

AGLG

PERSPECTIVES SERIES
DECEMBER 2018



AUDITOR GENERAL FOR
LOCAL GOVERNMENT

ACCESSIBILITY • INDEPENDENCE • TRANSPARENCY • PERFORMANCE

CONSIDERATIONS FOR LOCAL
GOVERNMENT ELECTED OFFICIALS

PRIMER ON DRINKING WATER MANAGEMENT IN BRITISH COLUMBIA

RELATING TO AGLG AUDIT TOPIC:
Local Government's Role in Ensuring Clean Drinking Water

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This booklet offers suggestions to all local governments interested in drinking water management practices. We recognize that every local government faces unique circumstances, including their size, community characteristics and the maturity and capacity of each organization. As a result, how each local government chooses to implement these suggestions will vary.



THIS BOOKLET

This Perspectives booklet is the second booklet in a four-part series. The first booklet (published in April 2018) focused on Emergency Management (including drinking water). This second booklet has been written mainly for elected officials to give a high level overview of:

- The importance of drinking water management
- Why an integrated and proactive approach to drinking water management is necessary
- Roles and responsibilities of elected officials and local government
- Sustainable financing of drinking water services

We hope this booklet will help elected officials determine how resilient its local government is for providing drinking water. It explores drinking water at a local government level, an audit topic the AGLG recently explored.

The two additional forthcoming booklets will provide guidance for local government staff on sustainable financing and integrated drinking water management. These more detailed booklets that focus on operational aspects will be aimed at senior management and staff within local government.

THE AGLG PERSPECTIVES SERIES

The office of the Auditor General for Local Government (AGLG) was created to carry out performance audits of local government operations in British Columbia (B.C.) and provide local governments with useful information and advice. The AGLG's goal is to help local governments fulfil their responsibilities to be accountable to their communities for how well they take care of public assets and achieve value for money in their operations.

The AGLG Perspectives Series booklets are designed to help improve local government performance. These booklets complement the AGLG's performance audit reports by providing local governments across the province with tools and more detailed information relating to the topics we examine.

Some AGLG Perspectives booklets are written mainly for elected officials, while others are directed more toward local government staff. Booklets are also helpful to others who take an interest in local government in British Columbia.

HOW THE AGLG'S AUDIT WORK CONTRIBUTED TO THIS BOOKLET

The AGLG recently conducted audits on local government drinking water management. From our audit findings and related research, we learned that local governments often face the following challenges:

- Gaps in systemic and proactive processes to providing clean safe drinking water (including risk assessment and management, and comprehensive maintenance schedules)
- Short term planning precluding development of a long-term vision
- Complexities of decision-making in a multi-jurisdictional /multi-scale environment
- Limited knowledge of, and relationships with, neighbouring First Nations
- Incomplete source water protection planning and mitigation
- Limited stakeholder and community engagement and participation
- Lack of integration/collaboration across local government departments
- Ad-hoc conservation and demand management strategies and tools
- Gaps in asset management planning and implementation
- Lack of full cost recovery accounting and barriers to full cost pricing
- Limited performance measurement and informal approaches to continuous improvement
- Lack of business continuity planning and areas for improvement in emergency management

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SPEAKING WATER: IMPROVING WATER LITERACY

INTRODUCTION



WHY SHOULD LOCAL GOVERNMENTS BE CONCERNED ABOUT DRINKING WATER?

Access to safe, reliable drinking water is essential to the well-being of every British Columbian. Many local governments across B.C. are responsible for providing drinking water to their community.

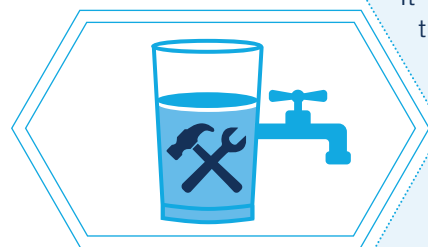
Sustainable water management is critical to human health, food and energy production, wildlife, habitats and economic prosperity. How water is managed is gaining increasing attention and some conventional approaches to water management—underpricing, over-use, inefficient use, and wasting water—are costly and unsustainable.

Local governments face a broad range of challenges including ageing infrastructure, evolving workforces, changing populations, groundwater and surface water quality, invasive species (e.g. Zebra mussels), over-extraction of water, flooding, water shortages, and the effects of climate change.

In addition, many local governments are grappling with underinvestment in water infrastructure, compounded by a backlog of maintenance and capital improvement projects, rising systems costs, urbanization, limited resources (finances or staff), changing technology, changing regulations (requiring system upgrades) and a history of underpricing and/or inadequate funding.

Even though discussion of climate change often focuses on greenhouse gas (GHG) emissions, we experience climate change primarily through water. For example, intense rainfall, floods, mudslides, storms and related ocean storm surges, droughts and waterborne diseases. In fact, 90 per cent of all natural disasters are water-related¹

DRINKING WATER SYSTEMS



It is estimated that more than \$60 billion* is needed to repair or replace aging drinking water systems in Canada.

*Source: Federation of Canadian Municipalities, *Canadian Infrastructure Report 2016* pg 12

¹ Source: UNESCO, *The United Nations World Water Development Report, 2015*



WHAT IS INVOLVED IN PROVIDING DRINKING WATER SERVICES?

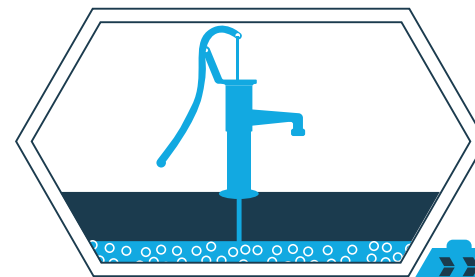
Ensuring successful delivery and management of community water supplies requires sourcing, treating, distributing, planning, engineering, monitoring and managing infrastructure systems. Most local governments will have a wide range of water-related tasks.

Best practices for water systems include: managing and protecting the water source (groundwater or surface water); economically treating the water; efficiently distributing the water; and, managing the overall water system to ensure long-term planning, conservation and environmental flows, and financial security. Water demand management can reduce peak flows and lessen the need for water infrastructure to be built to a higher capacity.

In local governments, water management is sometimes not addressed in a coordinated manner, with operations taking place independently from one another. For example, even though land use activities have a direct impact on the quantity and quality of water, land-use planning and water management are typically separated in local government organizations.

Uncoordinated water management can result in inefficient use of resources, can degrade waterways, often involves large and expensive infrastructure solutions and focuses on problem solving rather than a proactive approach.

