyze current data on a user-friendly platform. We expect this platform to be launched publicly in late 2019.

Improve water management programs

Goals

- Enhance cooperation, coordination and collaboration among water managers.
- Strengthen our water management capabilities.

Water management is an iterative process that involves planning, developing, implementing and evaluating programs, policies and regulation. Multiple players are involved in water management throughout the territory. Territorial and First Nation governments, boards and councils, the federal government, researchers, industry, and municipalities all contribute to water management and stewardship. The strategy not only significantly improved the collaboration between the various Government of Yukon departments with water management responsibilities, but with all water managers in the territory.

What we did

Water management depends on strong partnerships. Cooperation, coordination and collaboration between all parties supports an effective and efficient water management approach that reflects the needs and interests of all users. Collaborative initiatives include:

- Three Yukon Water Forums since the inception of the strategy, with the fourth scheduled for November 2019. These events brought together several Yukon government departments, First Nations, boards and councils, the federal government, researchers, industry, non-government organizations, and municipalities to discuss a range of topic areas related to water. In 2017, the Government of Yukon partnered with Champagne and Aishihik First Nations to host the Water Forum, both in Whitehorse and Haines Junction. The fourth Water Forum will be hosted in partnership with Carcross/Tagish First Nation.
- The [Snow Survey Program](#), in which we partner with the Vuntut Gwitchin First Nation, Parks Canada, United States Department of Agriculture, and the British Columbia Ministry of Environment to make projections about spring runoff, flood probability, and other water supply forecasts for different users, including Yukon Energy.
- Monitoring partnerships with Vuntut Gwitchin First Nation, Kluane First Nation, Daylu Dena Council and Tr'ondëk Hwëch'in to undertake monitoring and research activities (described in further detail under Priority 6).

- Partnerships with other governments and institutions have supported the expansion of monitoring networks and have enhanced our forecasting abilities (described in further detail under Priority 6).
- Recently, new agreements were initiated or signed to formalize partnerships. These include:
 - Under the Mackenzie River Basin Board, we signed a [Bilateral Water Management Agreement](#) (BWMA) with the Government of British Columbia in 2017 for the shared Liard sub-basin. We are currently working to update a similar BWMA signed with the Government of Northwest Territories in 2002. Through these agreements, we meet with partners including First Nation representatives to develop joint work plans. These agreements facilitate sustainable use of the transboundary waters, promote cooperative management, and protect and conserve the ecological integrity of the aquatic ecosystem of the Mackenzie River basin.
 - New Memorandums of Understanding between our departments, as well as between Yukon government and communities, regarding sharing of water well information and data.
 - A new Water Quality and Aquatic Ecosystem monitoring agreement was signed with the Government of Canada in 2019, which will help us advance water quality monitoring within the territory.

Ongoing work

We are working with First Nation governments and transboundary Indigenous groups, federal and municipal governments, industry, and organizations to develop a [Yukon wetland policy](#). Development of this policy will help build a foundation that recognizes wetlands as



Aerial view from Old Crow ice survey

By the numbers

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| 4 | Water forums |
| 4 | First Nations to conduct water monitoring |
| 2 | Partnerships with First Nations to complete water resource evaluations in two habitat protection areas |

important ecosystem components and will help inform exercises like land-use planning. The draft policy is currently under development and will include a final public feedback period before being released. To stay informed about this project, visit our Yukon wetland policy engagement page. Complementary to this initiative, the Yukon Water Board is developing wetland management guidelines for placer mining applicants preparing wetland plans.

We will continue working on agreements related to the Mackenzie River Basin Board. Planning for future bilateral management committee meetings are underway, as well as progress of monitoring and consultation activities with the Northwest Territories.

Plan for water needs now and in the future

Goals

- Ensure adequate water monitoring across the territory.
- Enhance the use of best available science, traditional and local knowledge in decisionmaking.

Yukon is made up of 500,000 square kilometres, including six main watersheds. Given the diversity of water resources, and factors such as climate change, population growth, development and land-use activities, community and localized monitoring networks are integral in providing region-specific data. This local data promotes better decision-making and management.

