

Water for Nature, Water for People

YUKON WATER STRATEGY AND ACTION PLAN

THE REPORT OF A MARKED WAR





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Water for Nature, Water for People





Canoeing Kluane Lake

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Dezadeash River and the Haines Highway intersect just south of Haines Junction

Minister's Message

Water is essential to life and to the health of Yukon's people, economy and natural environment. A strategic, comprehensive approach on which Yukon government can base its water management decisions allows everyone involved in water management to work towards common goals.

The Yukon Water Strategy and Action Plan recognizes the common interest of all water managers in the territory – from federal, First Nation and municipal governments as well as the Yukon government – in ensuring we will always have water for nature and water for people. It identifies more than 50 actions the Yukon government will undertake to meet these goals.

During the development of this strategy, the Yukon government listened to a wide variety of people and organizations about the values, priorities and actions we should include in our final document. Our approach is to focus on the desired outcomes, not on any particular use of water. The Strategy provides opportunities for partnerships, collaboration and engagement in implementing the strategy and action plan.

I appreciate the valuable feedback provided during the public review of the *Draft Water Strategy*. This information not only helped us build on what we originally proposed but also helped identify new actions, such as formalizing an approach for community water monitoring and promoting source water protection planning.

We will face increasingly complex water decisions in the future – climate change alone guarantees this. With the *Yukon Water Strategy and Action Plan*, the Yukon government is better positioned to provide for present and future needs so that the quantity, quality and overall health of waters flowing through Yukon lands are sustained for all living things.

Thank you to everyone who helped shape this important strategy.

Hon. Currie Dixon Minister of Environment





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"There's a land where the mountains are nameless, And the rivers all run God knows where..."

- ROBERT W. SERVICE, THE SPELL OF THE YUKON

Introduction

Yukon's Unique Water Landscape

Yukon has abundant water resources. Water covers approximately 8,000 km² of the territory in six major watersheds: the Alsek, Yukon, Porcupine, Peel, Liard and North Slope. Each of these watersheds has several tributaries. Wetlands range in size from the 6,000 km² Old Crow Flats (Van Tat K'atr'anahtii) to small locally important wetlands. Yukon also has extensive groundwater resources and aquifers, as well as widespread frozen water sources such as glaciers and permafrost. Some 1,396 glaciers cover about 10,000 km² of Yukon's landscape.

Yukon does not have the high degree of industrial use, contamination or water scarcity issues that some other jurisdictions have. Because most of Yukon's waters originate in and flow out of the territory, we have fewer downstream effects and impacts than other jurisdictions in Canada. More than three-quarters of Yukon's domestic water users live in Whitehorse, on the Yukon River. The remainder of the population lives amongst 15 communities and other remote areas of Yukon.

Water is vital to life: it is a necessity for our natural environment, biodiversity, and economy. It is used for drinking and waste disposal. Water provides habitat for fish, plants and animals and supports basic life processes. Extensive peatlands in northern Yukon are important storehouses of carbon. Water holds cultural and spiritual importance for many people. Water bodies provide places to hunt, fish, and trap, as well as excellent wildlife viewing opportunities. Waterways are used for travel, firefighting, recreation and harvesting. Businesses such as placer mining and agriculture depend on water's availability and hydroelectric facilities need reliable river flows as well as water storage in order to meet energy demands using renewable sources.

Traditional uses of water and other water rights are set out and protected in Chapter 14 of Yukon First Nation Final Agreements. Water was a determining factor in the establishment of Yukon's communities, providing travel and transport routes both historically and today, becoming embedded within Yukon's very identity. Yukon's heritage and economic prosperity (including traditional economies) have been built on its access to and use of water resources.

However, Yukon waters are not immune to problems such as those associated with natural and humancaused climate change and industrial development. Further, Yukon's remote location contributes to a general lack of data, knowledge and understanding of its waters. In order to ensure that Yukoners and transboundary users can continue to rely on the existing supply and quality of water, policy and action are needed to ensure that Yukon government is continuing to make informed and sustainable water management decisions.

Glaciers influence streamflow and water quality in Yukon. The territory's glaciated regions include the southwest Coast Mountains, the Saint Elias Mountains and portions of the Mackenzie Mountains. Glaciers in northern British Columbia at the headwaters of the Yukon River Basin influence flows on the Yukon River at Whitehorse and communities downstream.

Strategy Development

The Yukon government committed to developing a water strategy because it recognized a need for a comprehensive approach for addressing water issues and water management, within its areas of responsibility. Other agencies manage and/or advocate for the protection of water resources in Yukon: federal, territorial, municipal, and First Nation government departments, boards and councils, and a few non-governmental organizations. Roles and responsibilities of these agencies are outlined in Appendices I and II.

The Yukon government led the development of the Yukon Water Strategy and Action Plan over the course of two years with input from Yukon First Nation governments, transboundary First Nations, Yukon government agencies, representatives from the federal government, other provincial and territorial governments, municipalities and communities, boards and councils, non-government organizations, water researchers and consultants, the business community and individuals. This two-way process was invaluable in helping to ensure that the government's approach respects the diverse values and interests regarding water in Yukon.

The water strategy is intended to provide for present and future water needs as well as support better collaboration among the governments and agencies with responsibilities for water management. It recognizes that because water itself is dynamic, water management decisions must also be able to adapt to seasonal and climatic variability.



Water decisions can affect environmental, social and economic conditions. Decision makers need to take a wide array of circumstances into account including:

- Climate variability and climate change
- Population growth
- Technological change
- Water management regime
- Land use changes

- Aging infrastructure
- Cumulative effects
- Changing water demands
- Levels of consumption

"Water is not a static resource tied to any particular piece of land like mineral or forest resources, but rather a common gift shared by all of us that recognizes no boundaries."

- YUKON FIRST NATION RESPONDENTS



Strategy Overview

The Yukon Water Strategy and Action Plan ("strategy") is intended to help the Yukon government ensure that its water management decisions maintain the quality, quantity and overall health of waters while allowing for sustainable use. It recognizes that activities that use water or deposit waste into water can put ecosystem health under stress.