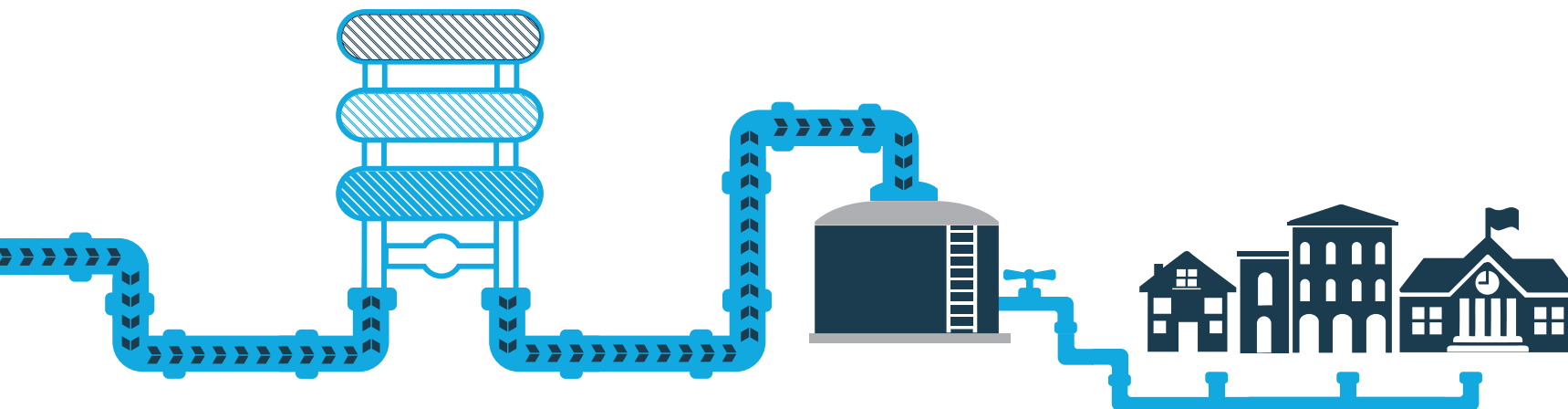
Monitoring and managing groundwater: is particularly challenging because aquifers are unseen, not fully mapped, and can be vast. They can also have unknown recharge rates, finite production rates, and sources of groundwater contamination can be difficult to identify.



Source water: Groundwater (wells and aquifers), surface water (open reservoirs, lakes, springs, rivers and streams) or a combination of the two.



A water (or waterworks) system is a system of water supply, including its watershed, source, treatment, storage and distribution facilities, where drinking water is provided for domestic and other purposes².



Treatment: A facility that includes treatment using physical, chemical, or biological processes, including any method of primary disinfection, to produce potable water.

Distribution: The portion of a water system in which water is conveyed from the treatment plant or point of supply to the point of consumption or use. A local government's

distribution system may include storage tanks, pump stations (to move water uphill), transmission (large diameter trunk mains) and distribution pipe (smaller pipes) to carry treated drinking water to users.

²Source: BC Government Public Health Officers Report 2000 page 9 & 10



WHAT SHOULD ELECTED OFFICIALS KNOW ABOUT WATER QUALITY?

Two of the most important aspects of water quality are microbial water quality and chemical water quality.

MICROBIAL WATER QUALITY

The primary focus in providing drinking water is protecting public health and microbial pathogens pose the greatest and most immediate risk to drinking water safety. There are three types of pathogenic organisms capable of causing water-borne illness:

- Bacteria (such as E.coli, Salmonella, Campylobacter, Legionella, Shigella and Yersinia)
- Enteric viruses (such as noroviruses, rotaviruses and hepatitis A and E viruses)
- Protozoa (such as Giardia and Cryptosporidium)

The standard for determining microbial water quality is the assessment for E.coli. In B.C., the only mandated tests for water quality are measuring E.coli and total coliforms. Drinking water officers are mandated to apply and enforce the *Drinking Water Protection Act* and *Drinking Water Protection Regulation*. This includes issuing operating permits.

Outbreaks of water-borne disease can be caused by issues such as:

- Poor infrastructure maintenance and treatment practices
- Inadequate attention to the protection of wellheads from sanitary and other releases
- Improper land application and disposal of manure, sewage sludge or wastewater
- Leaking septic tanks, cesspools, sewers or landfills
- Failure of water treatment systems³
- Introduction of contaminants through cross connections or water main breaks
- Weather (such as heavy rainfall and spring runoff)
- Poor mining or forestry practices and lack of proper riparian buffers
- Water contamination from highway and road runoff, fuel spills, or foreshore development

THE GUIDELINES FOR CANADIAN DRINKING WATER QUALITY



The Guidelines for Canadian Drinking Water Quality (developed by the Federal-Provincial-Technical Committee on Drinking Water for Health Canada) are applied differently across Canada.*

B.C. is currently the only provincial or state level of government in North American that does not explicitly identify drinking water standards beyond bacterial indicators.**

In 2012, the Committee introduced new testing guidelines for Giardia, Cryptosporidium and enteric viruses. However, testing for these and other emerging contaminants is optional and not a legal requirement in B.C.***

*Source: www.ncbi.nlm.nih.gov/pubmed/24776725

**Source: www.bcwqa.org/resource/library/1321474054-Treatment%20of%20Surface%20Water.pdf; Section 2 page 4

***Source: www.bclaws.ca/civix/document/id/complete/statreg/200_2003#section2

³A proportion of the gastrointestinal infections may be attributable to water-born transmission (Isaac-Renton, J.I.R. & Peck, S & Kendal, P. 2003 *Healthy drinking water in British Columbia: a physicians' update*. BC Med J. 45.)

Due to a range of factors, some B.C. water supplies have not always been safe. Among all the Canadian provinces, B.C. has had the highest number of boil water advisories per capita and the highest rate of gastrointestinal infections⁴.

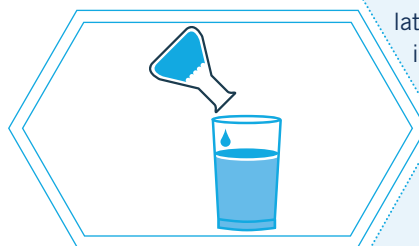
CHEMICAL WATER QUALITY

Although microbial pathogens pose the greatest risk to human health from drinking water, there are approximately 90 different chemical hazards listed in the Canadian Drinking Water Quality Guidelines that can also negatively affect drinking water quality⁴. Some of these are considered a concern only if they are present in amounts above guideline levels over a period of years, while others may be a concern in the short term if they are above guideline levels.

Sources of chemical contamination can occur through a variety of mechanisms. For example:

- Poor infrastructure maintenance and treatment practices
- Wildfires and firefighting activities
- Poor agricultural and land practices
- Naturally occurring metals (such as arsenic)
- Discharge of industrial waste, and contamination from roadways, construction, landfill sites and cemeteries
- Atmospheric deposits of chemical particles in dust, rain or snow

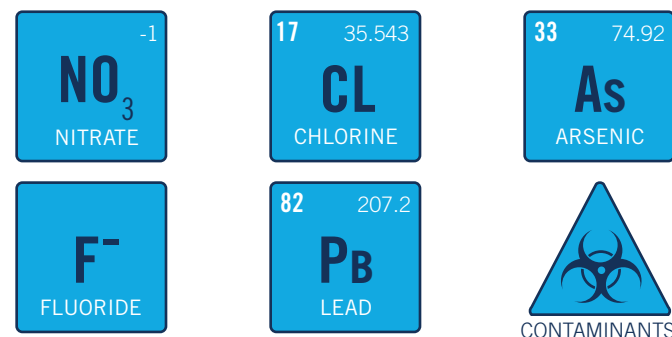
POTENTIALLY
HARMFUL CHEMICAL
CONTAMINANTS



- Cross connections within the distribution system or within homes or commercial properties

Analysis for chemical contaminants can be expensive, making comprehensive and meaningful monitoring programs difficult. Testing for chemical contaminants can also be difficult because the concentration may vary significantly with time or by location. Many times they are not evenly distributed in the system, and it is sometimes difficult to determine the source.