What we did

To advance data and monitoring coverage, we strengthened partnerships, data collection, and research. Key successes include:

Monitoring

Water quality monitoring is conducted across the territory. Our strong partnerships with local First Nations and other governments have supported additional and updated monitoring capacity. This helps gather information that can be used to assess changes in water conditions and cumulative effects. Our partnerships with four First Nations to monitor fresh water have spanned three years. These partnerships allow for ongoing monitoring, training opportunities, and increased territorial coverage of water monitoring, all while strengthening relationships. Specifically, we have partnerships with:

- **Vuntut Gwitchin First Nation:** To assess changing groundwater conditions and fish spawning in the Fishing Branch River; to monitor water in the Old Crow and Porcupine Rivers and Eagle Plains region; and, to monitor spring snow levels in the Vuntut Gwitchin Traditional Territory.
- **Tr'ondëk Hwéch'in:** To monitor water quality on the Ogilvie, Klondike and Eagle Rivers; and, to assess the background uranium and arsenic conditions in the Dawson Range.
- **Kluane First Nation:** To monitor hydrometric and groundwater in the Kluane Lake region.
- **Daylu Dena Council:** To undertake water levels monitoring in the Liard River; to conduct baseline monitoring studies in the Kotaneelee Basin; and, to monitor surface water in Tom Creek.

We have also increased collaboration with First Nations on individual projects. This has involved collaborative field visits, planning activities, and sharing of final reports. Recent projects include:

- **Kwanlin Dün First Nation and Government of Yukon:** In 2019, personnel from the First Nation and the Government of Yukon teamed up to monitor Fish Creek for signs of human waste. Water sampling concluded that sample sites had clean, high-quality freshwater.
- **Tr'ondëk Hwéch'in, Lorax Environmental Services and Government of Yukon:** Since 2018, representatives from all three organizations, with involvement from White River First Nation and Selkirk First Nation, have been researching and monitoring local water sources to measure concentrations of uranium and arsenic in the Dawson Range region. These two elements are naturally occurring, however, a better understanding is desired to support decision-making, managing and responding to proposed development projects in the region.
- **Kluane First Nation, Government of Yukon, Government of Canada:** Between 2017 and 2018, Government of Yukon partnered with Kluane First Nation and the Government of Canada to examine groundwater in Kluane Lake. In 2017, 42 discharge sites were identified using infrared camera. In 2018, samples were collected from 20 of these sites to establish baseline information on groundwater quality. Findings were examined to study the relationship between groundwater and salmon spawning habitat throughout Kluane Lake.