The strategy will help government strengthen its understanding, knowledge and overall management of water through the utilization of scientific, traditional and local knowledge. The strategy starts with a vision, principles, goals and priorities, which provide a framework for the actions the Yukon government will undertake.

The strategy sets out how and why the Yukon government will:

- Develop a common understanding of the vision, principles and goals to use when making decisions affecting water resources;
- Generate a better understanding of Yukon's water resources and especially the groundwater resources that we currently know so little about;
- Maintain and improve access to safe and affordable drinking water;
- Promote the sustainable and wise use of water so current and future water needs are met;
- Expand upon the collection of water knowledge and better communicate what we know;
- Facilitate improved collaboration among water decision makers in various governments and organizations (e.g., federal, territorial, First Nation and municipal); and
- Address pressures that affect Yukon's water resources, such as climate change.

The strategy recognizes that the Yukon government must focus effort on water management issues that are most relevant to the territory's unique water landscape. Given the amount and importance of work to be undertaken, not all priorities and actions can be undertaken immediately.

The strategy also calls for the government to foster stronger working relationships with other governments and organizations. A more coordinated approach to water management and water issues is helpful because water management does not rest with the Yukon government alone. Addressing water issues is a shared responsibility.

River ice break-up dates for the Yukon River at Dawson since 1896 show that the break-up is occurring earlier (five days on average) in spring than historically. A similar trend is occurring for the Porcupine River at Old Crow.



St. Elias Mountains and the Kaskawulsh Glacier, Kluane National Park and Reserve

Some of the recent water initiatives that the Yukon government has undertaken which were supported by collaboration with other water managers include:

- Reporting on the vulnerabilities of Yukon water to climate change, as called for in the *Climate Change Action Plan;*
- Creating YukonWater.ca, an online information portal for past and real-time water data;
- Adopting the Canadian Wetlands Classification System;
- Developing Wetlands Best Management Practices;
- Creating an information package for Type A and B quartz mining undertakings;
- Creating the Yukon Placer Watershed Atlas, an online information tool in GIS format;
- Developing two protocols, the *Water Quality Objectives Monitoring Protocol* and the Aquatic Health Monitoring Protocol under the Fish Habitat Management System for Yukon Placer Mining;
- Investing in infrastructure for community drinking water and waste water systems; and
- Completing engineering assessments of large drinking water systems' infrastructure.

Strategy

Vision

The quality, quantity and overall health of waters flowing through Yukon lands are sustained for all living things now and in the future.

Principles

The following principles will guide the Yukon government's approach to water management:

Sustainability Undertake actions that main- tain a healthy balance between environmental, economic and social needs now and in the future.	Conservation Encourage and support water conservation and sustainable use.	Forward-looking Anticipate future changes in water quality, quantity and needs due to development, cumulative effects, climate change and population growth.
Adaptability Promote and develop adaptive	Security Maintain affordable, adequate,	Stewardship Conserve or restore the integ-
management strategies to cope with uncertainty and change.	equitable and reliable water quality and quantity.	rity of Yukon watersheds through both individual and shared efforts.
Cooperation	Respect	Communication
Develop and promote part- nerships and collaboration with other governments and organizations in light of shared responsibilities and interests.	Acknowledge and demonstrate respect for the intrinsic value of water and the diverse human values and interests regarding water.	Communicate water issues and decisions with citizens, governments and partners, enhancing their ability to make decisions informed by shared knowledge.

Goals

Water for Nature

Sustain water quality and quantity for aquatic and terrestrial health and ecosystem services. Respect the intrinsic value of water.

Water for People

Ensure accessible, safe and sufficient water for drinking and other purposes, including commercial, recreational, heritage, cultural and spiritual uses and values. Promote sustainable and wise use of water to support environmental, social and economic needs.

Bennett Lake

BETTER UNDERSTAND AND MANAGE YUKON'S GROUNDWATER

Groundwater is integral to the replenishment of surface water systems that support aquatic and terrestrial life. It is the primary source of drinking water for Yukoners and supports activities that are important for our economy. In order to protect Yukon's groundwater from contamination, improvements to our understanding, monitoring and management of this resource are essential. The actions government will undertake to advance this priority area will focus on formalizing and expanding its existing groundwater programs.





PLAN FOR WATER NEEDS NOW AND IN THE FUTURE

Water systems will change in the future as a result of impacts from climate change, population growth, development and new land use activities. Agencies and proponents need baseline water quality, hydrology and meteorological data to consider new activities in undeveloped areas. To advance this priority, the government will focus on ensuring adequate water monitoring and research takes place across the territory and enhancing the use of best available science, traditional and local knowledge in decision making.

Priorities

The Yukon government will work in six priority areas to address the strategy's goals:



IMPROVE WATER MANAGEMENT PROGRAMS

There are many Yukon government departments and agencies with water management responsibilities. The action plan identifies ways for them to improve collaboration and together identify and address water management areas that need improvement. The actions government will take to advance this priority area will focus on enhancing cooperation, coordination and collaboration among Yukon government water managers and strengthening their overall water management capabilities.

MAINTAIN/IMPROVE ACCESS TO SAFE DRINKING WATER

People want to know the state of their drinking water systems, that standards are being met and maintained, and what improvements are being made and why. Governments operate drinking water supply systems, make improvements to those systems, and construct new systems. The Yukon government regulates the provision of drinking water by large and trucked public systems. To advance this priority area, the government will focus on better protection of drinking water sources as well as enhancing its education and outreach activities.





PROMOTE THE SUSTAINABLE USE OF WATER

Efficient water use helps 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, providers and taxpayers. Increased use of best management practices will help reduce impacts to the environment and ensure adequate water is available for businesses, communities and other users. The actions government will undertake to advance this priority area will focus on providing more guidance and advice to licensed and non-licensed water users.