SOME OF THE MOST COMMON CHEMICALS IN DRINKING WATER:



†Refer to APPENDIX 1: Some of the Most Common Chemicals in Drinking water for more detailed information.

The number of potentially harmful chemical contaminants identified has expanded as methods to detect them have improved. In terms of risks to human health it is difficult to accurately identify the duration and magnitude of exposure in a given population and human health outcomes. For example, water is often not the only source of exposure to chemicals. Arsenic, fluoride and nitrate/nitrite are some of the most important examples of chemicals that have shown demonstrable health effects from consumption of contaminated drinking water.

Source: World Health Organization web content

⁴Source: Guidelines for Canadian Drinking Water Quality



WHAT SHOULD ELECTED OFFICIALS KNOW ABOUT WATER QUANTITY?

Demand for water directly impacts water supply. It is essential that local governments fully understand the impacts on water in their area now and into the future.

Fresh water is not limitless. Most local governments should be aware of the amount of water available to meet the various needs of its community and the surrounding areas. Across British Columbia there are wide variations in geography, population density, climate, precipitation and available water resources.

Some areas have an abundance of water while others experience desert-like conditions; some regions experience both. These regional imbalances are exacerbated by seasonal variations. During the summer months rainfall is usually at its lowest and consumption levels are typically at their highest.

Climate change predictions for B.C. suggest that we can expect:⁵

- Wetter winters (with more extreme precipitation events that can cause localized flooding and increased run-off)
- Warmer winters (with changes in snow packs)
- Earlier and warmer springs (with peak river flows occurring earlier)
- Longer, hotter and drier summers, typically with little or no rain
- Some of the smaller rivers in southern B.C. may dry up during the summer and early fall
- Most small glaciers in southern B.C. will likely disappear
- Salmon migration patterns and success in spawning are likely to change

Long term changes in the amount, form, and timing of precipitation have significant impacts on freshwater and terrestrial ecosystems as well as on human activities. For example, snow acts as a temporary storage system for winter precipitation. When snow melts in spring and early summer, water recharges groundwater aquifers, fill reservoirs, streams and rivers and replenish soil moisture. Shrinking snow packs mean less water will be stored, with less available water released in late spring or summer.

At the same time as environmental factors may reduce the water supply, human demands on the supply may increase, contributing to the unsustainability of supplies. Canadians are the second-highest consumers of water in the world:

- Canadians consume an average of 223 litres of potable water per person per day
- British Columbians consume an average of 296 litres of water per person per day^{6,7}

Despite the great demand for water, prices in B.C. typically remain lower than the full cost of providing water.⁸ For more on this discrepancy, please refer to the 'Understanding Sustainable Financing' section of this booklet.

Traditionally, methods of providing more water have focused on securing new sources by:

- Building new or expanding existing reservoirs, pumping stations and treatment plants
- Increasing the amount taken from groundwater or from surface supplies such as rivers and lakes
- Sinking new boreholes or taking water from new surface sources

⁵Source: Ministry of Environment *Indicators of Climate Change for British Columbia 2016*

⁶Source: Statistics Canada *Canada at a Glance, Environment edition Water, Table 4*

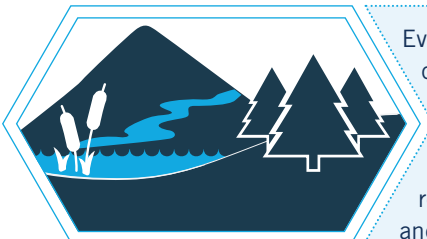
⁷Note that some sources show that Canadians consume an average of 466 litres of potable water per person per day. This higher figure also accounts for industrial, commercial and other uses of water provided by public utilities as well as residential use.

⁸Source: Brandes, O.M., Renzetti, S. and Stinchcombe, E. (2010) *Worth every penny: A primer on conservation-oriented water pricing*. POLIS project (UVic): Victoria, B.C. pg 1

Construction of new infrastructure is expensive. For example, a new reservoir may be a multi-million dollar project. It may also require large amounts of land and have significant environmental wildlife habitat impacts.

Protection of the water supply is now essential to long-term sustainability. Local governments should consider placing greater emphasis on using their existing water resources more effectively, efficiently and in a more sustainable way.

Year-round access to adequate water quantity is also necessary for firefighting (referred to as fire flows). Almost all local government water systems serve a dual purpose for firefighting, and so require adequate pressure and volume.



DEFINING A WATERSHED

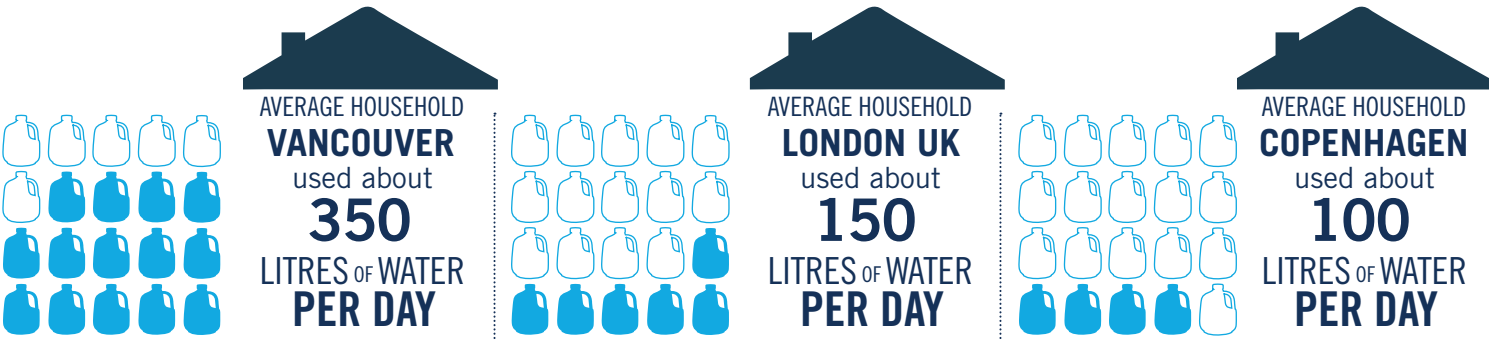
Everyone lives in a watershed. A watershed is an area of land that drains streams and rainfall to a common water body such as a river, lake, the outflow of a reservoir, or mouth of a bay or an underground aquifer. A watershed consists of the land surrounding and draining into lakes, streams, reservoirs and wetlands or the underlying groundwater. Larger watersheds contain many smaller watersheds. The terms catchment or drainage basin are also used to describe a watershed.

Source: US Geological Survey web content

Water efficiency: Measures and techniques to reduce the amount of water used for a particular purpose. Examples include water saving technology (e.g. water efficient devices such as low flush toilets and shower heads), leakage control, education on efficient water use and building codes, pricing and metering.