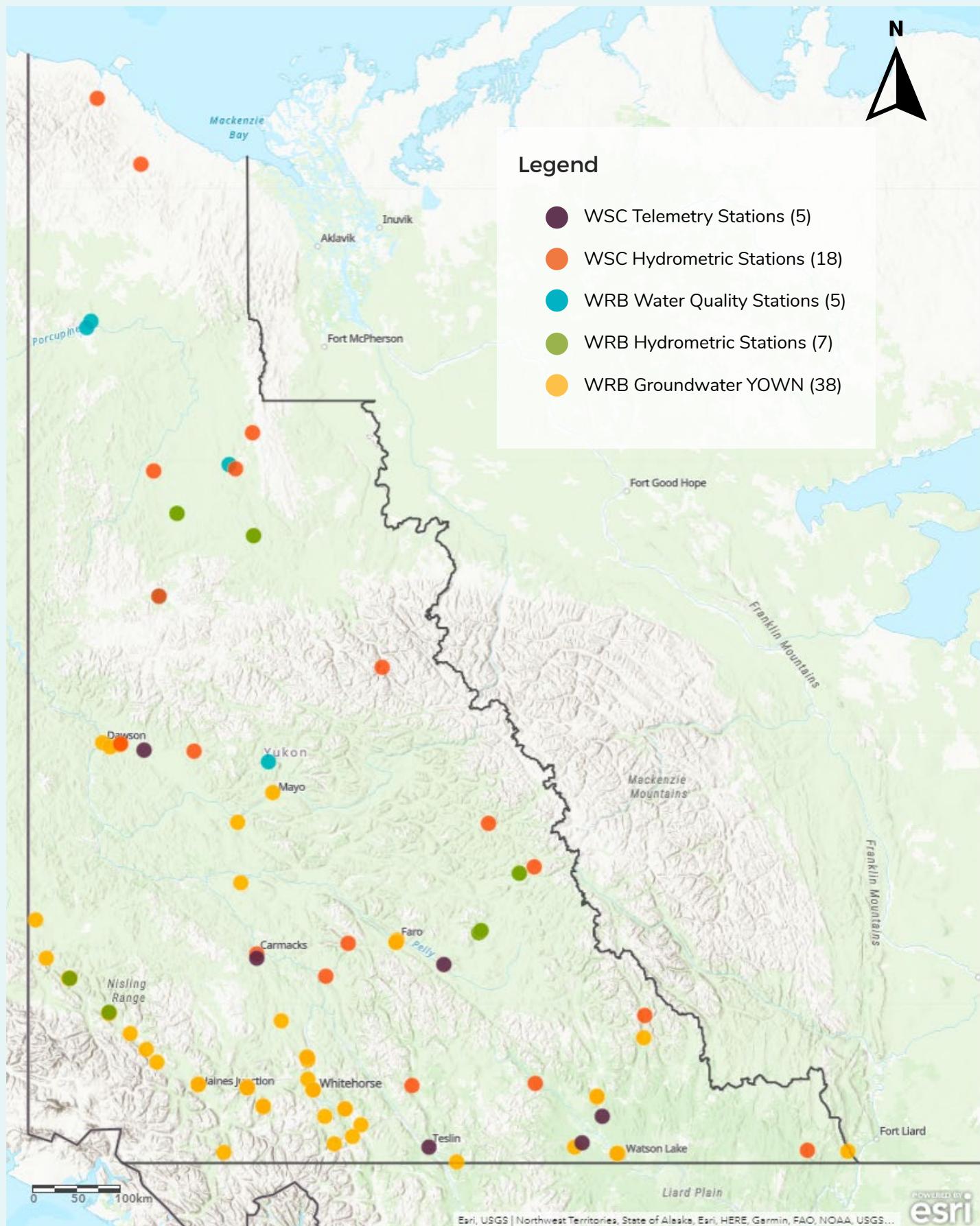
Water sampling training on the Takhini River

By the numbers

5	New or upgraded telemetry stations
25	New or upgraded hydrometric stations
5	New water quality network stations
38	New YOWN monitoring wells by 2018

Capacity to manage Yukon's water resources is significantly improved by different types of monitoring sites. Infrastructure upgrades and installation over the past five years have improved our geographic spread and monitoring capabilities. Most installations and upgrades have been undertaken by us, as well as through partnerships with the Water Survey of Canada (WSC), within the Government of Canada. New monitoring stations are presented in the map on the next page.

New or Updated Water Monitoring Stations since 2014



Research

Now and into the future, local and regional water-based research is important to supporting water management. To make sure our research aligns with the strategy, builds meaningful partnerships and provides useful results, we have focussed on research that is strategic and proactive. Over the past five years we undertook new research initiatives with partners that include Public Safety Canada, Université de Sherbrooke, McGill University and Yukon College, while long term multi-disciplinary research with Global Water Futures and the University of Saskatchewan and McMaster University continued. Projects include:

- **Use of artificial sweeteners in auditing processes:** To date, we have analyzed the presence of human waste in waters through monitoring movement of artificial sweeteners. We have used this new technique for audits of municipal wastewater treatment facilities, the Fish Creek project in partnership with Kwanlin Dün First Nation, and at YOWN sites.
- **Sustainable design of Dempster Highway stream crossings:** In partnership with McMaster University, we initiated a multi-year monitoring project on streams crossing the Dempster Highway in order to better understand the hydrological and ice regimes of northern Yukon in a changing climate.