IMPROVE THE SHARING OF INFORMATION ABOUT YUKON'S WATER

Information regarding surface and groundwater supply and quality is essential when planning water use activities and assessing their impact on the ecosystem. Improved communication about available water information and data will enhance the ability of citizens, governments and partners to make decisions informed by shared knowledge. To advance this priority area, the government will focus on improving communication, education and outreach about the state of Yukon's water. It will also enhance the web-based tools now in place for sharing information and data with the public.

Action Plan

This section highlights work currently underway as well as new or enhanced action items that will advance the Yukon government's approach to making progress on the priorities and goals of the *Yukon Water Strategy*.



Aishihik Lake wetlands



Better Understand and Manage Yukon's Groundwater

Several Yukon government departments have responsibilities linked to groundwater. Some examples include building and operating public drinking water wells in Yukon communities (Community Services), regulation of public drinking water systems (Health and Social Services) and the operation of a long-term trend monitoring network (Environment). However, in order to better understand and manage Yukon's groundwater, improved coordination and enhancement of such programs is needed.

The majority of Yukoners rely on groundwater for their domestic needs; only Carcross and Marsh Lake's Army Beach Water Treatment Plant supply surface water to users. Outside of communities, many rural residents also have their own groundwater wells.

Work already underway...

Includes periodic updates to the Yukon Water Well Registry, a publically accessible groundwater database containing construction details and groundwater level information from water wells in Yukon. Some information is provided voluntarily and some is collected through the Rural Domestic Water Well Program. Although there is no legislation in place pertaining specifically to water well drilling, the government undertakes groundwater protection through the *Waters Act* as well as encourages well drillers to follow the Canadian Ground Water Association's *Guidelines for Water Well Construction*. New wells have been added to the Yukon-Wide Long Term Groundwater Monitoring Network. Baseline studies are undertaken on a project-specific basis in areas under pressure, including from climate change and anticipated development.

Work to be undertaken...

Enhance and formalize the existing groundwater program in Yukon.	• Develop and implement an online process for the voluntary submission of water well drilling logs on YukonWater.ca in the interim while a regulatory framework to make submissions mandatory is developed.
	 Acquire and integrate hydrogeological expertise into existing programs.
	 Enhance the centralized groundwater database and make it available through YukonWater.ca.
	 Engage water managers from other governments and agencies to identify knowledge gaps and prioritize groundwater issues.
	• Expand the existing groundwater network by establishing new wells, collecting additional baseline data and mapping groundwater sources.
Develop a regulatory framework to manage groundwater.	 Collaborate with water partners and stakeholders to enhance protection measures for groundwater.
	• Develop a water well drilling program to make well log and well data/information submissions mandatory and to standardize well drilling practices and construction standards.

"Strategically locating groundwater monitoring wells should be considered. We simply need more in the Yukon to understand groundwater. Workshops, toolkits and databases alone will not address this need."

- YUKON FIRST NATION RESPONDENTS

"Ensuring a supply of safe drinking water is a top priority. To the extent that the population in Yukon grows, there will be increasing demand on water supplies."

- SURVEY RESPONDENT



Village of Mayo water treatment plant



Maintain/Improve Access to Safe Drinking Water

Yukon's *Drinking Water Regulation* requires large public drinking water systems to undertake routine sampling and testing for both chemical parameters and bacteria. Three departments have a major role in ensuring access to safe drinking water. The Department of Health and Social Services, through its Environmental Health Services section, operates an accredited water quality laboratory for bacteriological testing. Drinking water operators and private well owners can use this service at no cost. In addition, Environmental Health Services helps clients with their testing and interpretation of results. The Department of Community Services operates public drinking water systems in unincorporated communities and monitors the results of sampling and analysis. The Department of Highways and Public Works tracks bacteriological water quality information for all Yukon government-owned buildings not serviced by a public drinking water system.

The *Drinking Water Regulation* under the *Public Health and Safety Act* was passed in 2007. This regulation provides the foundation for the Department of Health and Social Services' regulatory program for public drinking water systems in Yukon. Ongoing program development and updates to the *Drinking Water Regulation* are key to both maintaining and improving access to safe drinking water.

Work already underway...

Significant investments in community drinking water systems have been made in order to meet the standards outlined in the *Drinking Water Regulation*. Recent upgrades include the drilling of new source wells and construction of drinking water fill stations. The Energy Solutions Centre of Energy, Mines and Resources encourages domestic users and contractors to conserve water through its Good Energy Rebate Program for water and energy efficient products.

Work to be undertaken...

Foster stronger working relationships with other governments and agencies involved with drinking water sources in Yukon.	 Promote source water protection planning. Work toward greater consistency in identifying community needs in the development of water systems. Collect and distribute map-based information about the location of community water wells to land use planners and regulators in order to highlight the value of these water sources. Undertake intergovernmental work to collect information on community water-system costs and sustainability; and organize education initiatives involving communities and stakeholders.
Enhance opportunities for education, training and access to information.	 Increase public awareness about water use, costs and conservation opportunities. Develop and deliver educational programs about the importance of drinking water and the connected topic of source water protection. Support the development of courses and other training opportunities for drinking water professionals, such as drinking water system operators.
Evaluate drinking water use and efficiency.	 Gather baseline data to assess drinking water use and the real cost of providing water in Yukon. Assess the feasibility, costs and benefits of metering water use.
Ensure regulatory programs meet public need for safe drinking water.	• Assess the effectiveness of the <i>Drinking Water Regulation</i> and associated program and adjust as required to ensure Yukoners have access to safe drinking water.

The Good Energy Rebate Program encourages responsible energy use and also helps Yukoners reduce their water consumption. Low-flush toilets and water-conserving Energy Star clothes washers and dishwashers are all eligible for rebates. The water-saving appliances that have been installed to date through the program will reduce water use in Yukon households by about 280 million litres over the appliances' lifespan. This is enough water to fill an Olympic-sized swimming pool more than 200 times!