Water conservation: Practices and behaviours for using water in ways that conserve it for essential tasks, for instance by replacing lawns and green boulevards with xeriscaping. Conservation approaches may question and sometimes change conventional practices of using water.

Stormwater: Rainwater and runoff from buildings, roads, and parking lots, which is often carried into local waterways. Often seen as a nuisance, rainwater is increasingly viewed as a way to recharge groundwater for future use; however, contamination risks need to be assessed and addressed.



*Source: The International Water Association, *International Statistics for Water Services 2018*



5 WHY IS A PROACTIVE, INTEGRATED, RISK-BASED APPROACH TO DRINKING WATER SO IMPORTANT?

Since no single action can address all water-related challenges, a combination of actions is needed at a variety of scales (from household, to neighbourhood, community and watershed). Integrated and sustainable approaches to water management are resilient, flexible and agile and better able to cope with unpredictability and change.

Local governments need to manage water in a way that is resilient to the impacts of climate change and population growth, while ensuring the sustainable management of water resources and protection of aquatic environments. Short-term thinking about drinking water may result in local governments being forced to react to emerging problems, often requiring large and potentially unaffordable capital investments.

The most reliable way for local governments to manage their drinking water resources is to understand the entire water system with its critical linkages and develop a proactive long-term plan that includes the protection of source waters and a 'risk based,' comprehensive approach to the management of water, wastewater and stormwater systems. See our forthcoming booklet on Integrated Water Management for detailed information on this.



A risk assessment identifies potential internal and external threats to water quality, quantity and service continuity throughout the system, from the water source all the way through to the customer, including the water treatment plant, storage and distribution system.

The local government estimates the likelihood of each threat occurring and how often it might occur and identifies possible response strategies (risk management). Risks need to be balanced with available mitigation options that can be undertaken with available resources.*

In many sectors (such as food production) risk assessment and management are central to operations and protocols. Comparatively speaking, formalized, explicit and routine risk assessment practices in the water sector are newer and less widespread.

*Source: The Water Research Foundation, *Risk Governance: An Implementation Guide for Water Utilities* 2013



WHY IS IT IMPORTANT FOR A LOCAL GOVERNMENT TO BE RESILIENT?

Resilience is when systems (people, communities and ecosystems) are prepared for and able to withstand disruptive natural and man-made events, recovering and adapting to a ‘new normal’ with more frequent and extreme events.

“Humans are not born with resilience—we learn it, adapt it, and improve upon it. The same is true for organizations, systems, and societies.”⁹

Water-related disasters can have both direct impacts such as damage to buildings, infrastructure and crops and loss of life and property as well as indirect impacts such as effects on human health, losses in productivity and livelihoods, increased investment risk and indebtedness.

The increasing cost of disasters should be a significant incentive for local governments to focus more attention on resilience of their water systems through preparedness, integrated land use and water planning, prevention and addressing the root causes of vulnerability in their community.

TYPES OF WATER-RELATED HAZARDS & EMERGENCIES in B.C. THAT COULD AFFECT LOCAL GOVERNMENT RESILIENCE



Technological: power outage/disruption, pump failure, broken water main, chlorine gas leaks, backflow conditions, leaking pipes, treatment process breakdown or dam breach.



Weather: heavy rainfall, flooding, drought (loss of source), heat waves, snow and storm surges.

Source contamination: Leakage of gas or other hazardous material into a water course or groundwater recharge zone, animal activity near intake, failing septic system close to source.



Fire: wildfire/forest fires, interface fire, using water supply to fight a fire, fire at the water supply system, aerial fire retardant in watersheds.

Landslides: mudslide or avalanche above intake.



Human-related: human error, intentional (e.g., vandalism and terrorism), staff absences. Hazardous material events such as oil spills or spills of disinfected water into fish-bearing streams.

Geological: earthquakes, volcanic activity and tsunamis.



⁹Source: 100 Resilient Cities web content

Source: Emergency Management British Columbia, *The All-Hazard Plan* (2012)

INTERESTED IN LEARNING MORE

- Province of B.C.'s web page on Drinking Water Quality includes information about drinking water protection, shared roles and responsibilities, resources for water system operators, information on water quality notifications and contacts and publications

www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality

- Office of the Provincial Health Officer: Progress on the Action Plan for Safe Drinking Water in British Columbia 2015

www2.gov.bc.ca/assets/gov/environment/air-land-water/pho-drinkingwater2015-web.pdf

The background is a dark blue field covered with numerous water droplets of various sizes. Overlaid on this are two large, light blue geometric shapes: a circle on the left and a triangle on the right. A smaller, solid dark blue circle is positioned in the center, overlapping both the larger light blue shapes. This central circle contains the text.

**LOOKING AFTER
WATER:**

**UNDERSTANDING
DRINKING WATER
ROLES AND
RESPONSIBILITIES**

UNDERSTANDING WATER GOVERNANCE: ROLES & RESPONSIBILITIES



WHAT IS WATER GOVERNANCE?

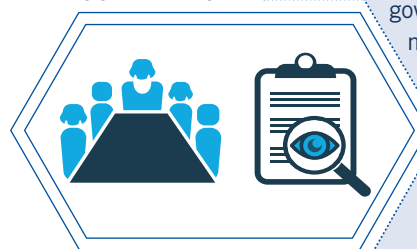
Water governance is the decision-making process affecting water: how decisions are made and who gets to decide. More broadly, it's the political, social, economic and administrative systems that influence the use and management of water.

Governance includes legislation and institutions, formulation, establishment and implementation of water policies and clarification of the roles and responsibilities of government, civil society and the private sector in relation to water resources and services. Governing bodies involved in water may include traditional local governments, the private sector, First Nations, non-governmental organizations and public-private partnerships.

Governance also reflects a diverse range of “non-state” actors such as private sector organizations, including corporations and non-government organizations, public-private partnerships and quasi-governmental boards that can also play key roles in the way drinking water is managed.

The shift in terminology from government to governance reflects the fact that governments are not always the sole source of decision-making authority. Authority and responsibility for decisions may be shared among levels of government (from local to national), individuals, firms and non-governmental organizations.

UNDERSTANDING THE DIFFERENCE BETWEEN WATER MANAGEMENT AND WATER GOVERNANCE



The fundamental difference between water governance and water management is that water governance is about ‘oversight’ whereas management is the administration and routine decisions made in daily operations of a water system.

WHAT LEVELS OF GOVERNMENT AND LEGISLATION ARE INVOLVED IN DRINKING WATER?

Providing safe, clean drinking water is a shared responsibility between multiple levels of government.