Forecasting and innovation

Use of forecasting technologies, modelling technologies, and innovative tools applied with historic data, helps us remain proactive and responsive to the pressures of a changing climate, population growth and land development. These advancements have equipped us with the ability to better predict floods, collect real-time data, react accordingly, and plan for future water needs. To date, we and our partners have:

- Improved flow forecasting on major rivers, such as the Upper Yukon River, the Pelly River, the Stewart River, and the Liard River.
- Enhanced flood forecasting for all 13 Yukon communities that are at risk of flooding, through a flood frequency analysis and the production of flood maps.
- Installed 21 telemetry systems at existing monitoring stations throughout the territory to improve our ability to monitor water conditions remotely, and make prompt decisions when necessary.

Baseline studies and reporting

Agencies and proponents need baseline water quality, hydrology and meteorological data to monitor trends and consider new activities in undeveloped areas. Through partnerships, we undertook baseline and research studies on the Kotaneelee region, the Eagle Plains region, Ni'iinlii Njik (Fishing Branch) and Indian River watershed. In each of these studies we assessed a variety of parameters including water levels, aquatic ecosystem conditions, habitat, water quality and groundwater systems.

Hydrologist checking a water monitoring station in Old Crow



ONGOING WORK

In order to support planning for current and future water needs, we gather and apply a balance of the best available science, traditional knowledge and local knowledge. Past initiatives have prioritized collaborating with First Nations, universities, municipalities, contractors and non-government organizations on research projects and monitoring efforts to inform decisionmaking. We will continue this work to ensure that our government and partners are aware of shifts in freshwater dynamics.

In addition, we have made progress in applying new technologies to improve our flood forecasting capabilities. Recently, we received funds from the Government of Canada's National Disaster Mitigation Program to improve flood forecasting, flood preparation and management capabilities. By 2020, we aim to produce a flood management system that will include:

- Updates to floodplain maps so they continue to provide accurate and relevant information to support land use and local area planning processes;
- Flood detection stations and flood forecasts for many communities, stream crossings and mine sites. This will improve early warning systems, necessary preparation and response;
- Preparation and intervention protocols, by collaborating between departments; and
- A visual platform with real-time data to assist in communicating flood risks.

Through a partnership with the Université de Sherbrooke's LakePulse project, water quality in 23 lakes across the territory was sampled in summer of 2019. This project will continue across Canada in 2020.



Continuing the dialogue

Since the launch of the strategy in 2014, considerable progress has been made in advancing all six priority areas. Communication and collaboration is stronger and knowledge sharing and coordination is better. Data and monitoring have benefited from community monitoring, innovative technologies and application of new tools, and upgrades and expansion of monitoring infrastructure. Research has uncovered new findings, contributed to long-term data sets, and improved our ability to make responsible and proactive water management decisions.

As we move forward, we will build on the progress made in the last five years, and we will continue the conversation around water. Research, monitoring and management partnerships established during the past five years will stay in focus and we will continue to apply innovative technologies and monitoring techniques.

Specifically, we plan to:

- Work on developing regulation regarding groundwater management, water well drilling and monitoring;
- Communicate information and share advice related to sustainable water use through education and awareness initiatives;
- Promote discussion to inform the development of a Yukon wetland policy;

- Advance agreements with First Nation governments and other jurisdictions regarding transboundary water management through the Mackenzie River Basin Transboundary Waters Master Agreement;
- Collaborate with First Nations, researchers and academic institutions to further advance our collective knowledge and understanding of Yukon's water;
- Evaluate current water monitoring networks and support continuous improvements to data collection;
- Map flood risks for 13 Yukon communities; and
- Host events that promote collaboration, such as the Yukon Water Forum.

Conclusion of the Yukon Water Strategy and Action Plan: Water for Nature, Water for People does not signify a reduction of water-related work throughout Yukon. We are committed to responsible management and conservation of the territory's water resources, and we recognize that water stewardship involves a collective effort. We look forward to the future as collaborative and innovative work continues on the sustainable management and conservation of the territory's vital resources. We are committed to ensuring that we will always have water for nature and water for people.