For more information, visit www.energy.gov.yk.ca/good_energy.html.

"Headwaters are where water is born. Elders have knowledge regarding headwaters; they are sacred land and should not be contaminated or used recklessly."

- ROSS RIVER COMMUNITY MEETING PARTICIPANT



Placer mine sluice box in the Klondike region



Promote the Sustainable Use of Water

The Waters Act water licensing process provides for the conservation, development and utilization of waters in Yukon. Government water inspectors conduct proactive enforcement and compliance monitoring programs to help eliminate or reduce the risks associated with water use. Other Yukon legislation and regulation also have provisions for managing water when undertaking activities that impact water, such as the Oil and Gas Act, Placer Mining Act and Quartz Mining Act. Further, First Nation Final Agreements and the Yukon Environmental and Socio-economic Assessment Act also aim to ensure that water is used and managed sustainably in Yukon. In addition to this regulatory framework, government can promote the sustainable use of water by providing guidance and advice to water users in other ways.

Chapter 14 of Yukon First Nation Final Agreements relates to water management. The objective of this chapter is "to maintain the Water of the Yukon in a natural condition while providing for its sustainable use."

Work already underway...

Includes developing and sharing best management practices for works affecting water and for wetlands. The Yukon government has adopted the Canadian Wetlands Classification System to provide a practical and consistent framework for the characterization and description of wetlands. This system allows proponents to communicate clearly with assessors, identify values associated with the wetland in question and develop mitigation strategies as appropriate.

Work to be undertaken...

Provide further guidance and advice to water users.	 Promote the operational use of the Canadian Wetlands Classification System for Yukon government projects through environmental assessments and regulatory application reviews.
	 Engage with water users to ensure they understand the relevant legislation and regulation and, if applicable, licences and permits related to their activity.
	• Review, improve and expand the existing <i>Best Management</i> <i>Practices (BMPs) for Works Affecting Water in Yukon</i> , making sure to engage all users and use the best information available (science and technology as well as local and traditional knowledge).
	 Communicate and promote BMPs and guidelines and their application.
	 Use BMPs to help inform other water and land use practices/ processes.
	 Encourage the use of innovative technology to improve affordable, wise use of water.
	 Explore ways to better understand and receive reporting on fluctuations in use (i.e. daily use) by licensed water users.
	 Develop a webpage on YukonWater.ca that gives practical tips on the wise use of water.
	 Explore the development of tools and guidance that define, recognize and promote the importance of headwaters.

"Develop greater involvement of communities and schools in monitoring and use of water." - WHITEHORSE OPEN HOUSE PARTICIPANT



Screen shot of YukonWater.ca



Improve the Sharing of Information About Yukon's Water

With water management programs offered by many Yukon government departments, having information about these programs in a central place is important. Whether it's a student searching for facts and information to understand the water cycle, a government analyst seeking data about surface and ground water quantity for planning infrastructure projects, or a water licence proponent seeking data and information to minimize their impact to the environment, it is important that government finds ways to improve how water information in Yukon is shared.

YukonWater.ca provides a variety of information about water resources in Yukon and an online catalogue of water data collection sites in the territory. This online catalogue is the first centralized water database in Yukon.

For more information, visit YukonWater.ca

Work already underway...

Includes YukonWater.ca and Waterline web-based tools. Several departments have also initiated issue-specific campaigns to communicate and share water news and information. An example of this is the Canada Water Week campaign which features education and outreach activities such as films and public presentations.

Work to be undertaken...

Improve communication, education and outreach regarding Yukon's water.	 Enhance communication with other governments. Increase education and outreach activities on water-related data and information, partnering with other organizations where appropriate. Enhance reporting on Yukon's water in the government's annual <i>Yukon State of Environment Report</i>.
Enhance tools for sharing water information with the public.	 Continue to improve both YukonWater.ca and the Waterline web tools based on the results of periodic user satisfaction surveys. Increase the number of water monitoring networks included in the water data catalogue on YukonWater.ca. Make water data available online. Develop a plan on how to track water allocation for licensed use
	 Add select geospatial information to Waterline including locations of water use and water quality data sampling sites. Enhance capacity to store, analyze and manipulate data to promote improved sharing of water data and information with water partners and the public.

The Yukon Water Board's Waterline is an online registry that houses all water use applications, licences, comments (interventions) and reports in a searchable format. The goal of Waterline is to increase transparency and encourage participation in the water licensing process by providing information to the public in an accessible format.

Visit Waterline at www.yukonwaterboard.ca/waterline.



- WHITEHORSE OPEN HOUSE PARTICIPANT



Repair to road washout at Canyon Creek near Rancheria on the Alaska Highway



Improve Water Management Programs

The Yukon government delivers a wide range of water management programs through seven departments. Programs range from drinking water regulation to baseline water quality monitoring to flood forecasting. Collaboration between Yukon government departments includes an interdepartmental committee, the Strategic Water Initiatives Group, which has been involved in the development of this water strategy and action plan. This strategy will enhance and formalize further collaboration within and beyond the Yukon government.

The Yukon River Watershed Management Working Group is called for in the Final Agreements of Carcross/Tagish First Nation, Ta'an Kwäch'än Council and the Kwanlin Dün First Nation. Its purpose is to make recommendations and coordinate efforts with others to maintain or improve the health of water and shorelines and protect/ enhance freshwater fish and salmon and their habitat.

Work already underway...

Includes recently adopting and administering the *Wastewater Systems Effluent Regulations* (under the federal *Fisheries Act*) through a harmonization agreement developed with Environment Canada. In addition, the Yukon government continues to work with neighbouring jurisdictions, including British Columbia, the Northwest Territories and Alaska, to manage transboundary waters.

Work to be undertaken...