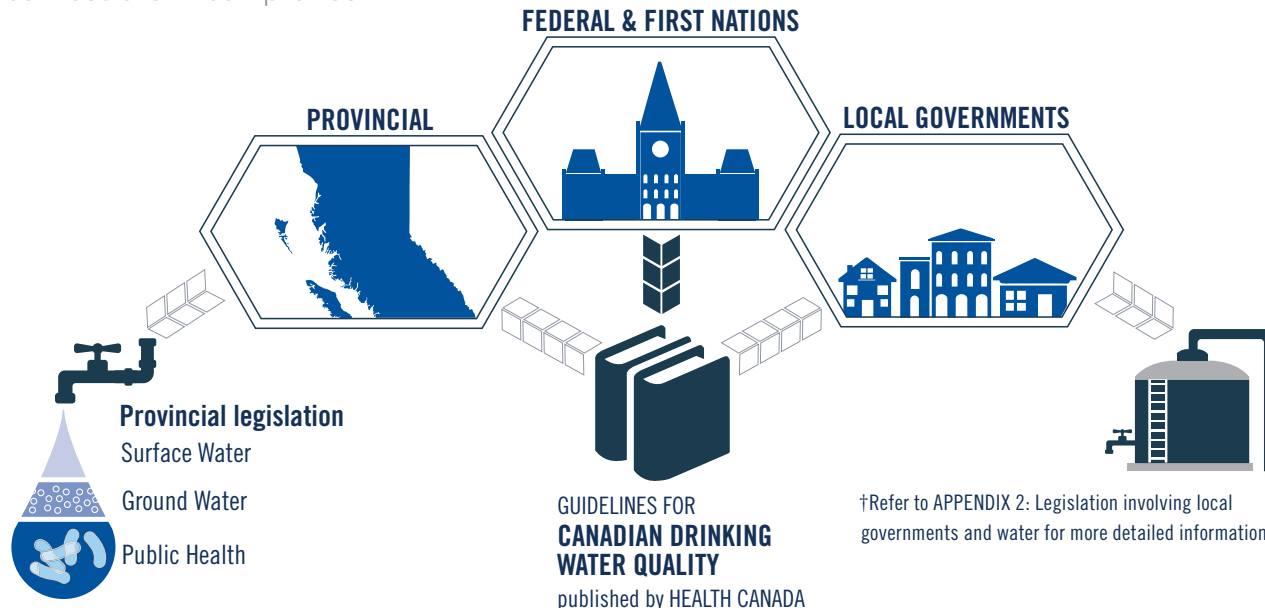
In B.C., approximately 14 provincial government agencies have responsibilities relating to drinking water and source protection, and there are numerous relevant statutes.¹⁰ The management of potable drinking water on First Nation reserves is a shared responsibility between First Nations and the federal government.

Legislated powers over water are complicated, as there is some overlapping jurisdiction and some delegation by the federal and provincial governments.

The *Community Charter* and the *Local Government Act* enable a local government to establish terms and conditions for the services it provides and for the development of land and its impact on the community.

While local governments may be the most familiar with these pieces of legislations, there are a number of other statutes and regulations that need to be considered when dealing with drinking water. (see Appendix 2 for a description of legislation related to drinking water in B.C.)

It is the responsibility of each local government to review all relevant legislation to ensure that its drinking water services are in compliance.




¹⁰The exact names and numbers of provincial agencies changes periodically due to the reorganization of B.C. ministries and transfer of primary drinking water protection regulatory responsibilities; Source: Office of the Provincial Health Officer. *Action Plan for Safe Drinking Water in British Columbia 2015* pg 7

WHAT RESPONSIBILITIES DO LOCAL GOVERNMENTS HAVE RELATED TO DRINKING WATER?

Local governments may have different objectives, policies and responsibilities related to water, which often include:

- Regulating water collection and use through local land use planning and controls on the development of private lands
- Engaging in water and watershed planning
- Protecting drinking water sources by preserving and managing watersheds, surface waters, reservoirs, rivers, streams, aquifers, riparian areas, wetlands and other sensitive habitats
- Delivering safe drinking water that meets the requirements of the *Drinking Water Protection Act* and Drinking Water Protection Regulation, as well as the conditions set by operating permits
- Distributing water from the point of collection to treatment and the eventual delivery of the water to the users
- Collecting water after use through means such as drainage and waste water treatment systems and disposing of it in an environmentally sustainable manner
- Employing flood risk management techniques in land use planning
- Managing water supply and demand by instituting water conservation programs
- Ensuring environmental operators working in water treatment and distribution are certified¹¹



In addition to the B.C. regional districts and municipalities that are responsible for water systems to provide water for domestic, commercial, agricultural and industrial use, water services are also provided by:

IRRIGATION AND IMPROVEMENT DISTRICTS	WATER USERS' COMMUNITIES
PRIVATE UTILITIES	GOOD NEIGHBOUR SYSTEMS
FIRST NATIONS	

In 2015, the Provincial Health Officer highlighted particular challenges faced by suppliers of drinking water to small or remote communities in B.C. These included inadequate treatment, difficulty attracting and retaining qualified operators, difficulty getting access to lab services in a timely way and inadequate financial resources to upgrade their systems. Some of these challenges may also apply in larger water systems and larger urban communities.

¹¹ Operator certification and classification of drinking water systems in B.C. are the responsibility of the Environmental Operators Certification Program (EOCP). Operators of water systems serving more than 500 individuals must be certified. www.eocp.ca



WHAT AUTHORITY AND RESPONSIBILITIES DO ELECTED OFFICIALS HAVE IN RELATION TO DRINKING WATER?

A responsible elected official should ask questions to clarify understanding and should ask staff to identify risks and threats to the water systems. Elected officials do not have to be experts, but should seek advice from experts and act accordingly based on that advice.

As a governing body of the local government, elected officials are the decision makers and overseers of the operations that provide safe drinking water. Elected officials have authority to authorize expenditures, pass bylaws, approve planning and development, appoint management, define policy, and make other strategic decisions to ensure safe water services are provided. Depending on the circumstances they also ensure or contribute to ensuring that source waters are protected.

Local governments supplying water to constituents have a duty to provide safe drinking water. In order to accomplish this, elected officials should be informed and vigilant.

Elected officials should read the plans and reports about drinking water prepared by staff to gain a basic understanding of the issues and factors affecting their local government's water systems. Newly elected officials should have a tour of the drinking water facilities and become familiar with the water systems. This includes learning about water sources, the physical conditions of major infrastructure, the background of staff, the minimum drinking water standards, licences and approvals required to operate the systems, and the long-term financial plan.

The decisions that elected officials make can impact the long-term provision of drinking water to current and future water users. Establishing a long-term vision and considering how decisions fit within their strategic plans, along with determining which other entities should be involved, can facilitate a more robust and flexible framework. *(see questions 14-19 in this booklet for more information on working with others.)*

While elected officials do not supervise daily operations, they are responsible for providing oversight and accountability for the operations. This means that elected officials, as a council or board, should be confident that the systems are being monitored frequently. Monitoring includes:

- Ensuring that accredited testing services are used
- Ensuring that audits, tests and inspections of the water system are carried out on a periodic and frequent basis
- Requesting regular, accurate and current updates on the system
- Ensuring that there is a sufficient number of qualified and adequately trained staff
- Evaluating whether operations are meeting compliance requirements
- Ensuring that notification is provided when there are adverse results noted in testing and that appropriate precautions are taken
- Ensuring that steps are taken to correct deficiencies
- Ensuring that policies and by-laws are up to date, appropriate and relevant

Elected officials should work with their CAO/executive team to ensure that staff can carry out their responsibilities to provide the community with safe potable water.

WHAT QUESTIONS SHOULD GOVERNING BODIES ASK ABOUT THEIR DRINKING WATER?

When decisions come before a governing body relating to drinking water, the governing body should understand the impacts on their community and public health. While every situation will be different, the following are some questions the governing body might want to ask:

HEALTH AND SAFETY

- What are the risks to public health?
- Are we meeting our legislative and regulatory requirements?
- Are there any areas of risk that we need to address?
- What checks and balances are in place to ensure the continued safety of our drinking water?
- Have we considered safer alternatives (e.g. chemical use or other environmentally sensitive decisions that may impact the water system and public health)?
- What is the public health impact or long-term cost of deferring this decision?
- Will this decision affect our drinking water sources and/or create new risks to drinking water sources?

COMMUNICATION AND SERVICE

- How are we communicating information about this project to our customers?
- Does the local government have a robust communication plan?
- Does the community have enough information about the decision to support it?

- Are our customers satisfied with our level of service? How are we measuring it?
- How many complaints are we receiving, and how are they being addressed?
- How will this decision impact our community's demand for water?

PLANNING AND MANAGEMENT

- Does our organization have adequate data/knowledge to make informed decisions?
- Have we consulted with the right levels of government, including First Nations?
- What is our process for identifying and managing risk?
- Are there any areas of risk that we need to address?
- How are we managing our drinking water infrastructure? Do we have an asset management plan for our water infrastructure? *(See question 20)*
- Is there a long-term strategic financial plan for the water system?
- Are we seeking the opportunity to combine our water systems with others?

- Are there any emerging issues related to our drinking water that we should be aware of?
- Have staff prepared for an emergency by testing and practicing plans and procedures?
- What is our role in a drinking water emergency? *(See the AGLG Perspectives booklet on Improving Local Government Emergency Management)*
- If there is a drinking water emergency, what is our emergency management plan?
- Is the initiative we are considering the best solution for the long term, or is it a short term solution which may result in increased overall costs in the long term?
- Have we adequately considered the environmental impacts of this decision?
- Is the decision we are considering the best alternative for the region or entire watershed, or will it impact some areas negatively, and if so, is the decision justified?

Source: Adapted from—*Taking Care of Your Drinking Water: A Guide for Members of Municipal Council*; Government of Ontario

A local government has a variety of governance tools, such as structure, operations, strategic plans, bylaws and policies that it can use to deliver water in an open, accountable and transparent manner (*see Appendix 3*).

GOVERNANCE STRUCTURE

The local government should clearly identify who has decision-making responsibilities:

- The governing body should make high-level decisions about drinking water while senior management initiates and informs the governing body about drinking water issues and then supports the governing body's decisions to resolve those issues
- Staff generally looks after daily operations and management of the service
- The local government can also establish advisory committees and interjurisdictional committees to assist in gaining the public's perspectives on drinking water

STRATEGIC PLANS

The governing body should incorporate drinking water policies as part of its general strategic or master plans such as official community plans.

SEPARATE STAND-ALONE PLANS

A local government should have separate standalone plans pertaining to drinking water such as water conservation, drought management,¹² drinking water protection and source assessment. Emergency and contingency plans should include steps to ensure that drinking water remains available to residents during and after an incident (*see AGLG Perspectives booklet Improving Local Government Emergency Management*).

BYLAWS AND POLICIES

The bylaws, policies, and policy instruments that a local government adopts may impact the use, conservation and quality of drinking water. Water bylaws establish the water system, the fees for consumption and the measures that can be taken to conserve drinking water. Irrigation and landscaping bylaws can help in conservation efforts. Stormwater and sanitary sewer bylaws ensure that waste water is gathered and treated appropriately, and also set fees. Through policies, a governing body can establish performance standards and measures that pertain to water systems. To ensure that staff can always act in the best interests of the public, the governing body should enact codes of ethics, conflict of interest, whistle blower and harassment policies to protect staff who “do the right thing.”

GOVERNING BODY OPERATIONS

A governing body should expect staff to maintain accurate and detailed record-keeping and regular and consistent monitoring and reporting on the state of the drinking water system. While a governing body may occasionally need to discuss certain aspects of drinking water provision in closed meetings, the governing body should ensure that sufficient, appropriate and accurate information about drinking water is provided to the public in an open and timely fashion. The governing body should engage in frequent periodic reviews of its drinking water plans and policies as well as in regular, formal evaluations of its governance and organizational structures to align its structures, strategies, resources and operations with its drinking water objectives.

¹²See *Dealing With Drought: A Handbook for Water Suppliers in British Columbia*, Updated July 2016 for guidance on how to develop a comprehensive drought management plan.

WHY SHOULD ELECTED OFFICIALS BE INTERESTED IN STAFF CAPACITY AND TRAINING?

Local governments face several issues relating to staff capacity and training that elected officials should be aware of:

CURRENTLY, OVER ONE-THIRD OF B.C.'S OPERATIONS WORKFORCE IS CLOSE TO RETIREMENT AGE¹³

This significant shift in the workforce raises serious concerns over potential knowledge loss and inadequate succession planning. Local governments need to ensure important knowledge is captured and record keeping systems are in place. Succession planning, including training, mentoring and job shadowing, should also be considered.

THERE IS A GROWING SHORTAGE OF QUALIFIED AND EXPERIENCED WORKERS IN B.C.'S WATER AND WASTEWATER SECTOR

The BC Water and Waste Association and the Environmental Operators Certification Program have projected that, over the next decade, 3,319 new workers will be needed in this sector alone, accounting for 53 per cent of the workforce. Recruitment and retention of staff is a growing challenge for public water and wastewater facilities, particularly retaining workers at intermediate or higher levels. Employee turnover can be high and there may be insufficient training opportunities for key positions. Smaller municipalities and remote communities tend to lose talent to larger municipalities that offer greater career growth and better compensation.

Local governments should consider the benefits of retention strategies that include the professional development needs of employees, and set aside sufficient training budget and resources to ensure that workers can maintain skills and certifications and advance in the workforce.

MANY WATER-RELATED WORKFORCES LACK GENDER DIVERSITY AND INCLUSION

B.C.'s water sector workforce is predominantly male (87 per cent). Operator and supervisor positions are mostly held by men and managerial employees tend to be older than staff in other positions. It has been found in other countries that inclusivity and diversity in utilities staffing is a way to respond to industry challenges more sustainably.¹⁴

Local governments could review their strategies and processes for attracting, recruiting, training and retaining employees from under-represented groups to ensure an inclusive work environment that supports a diversified staff.

EXAMPLE OF HOW LOCAL GOVERNMENTS CAN SHARE RESOURCES AND COSTS FOR TRAINING



The circuit-rider system develops a cohort of skilled operators who travel on a scheduled basis to visit individual water treatment plants (including remote facilities) to provide hands-on training and operator support. First developed in Saskatchewan for First Nations water operators, this system has been adopted by many First Nations administrative regions in Canada.