Enhance cooperation, coordination and collaboration with other water managers.	 Host an annual or biennial Water Forum in Yukon to exchange information, collaboratively address water issues and promote continuous improvements. Communicate more with First Nation governments regarding water issues in their traditional territories. Enhance intergovernmental communication on specific water issues such as flood risk and climate change.
Strengthen our water management capabilities.	• Examine the effectiveness of the <i>Waters Act</i> and <i>Waters Regulation</i> and licences issued under this legislation.
	 Strengthen the Yukon government's existing policy prohibiting the bulk removal of water from Yukon watersheds.
	• Provide adequate climate change and cumulative effects information to the Yukon Environmental and Socio-economic Assessment Board and the Yukon Water Board to inform their recommendations about water use mitigations and decisions.
	 Monitor cumulative impacts on water quality, quantity and rate of flow at the watershed scale.
	 Undertake flood risk mapping to increase community understanding and knowledge of which areas are vulnerable to flooding.
	 Enhance flood forecasting capabilities by updating computer- based models.
	• Develop a policy for managing Yukon wetlands, including support for wetland inventory and monitoring, in partnership with other governments, stakeholders and the public.

The Yukon government enhanced the water monitoring program in North Yukon to improve understanding of water distribution, movement and quality. It established three new hydrometric monitoring stations in the summer of 2013, one of which was installed in partnership with Environment Canada. Water quality baseline sampling, conducted in partnership with Na-Cho Nyäk Dun, began in 2012 in the Peel watershed. A collection of 16 water quality samples from the Upper Porcupine watershed in the Eagle Plains basin was collected in 2013. In March 2014, a groundwater monitoring station was established.

"Conserving a resource that remains intact is much more cost effective overall than it is to attempt to replace ecosystem functions and values once they have been lost."

- NON-GOVERNMENTAL ORGANIZATION RESPONDENT



Ice break-up on the Big Campbell River, Robert Campbell Highway



Plan for Water Needs Now and in the Future

The Yukon government has water monitoring networks to measure surface water, groundwater, precipitation, permafrost, snow and glaciers. This data is critical for many government services such as protecting communities from flood risk, calculating the appropriate size for culverts and determining the optimal design for roads, bridges and drainage systems. Information is needed to understand changes to Yukon's waters as a result of impacts from a warming climate, population growth and future development. For example, changes in water supply can have a dramatic effect on hydroelectric power generation, and existing hydrological records may no longer be sufficient for transportation planning and infrastructure development. It will be important to expand water monitoring networks and to enhance the use of the information to ensure good decision making over time.

The Wolf Creek Research Basin was established in 1993 to carry out water-related studies. It has evolved into a multidisciplinary project including studies of climate and climate change, permafrost, vegetation, fisheries and wildlife. Findings on meteorological and hydrological processes in cold regions have been transferred to other Yukon regions as well as other cold region jurisdictions for use in project design, assessment and operation.

Work already underway...

Includes the continued utilization of the Wolf Creek Research Basin for long-term multidisciplinary research including water and climate change studies. New hydrometric sites and water quality monitoring in North Yukon are recent additions to Yukon's water monitoring network. In addition, the Yukon government participates on national and regional bodies such as the Canadian Council of Ministers of the Environment, the Council of the Federation's Water Stewardship Council and the Mackenzie River Basin Board to address water issues of mutual interest. The collective work generated by these bodies will help the Yukon government plan for today's water needs as well as those we anticipate in the future.

Work to be undertaken...

Ensure adequate water monitoring across the territory.	 Formalize an approach for community water monitoring. Expand existing water monitoring networks to ensure that enough information is available for good decision-making. Increase the number of real-time water data transmitting stations.
Enhance the use of best available science, traditional and local knowledge in decision-making.	 Collaborate with scientific, traditional and local knowledge holders on an effective approach to informed water decisions. Incorporate adaptive management approaches, traditional knowledge and local knowledge into government's water policies and plans. Invest in technology and innovation (e.g. forecasting models, remote sensing, and aerial photography). Communicate the purpose and benefits of water valuation and explore ways to integrate this tool into decision-making. Prepare to build capacity for dealing with community development and new resource activities as they relate to increased water use and deposits of waste to water. Identify partnership and funding opportunities to help further water-related research. Undertake research to better understand and adapt to climate change impacts on Yukon's hydrological regime.

Damage to the Alaska Highway—the single primary northern and southern traffic route—has significant consequences for the shipment of food and goods into the territory as well as for tourists and residents. A washout in 2012 near Rancheria backed up traffic for one week and required a Hercules transport plane to ship food to Whitehorse and helicopters to move telecommunication workers to the scene. Indications suggest that the occurrence of water-related damage to our highways is increasing.



Implementation and Evaluation

Implementation of the Yukon Water Strategy and Action Plan will involve seven departments of the Yukon government. These departments will work together, and where appropriate with partners including other governments, non-government organizations, the business and the academic communities to fulfill the actions in this strategy.

To ensure that the strategy remains relevant over time, it is important to evaluate progress and the effectiveness of actions. To do this the government will:

- Provide updates at regular meetings of the Yukon government's Strategic Water Initiatives Group, on YukonWater.ca and at water forums.
- Evaluate and report on progress of the Yukon Water Strategy and Action Plan after five years.



Glossary

Adaptive Management: A scientific approach to resource management that rigorously combines management, monitoring and research to effectively manage complex ecosystems in the face of uncertainty.

Aquifer: An underground layer holding water that can yield a usable quantity of water.

Baseline: Comprehensive understanding of the natural seasonal and annual variability of environmental (physical, chemical and biological) parameters within a specific area. Although an absolute minimum of three years of data is required to form baseline, ten years is often the desired timescale.

Best Management Practices: Any kind of existing or new practices that helps to reduce the time, intensity or duration of the footprint or effect of an activity. BMPs are recommended practices when conducting an activity, but are not regulatory standards which are measured or evaluated for compliance purposes.

Climate: The average weather for a particular region and time period. Water is linked inextricably with climate.

Climate Change: A change in the average weather that a given region experiences. Climate change on a global scale includes changes to temperature, shifts in wind patterns, and changes to precipitation. Climate change, such as the warming trend recorded over the past decades, shows up in our water resources.