Source: Hrudey, S.E. Safe drinking water policy for Canada – *Turning Hindsight into Foresight*, 2011 p.12

¹³Source: B.C. Water & Wastewater Sector Workforce Profile 2015

¹⁴Source: Water Services Association of Australia, *Tapping the Power of Inclusion and Diversity in Urban Water*

MAKING INTEGRATED WATER MANAGEMENT HAPPEN: WORKING WITH OTHERS

Addressing a drinking water system as a whole (from source to the tap and back to the environment) involves thinking about long-term security of water supply, flood control, environmental repair and protection, sustainable financing, resource recovery, public health protection and public amenities.

Inter-departmental coordination is the best way to ensure that local governments make the most effective and efficient use of limited resources. To do this effectively, local government departments responsible for functions such as engineering and operations, land-use planning, parks and recreation, finance, information technology, emergency management and communications should be involved.

A good practice for local government is to make collaboration and cooperation across departments part of its organizational culture.

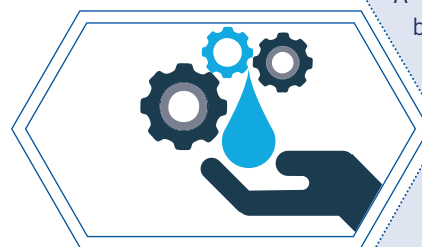
WHAT IS GOOD WATER GOVERNANCE?

Good governance is a means of facilitating improved decision-making, improving management efficiency in water use, and government responsiveness.

Good governance outcomes are impacted by various factors such as inclusiveness, participation, good-faith consultation, efficient procedures, accountability and transparency.

Good governance can be measured by the degree to which decisions are inclusive, participatory, accountable, transparent and responsive. All stakeholders must be part of the governance process if the drinking water system is to be sustainable now and in the future.

A local government that believes in good governance commits to including stakeholders, adapts to varying situations, monitors and assesses on a continuous basis and problem solves accordingly.



WHY IS IT IMPORTANT TO ENGAGE WITH OTHER LEVELS OF GOVERNMENT AND STAKEHOLDERS?

While a local government may be responsible for a drinking water system, there are other groups with a vested interest in the provision of drinking water. It is important for a local government to identify other interested parties and consider their concerns when making decisions about drinking water.

Within the local government's jurisdiction there will be a range of local community groups, businesses and industries, as well as the public whose perspectives ought to be considered. For example:

- Environmental groups and water basin councils or boards will often bring forward issues impacting water to the attention of the local government.
- The federal and provincial governments and other governmental organizations are concerned that local governments are meeting various requirements set by those levels of government.
- Neighbouring First Nations may have rights and title related to water which should be considered from a constitutional and water licence holder point of view. In addition, First Nations may have concerns about water-specific issues,¹⁵ the environment¹⁶ and human use.¹⁷
- Neighbouring local governments (municipalities, regional districts and improvement districts) may be impacted by a local government's decisions concerning drinking water, in particular if those neighbours are drawing from the same water source, as is often the case. For example, improvement districts are often responsible for the operation of drinking water systems. Sometimes these systems are within the boundaries of a municipality, or in communities located next to local government boundaries.
- Industry and agriculture have vested interests in water. Water use can be central to their business activities and their discharge practices can have detrimental effects on the surrounding water quality.
- The public needs to be engaged as they have a vested interest in safe drinking water and protection of their rights to drinking water.¹⁸

¹⁵Such as poor water quality, increasing drought conditions, earlier peak stream flows, changing water temperatures, increased risk to water quantity due to low water levels, and increased risk to water quality due to coastal erosion and storm surges.

¹⁶Such as rapid glacier melting, widespread thawing of permafrost, and shifting marine ecosystems.

¹⁷Such as conflicts over water use and water allocation as result of increased agricultural, commercial and industrial demands, growing urbanization, increasing number of boil water advisories, increased flood damage to buildings, roads, bridges and rail lines; and increased air pollution and exposure to water and food borne pathogens: Source: *Fraser Basin Council: Rethinking our Water Ways*, (2011) p.10

¹⁸The Public often lacks understanding of water challenges and may not be motivated to change practices or habits. It is unrealistic to expect them to embrace water sustainability objectives without this understanding: Source: Brandes, O.M, Renzetti, S. and Stinchcombe, E. (2010) *Worth every penny: A primer on conservation-oriented water pricing*. POLIS project (UVic): Victoria, B.C. pg 11



HOW SHOULD LOCAL GOVERNMENTS WORK WITH OTHERS?

“Consultation in its least technical definition is the talking together for mutual understanding.”

Source: Updated Procedure for Meeting Legal Obligations When Consulting First Nation, Provincial Government, May 2010 Pg 7

Consulting others often leads to more informed decisions. The type of consultation in which a local government engages when developing an official community plan provides a preliminary approach to engaging with others. At the very least, a local government needs to provide adequate details about the plan and be open and receptive to input throughout the various stages of the plan development.

In order to give due consideration, a local government should determine in advance the level of consultation and engagement it should undertake depending on the decisions, others affected, and immediacy of the issue.

WHY IS INTER-AGENCY COOPERATION IMPORTANT TO SOURCE WATER PROTECTION?

The majority of B.C. local governments are located in multi-use watersheds, which means water resources are shared between a variety of users. Greater Vancouver and Greater Victoria, serving over half the B.C. population, are the two most prominent examples of jurisdictions in B.C. with protected watersheds.

It is common elsewhere in the province to have multiple users that share a limited water resource, and numerous activities that can inadvertently contaminate the water supply.

Local governments need to manage activities and land uses around municipal wells and/or drinking water treatment plant intakes to protect the quality and quantity of existing and future sources of drinking water. Neglecting source water protection can be costly.¹⁹

However, local governments may encounter significant issues when it comes to watershed management. They may not have regulatory authority over activities outside local government boundaries. They may also have limited involvement in activities regulated by federal or provincial governments.

In many instances, particularly where communities rely on surface water, the majority of the watershed is outside of the local government's jurisdiction so the only way to attain watershed protection is through partnerships with others who do.

For example, control and oversight of land-use activities such as mining, forestry and manufacturing is usually carried out at a provincial scale and spread across multiple agencies (including ministries responsible for the environment, energy, forests, lands and natural resources, and health).

Interagency cooperation is important when activities occurring within a watershed impact water quantity and quality and these impacts are a result of decisions made outside of the local government jurisdiction.

In the absence of a province-wide strategy to protect source waters, it's necessary for local governments to build partnerships fostered through relationships with other actors and agencies in the shared watershed to collaborate on source water protection.

SIMILKAMEEN VALLEY PLANNING SOCIETY: An example of coordinated planning in the Okanagan is the Similkameen Valley Planning Society (SVPS). The SVPS is a not-for-profit organization with membership from eight governing bodies: Municipalities of Keremeos and Princeton, Regional District of Okanagan-Similkameen Electoral Areas of B, G, & H, and the Indian Bands of Lower Similkameen and Upper Similkameen.

Source: *Strategy for a Sustainable Similkameen Valley* 2011-2020, pg 4

THE COWICHAN WATERSHED BOARD: Formed in 2010 to provide leadership for sustainable water management in the Cowichan watershed and adjoining areas.