Community Water Monitoring: Driven by local information needs, community monitoring increases awareness of the amount, availability and quality of water in an area. It encourages people within communities to be involved with water stewardship and often amalgamates traditional knowledge and local observations with research or monitoring activities.

Cumulative Effects: Changes to environmental or socio-economic components caused by an activity (related to a project being assessed) in combination with other past, present, and future activities.

Ecosystem Services: A catch-all term for the things that water does in its natural setting. Generally, ecosystem services are broken into four categories:

- 1. Provisioning Services: Drinking water, food, timber.
- **2. Regulating Services:** Climatic control, waste assimilation, flood protection, water purification, fire regulation.

- **3. Cultural Services:** Recreation, spiritual nourishment.
- **4. Supporting Services:** Photosynthesis, soil formation, nutrient cycling, animal habitat.

Glaciers: Perennial ice mass that has accumulated on land and has formed through compaction and recrystallization of snow.

Groundwater: Water that is located in the spaces between soil particles and in the fractures of rock formations underground. Water enters the ground through infiltration, and flows underground either to be stored in aquifers or to return to the surface through springs, wells or seepage into creeks and other water bodies.

Hydrology: Study of the distribution, mass and movement of water in the various components of the water cycle.

Intrinsic Value: The value that something has "in and of itself", independently of the values placed on it.

Life Processes: Essential biological functions that living organisms must perform to sustain life. Water is one of the essential elements required to execute these functions.

Meteorology: Study of the atmosphere and atmospheric processes.

Networks: Describes a data collection program that gathers information about Yukon's water resources.

Permafrost: Permafrost is ground remaining at or below 0°C continuously for at least two years.

Potable Water: Water provided by a domestic water system that is safe to drink and fit for domestic purposes without further treatment and which meets the *Guidelines for Canadian Drinking Water Quality*.

Source Water Protection: In the municipal sector, there is significant concern about protecting ground-water from contamination. Source water protection of drinking water could include:

- A systematic approach to monitoring and tracking aquifer quality.
- Limiting the potential for contamination of drinking water sources.
- Public education about the potential risks of well contamination.
- Protection for surface water bodies such as streams, creeks and even lakes that are either direct



Water discharge measurement on Dalglish Creek in the Peel River watershed

sources of drinking water or feed into sources for drinking water.

Surface Water: Water from a source which is open to the atmosphere and includes streams, lakes, rivers, creeks, springs, and any other type of well that is under the influence of surface sources.

Traditional Economy: The traditional economy of Yukon First Nations people is recognized in Chapter 12 of the Umbrella Final Agreement. The term is defined in the North Yukon and Peel Watershed Regional Land Use Plans; however, definitions may differ from region to region.

Treatment: Any physical, biological or chemical process which makes water potable.

Tributary: Freshwater stream or river that flows into a larger stream, river or lake. For example, the Klondike River is a tributary of the Yukon River.

Water Data: Factual quantitative or qualitative information used to describe a natural or human-altered aspect of the water cycle.

Water Information: A broad term that encompasses the variety of ways that knowledge can be gained on water and includes data, brochures, websites fact sheets, peer reviewed papers etc. YukonWater.ca is an online resource that shares information regarding water resources in Yukon.

Water Monitoring: Collecting scientific data and observations to characterize water quantity and quality throughout all of the phases of the natural and human-altered water cycle. Some examples of the various ways that water can be monitored include measuring water levels, relative humidity in the air, snowpack depth and lake water metal concentrations.

Water Quality: Physical, chemical and biological characteristics of water.

Water Valuation: Water valuation is the process of expressing a value to the range of goods and services that the resource provides to support its allocation and sharing. The 'value' of the water resource may be economic, cultural, spiritual, and traditional in addition to its intrinsic value.

Wetlands: Land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, water dependent vegetation and other biological activities which are facilitated by a wet environment. The five wetland classes, as defined by the Canadian Wetland Classification System, are bog, fen, swamp, marsh and shallow water. Areas do not need to be "wet" all year to be considered "wetlands."

Appendix I:

Yukon Government Roles and Responsibilities

In 2003, the federal government transferred ("devolved") most of its responsibilities for water, land, forestry and mineral resources to the Yukon government. Water management does not rest with the Yukon government alone. It remains a collaborative effort among territorial, federal, First Nation, regional and municipal governments, stakeholders and the public. Within the Yukon government, there are seven departments with responsibilities for Yukon waters:

Community Services	Community Services administers federal infrastructure funding such as the Building Canada Fund and the GasTax Fund. The department provides project management services to oversee construction of infrastructure throughout the territory and also manages the operation and maintenance of infrastructure in unincorporated communities. This includes, among other things, water and waste water treatment facilities. The department also provides advice to municipalities on governance and operational matters related to local services and related infrastructure.
Economic Development	Economic Development works with other departments to ensure that water remains useable and accessible to Yukon's private sector, from eco-tourism operators to placer miners.
Energy, Mines and Resources	Energy, Mines and Resources undertakes compliance monitoring and enforcement of water licences (for mining projects) and other authorizations with water-related terms and conditions for regulated resource development projects. It conducts research and analysis of water quality, glaciers, permafrost, and surficial materials that contain groundwater. The department also has legislated responsibilities for water management in relation to land disposition and various land and resource uses, including the issuance of water lot leases, quarrying, dredging, forestry (water quality, fish habitat and soil hydrological functions), agriculture (irrigation and wells), mining (both placer and quartz) and oil and gas (water use, disposal and protection of quality). The department is also responsible for water management at abandoned Type II mines (monitoring water treatment and discharge).







Water Quality sampling on Chance Creek in the Porcupine River watershed

Environment	Environment develops water-related strategic plans and policies; monitors, analyzes, and reports on some aspects of water quality (e.g., aquatic health) and quantity (e.g., flood forecasting); and provides expert technical advice in these areas. It plays a key role in the administration and enforcement of the <i>Waters Act</i> , including monitoring compliance of water licences. Other responsibilities include the review of project applications for water use and the deposit of waste, monitoring of licensed groundwater sampling for solid waste disposal sites, remediation of contaminated groundwater as part of Yukon government's Environmental Liability and Remediation program, development of adaptation responses as climate change impacts Yukon's hydrological regime, park planning and operations, and freshwater fish and fish habitat management.	
Executive Council Office	Executive Council Office is responsible for administering the water licensing process and supporting the Yukon Water Board.	
Health and Social Services	Health and Social Services regulates public drinking water systems through the <i>Drinking Water Regulation</i> under the <i>Public Health and Safety Act</i> ; provides information and advice to clients; and performs inspection and enforcement activities in a variety of program areas, including public drinking water, sewage disposal, food safety and the control of infectious disease.	
Highways and Public Works	Highways and Public Works ensures safety and comfort in Yukon government buildings and, as such, provides potable water and sewage disposal. The department also researches permafrost to understand how it is impacted by transport infrastructure and development.	



Appendix II: Other Agencies' Roles and Responsibilities

Federal Government	In Yukon, the federal government has jurisdictional responsibility for water in certain areas such as navigation fisheries and boundary waters, and shares responsibilities in other areas such as agriculture and health. It is also responsible for managing water on federal lands (e.g. National Parks), First Nation reserves and in federal facilities.
Yukon First Nations	Yukon First Nations have rights in relation to water that are set out in Final Agreements. These include use and protection of water on Settlement Lands, and use of water in Yukon for trapping, non-commercial harvesting and traditional heritage, cultural, and spiritual purposes Eleven Yukon First Nations are self-governing. Each of these First Nations can make and enact laws in respect of its lands and citizens, including resources management taxation, and municipal planning. First Nation governments play a large and growing role in Yukon. The Council of Yukon First Nations nominates one-third of the members of the Yukon Water Board Many First Nation governments own and operate their own drinking water systems. Transboundary First Nations have rights in relation to water as set out in Yukon Transboundary Agreements (currently the Tetlit Gwich'in is the only one). The Yukon River Inter-Tribal Watershed Council (YRITWC) an organization made up of representatives from the governments of more than 70 First Nations and Tribes in the Yukon River basin also plays a significant role in protecting Yukon's water. The mission of the YRITWC is to assist in protecting and improving the water quality of the Yukon River and all its tributaries.





Champagne and Aishihik First Nations is developing its own water strategy. The strategy is intended to bring a culturally-based focus to the management and protection of water in its traditional territory. The development of partnerships is a key feature of the strategy.

For more information, please contact the Champagne and Aishihik First Nations or visit www.cafn.ca.

In 2013, the member First Nations and Tribes of the YRITWC approved a Yukon River Watershed Plan. It combines modern science and policy with the traditional knowledge of the Indigenous governments and people of the Yukon River. The plan also includes specific, objectives and standards to protect the quality, quantity and flow of the water in the river.

For more information, please contact the Yukon River Inter-Tribal Watershed Council or visit www.yritwc.org.

Boards and Councils

In Yukon, there are a number of Boards and Councils, most created under the Umbrella Final Agreement, which have an interest in, or role with respect to Yukon waters:

- The Yukon Water Board issues water rights and regulates water use and waste disposal to water through its licensing process. Licences are required for various undertakings such as placer and quartz mining, municipal use, power, agricultural, industrial, recreational, conservation and miscellaneous undertakings. It is identified as a Board in Chapter 2 and has specific responsibilities under Chapter 14 of the Umbrella Final Agreement.
- The Yukon Environmental and Socio-economic Assessment Board is responsible for development assessment responsibilities under the Yukon Environmental and Socio-economic Assessment Act.
- Renewable Resources Councils and the Fish and Wildlife Management Board have responsibilities identified under Chapter 16 of the Umbrella Final Agreement and First Nation Final Agreements.
- The Yukon Land Use Planning Council and Regional Planning Commissions have responsibilities identified under Chapter 11 of the Umbrella Final Agreement and First Nation Final Agreements.



The Yukon Water Board is an independent administrative tribunal established under the *Waters Act*. According to the Act, the Board is to provide for the conservation, development, and utilization of waters in a manner that will provide the optimum benefit from them for all Canadians and for the residents of Yukon in particular.

For more information, please contact the Yukon Water Board or visit www.yukonwaterboard.ca.



Dawson City and the confluence of the Klondike and Yukon rivers

Communities	Incorporated Yukon communities (municipalities) build and manage drinking water and waste management facilities. Some unincorporated Yukon communities are represented by Local Advisory Councils who give advice on local area needs to the Yukon government.	
Other Jurisdictions	The Yukon government participates in a number of regional and national water initiatives:	
	• The Mackenzie River Basin Board involves six governments (Canada, Saskatchewan, Alberta, British Columbia, Yukon, and the Northwest Territories) working together to manage the water resources of the Mackenzie River Basin, including through the negotiation of bilateral water management agreements and the development of basin-wide aquatic ecosystem reporting.	
	 The Canadian Council of Ministers of the Environment (CCME) helps member jurisdictions meet their mandate of protecting Canada's environment. Water is one of CCME's key areas, and the council has enabled jurisdictions to enhance coordination on water issues such as wastewater effluent and water quality guidelines, as well as on water policy issues such as water valuation, water monitoring and climate change, and groundwater. 	
	• The Council of the Federation Water Stewardship Council is guided by the Council of the Federation Water Charter, which recognizes the collective obligation of Canadians and their governments to be responsible water stewards. Premiers endorsed the Water Charter in 2010.	
	• The Federal-Provincial-Territorial Committee on Drinking Water develops the Guidelines for Canadian Drinking Water Quality which are used as a standard for safe drinking water in Yukon. The Guidelines set maximum concentrations that are protective of health for many contaminants that can be found in drinking water.	
Non-Government Organizations	A number of non-government organizations advocate for the protection and conservation of water in Yukon, such as the Yukon Conservation Society, the BC Water and Waste Association (Yukon Chapter), the Friends of McIntyre Creek, the Yukon Chapter of the Canadian Parks and Wilderness Society, Ducks Unlimited Canada and the Utilities Consumers' Group.	

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The overall objective of the Yukon Research Centre's Industrial Research Chair is to develop research leadership to address northern specific challenges and opportunities within the mining industry. Two streams of applied research will be investigated by the Chair: mine influenced water management and treatment and terrestrial reclamation-practices. The first stream will focus on discharge water treatment (bioremediation project) and processing effluents treatment (build-up project) and the second on soils reclamation and land re-vegetation in northern conditions. This project is funded by both the Natural Resources and Engineering Research Council of Canada and the Yukon Mine Research Consortium.

For more information, contact the Yukon Research Centre or visit www.yukoncollege.yk.ca/research.

Academic and Research Sector	Water researchers and consultants from universities, colleges, businesses and government agencies provide insight, collaboration and dialogue regarding a number of water issues in Yukon.	50
	The Yukon Research Centre (YRC) at Yukon College is committed to developing collaborative research, innovation and outreach that meet the needs of northerners. Current water-related research at YRC involves hydro security and permafrost in a changing climate, wetland ecological assessments and mine water bioremediation.	addination of the second s
Corporate Users	Business, industry and other water users have a role to play in ensuring the best use and protection of our water. From local water-well drillers to eco-tourism outfits to large mining companies, water is fundamental to Yukon's economy. Without access to a secure and good-quality supply of water, people will not choose to live, visit or do business in Yukon.	
The Public	Yukon citizens and visitors also have a responsibility to use water sustainably and to protect our water resources. Conserving and caring for water in our homes and on the land helps to ensure the health of our shared waters now and into the future.	

Appendix III: Water Information for You

WEBSITES

Below are online sources of Yukon government departments and programs on water:

General: Information regarding Yukon's water, management regime, and programs related to water quality, hydrology, inspections, and climate change. YukonWater.ca

www.env.gov.yk.ca/monitoringenvironment/aboutwaterresources.php

Acts and Regulations: An index of acts and regulations including the *Waters Act* and accompanying *Waters Regulation*; the *Public Health* and *Safety Act* and accompanying *Drinking Water Regulation* and *Sewage Disposal Systems Regulation*; and, the *Government Organization Act.* www.gov.yk.ca/legislation

Waterline is a public register that provides that provides access to water licenses in Yukon.

www.yukonwaterboard.ca/WATERLINE

Climate Change: A report and a summary version of the vulnerabilities to Yukon's water resources as a result of a warming climate. www.gov.yk.ca/climatechange

Drinking Water: Information regarding water wells, water testing and permitting. www.community.gov.yk.ca/property/ruralwaterwell.html www.hss.gov.yk.ca/environmental_drinkingwater.php

Emergency Planning and Preparedness: Information regarding preparedness and planning for flooding, toxic spills, extreme weather and other emergencies. www.community.gov.yk.ca/emo

Enforcement and Compliance: Information regarding the enforcement and compliance of water licences. www.emr.gov.yk.ca/csi www.env.gov.yk.ca/monitoringenvironment/waterinspections.php

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Fishing: Information regarding fish, fishing regulations and licensing. www.env.gov.yk.ca/fishing

Infrastructure: Information regarding Yukon's water supply, waste management, recreational structures, transportation systems and more. www.infrastructure.gov.yk.ca

Licensing: Information regarding water licensing. www.yukonwaterboard.ca

Monitoring: Information regarding environmental monitoring programs related to climate change, water resources, contaminated sites, spills, site assessment and remediation, and environmental assessment. www.env.gov.yk.ca/monitoringenvironment

Yukon Water is the first centralized database of water monitoring sites in Yukon. YukonWater.ca

Municipal Services: Information regarding the operation of and maintenance of community infrastructure and service delivery programs for clean water, sewage, flood and erosion control, recycling, and solid waste systems in unincorporated Yukon communities. www.community.gov.yk.ca/cd/operations.html

Natural Resources: Information regarding resource sectors such as agriculture, mining, oil and gas, and forestry. www.emr.gov.yk.ca

Parks: Information regarding territorial parks and protected areas including the Canadian Heritage Rivers. www.env.gov.yk.ca/parks

Tourism: Information regarding water-related activities, travel and attractions. www.travelyukon.com

FACT SHEETS

During the public review of the *Draft Yukon Water Strategy*, it was suggested that more information be made available to help in the public awareness and understanding of water management in Yukon. While some of this information is provided within the appendices of the *Yukon Water Strategy and Action Plan*, the remainder is provided in a series of fact sheets which are available at YukonWater.ca.

- 1. Yukon Watersheds Map and Descriptions
- 2. History of Water Management in Yukon
- 3. Legal Framework for Water Management in Yukon
- 4. Guidelines, Policies, Agreements and Information Sheets Pertaining to Water Management in Yukon
- 5. Water Use in Yukon
- 6. Water Licensing and Permitting in Yukon
- 7. Overview of Water Monitoring in Yukon



Appendix IV:

Engagement Process and Key Dates

On March 20th, 2013, the Government of Yukon announced a public review of its *Draft Yukon Water Strategy* in order to achieve a comprehensive, thoughtful and innovative approach to water management that could be responsive to the values and concerns of Yukoners. The public review period was scheduled to end on May 31st but was subsequently extended to June 30th in response to requests for more time. Late comments and meetings were also accommodated by the review team.



Comments were sought on the draft vision, principles and goals as well as six priorities and the short- and long-term actions for achieving them. The review was promoted through a news release, direct communication with key water stakeholders, targeted mail-outs, advertising in newspapers and on the YukonWater websites, as well as frequent updates on the *Yukon Water Strategy* Facebook page and Department of Environment Twitter feed.

Thank you to all individuals, organizations, and governments who participated in the development of this water strategy. Your contributions are sincerely appreciated.