The Board's 14 members are appointed by its government partners and include:

- three members from the Cowichan Valley Regional District (including one who serves as Chair)

- three members from among the chief and councillors of Cowichan Tribes
- three or four members-at large from the community to provide specific local watershed knowledge
- one or two members recommended by the federal government
- two members recommended by the provincial Ministry of Environment

Source: www.cowichanwatershedboard.ca/

¹⁹Removing contaminants from drinking water can be expensive. Source water quality also impacts the treatment that is required and certification level of the environmental operators needed to operate the system. The most reliable way to protect public health and the environment is to proactively address water use and minimize sources of pollution before they enter water sources.

SOURCE WATER SUPPLIES (SURFACE AND GROUNDWATER) CAN BE CONTAMINATED IN A NUMBER OF WAYS

Some examples of 'threats' to source water include:



Overuse of water can be a contributing factor to the depletion of fresh water supplies



Inadequate attention to sanitation in wells, leaking septic tanks, cesspools, sewers or landfills

Agricultural practices (such as land application of pesticides and fertilizers or the improper disposal of manure)



Recreational activities on surface water (such as wastewater discharge or leaking fuel from boating)



Discharge of industrial wastes and atmospheric deposits of chemical particles in dust, or dissolved in rain or snow



Accidents such as chemical spills (railway or highway)

Natural resource extraction activities (for example, forestry and mining alter landscapes, which can impact watersheds)



Runoff from roads (such as fuel, oil and salt)



DRINKING WATER OFFICERS CAN ORDER SOURCE TO TAP ASSESSMENTS AND RESPONSE PLANS, HAZARD ABATEMENT OR PREVENTION ORDERS.

The *Drinking Water Protection Act* enables drinking water protection plans, which have regulatory force once adopted. Such a plan contains a series of policies to protect drinking water supplies against current and future potential threats.



**DRINKING WATER
PROTECTION ACT**



**WATER
SUSTAINABILITY ACT**
Since February 2016

The *Water Sustainability Act* enables the development of regional objectives (dealing with water quality and quantity), water sustainability plans (which have regulatory force, once adopted) and other mechanisms to advance watershed protection.

WHAT CAN LOCAL GOVERNMENTS DO TO ADDRESS SOURCE WATER PROTECTION WHEN MULTIPLE JURISDICTIONS ARE INVOLVED?

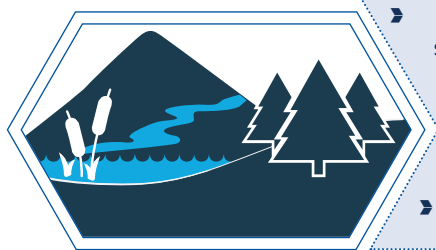
Since water-use and protection is a multi-stakeholder responsibility, it is very important for local governments to build and maintain ongoing relationships with groups that may share the valuable resource.

To start, local governments should:

- Identify the First Nation(s) whose traditional territory the local government is on, and begin (or continue with) meaningful engagement related to source water protection
- Be familiar with their government's jurisdiction (e.g. regulatory and non-regulatory roles and responsibilities)
- Get to know their governmental and community stakeholders (e.g. federal, provincial, improvement districts, regional districts and community organizations with an interest in source water protection)
- Understand the ministries and agencies that have responsibilities for water use and management
- Understand which industries are authorized to use and discharge water (e.g. mining)
- Consider working jointly with others to: identify risks and critical points of source water contamination; develop contamination response plans, standards and education; form joint governing boards; engage in land use planning
- Engage community stakeholders in water planning and management initiatives and strategies as well as in water-related decision-making
- Connect with and seek guidance from agencies or associations that specialize in water use and management with related expertise on water stewardship

Some local governments have begun to embrace collaborative decision-making around their watersheds. Two examples are the Cowichan Watershed Board and the Nicola Watershed Governance Pilot.²⁰ *(See our forthcoming Perspectives booklet on integrated water management)*

SOURCE WATER PROTECTION TOOLS



➤ Science, monitoring and information

- Planning tools such as drinking water protection plans, water sustainability plans, area-based plans, resource sustainability plans, environmental farm plans and community-led plans— some of these require provincial involvement and cooperation
- Risk assessment and management (such as a water safety plan)
- Education, outreach and partnerships

²⁰Sources: Cowichan Watershed Board web content and Nicola Watershed Governance Pilot web content

WHY IS IT IMPORTANT FOR LOCAL GOVERNMENT TO BUILD RELATIONSHIPS WITH FIRST NATIONS?

“Although no legal precedent exists indicating that municipalities have a duty to consult, municipalities are increasingly committing to building meaningful decision-making relationships with Indigenous governments and could participate in collaborative consent processes if the matter at hand falls within the bounds of delegated municipal jurisdiction.”

Source: Centre for Indigenous Environmental Resources and POLIS Project on Ecological Governance, Collaborative Consent and Water in British Columbia—Towards Watershed Co-Governance 2017 p. 20

In December 2015, the Truth and Reconciliation Commission called on governments among others, to take action on 94 Calls to Action to redress the legacy of residential schools and to advance reconciliation. These calls to action were for all levels of government to recognize Indigenous rights over land and resources.

Positive engagement between local governments and First Nations can facilitate stronger relationships, open dialogue, and improve understanding between communities to promote reconciliation and build a foundation for future relations.

Water-use decisions in First Nations in B.C. are governed by local First Nations authorities and the federal government, however, water source supply and quality impacts local communities, including municipalities and First Nations. Local governments should recognize that their decision-making, particularly around natural resources like water, may have an impact on First Nations. It is imperative that local governments make an effort to include First Nations early on in any planning processes.

GUIDELINES FOR WORKING WITH FIRST NATIONS:

Sustainability: achieve a vision where social well-being is supported by a vibrant economy and healthy environment

Respect and Equity: respect diverse values, cultures, interests and knowledge of all communities and regions; understand that water often has a spiritual side and may be considered a relation; commit to supporting equitable opportunities for achieving sustainability

Inclusive Decision Making: acknowledge First Nations governments as an order of Canadian government and aim to support coordinated and collaborative efforts among all government and non-government interests

Meaningful Engagement: support opportunities for meaningful First Nations involvement in all relevant activities towards achieving sustainability in the region, develop a common understanding of and shared expectations for meaningful involvement, engage in shared decision-making where appropriate and identify and address capacity challenges and opportunities associated with involvement

Intellectual Property: acknowledge the value, significance, and Indigenous ownership of traditional and local knowledge and respect the link between traditional knowledge and First Nations' rights

- recognize that incorporation of traditional and local knowledge is integral to ensuring sustainable management

- promote wider application of interpretation of traditional and local knowledge with consent and involvement of knowledge holders while also honouring confidentiality and conditions of information release (information should remain the property of knowledge holders)

Communication: foster frequent and open communication, information exchange, and inclusive, meaningful dialogue to develop shared solutions to sustainability challenges. Build effective relations with First Nations by engaging early (e.g. exchange information about the proposed project/work in a respectful and meaningful manner)

Source: Adapted from "Rethinking Our Water Ways: A Guide To Water And Watershed Planning For BC Communities In The Face Of Climate Change And Other Challenges", Fraser Basin Council, 2011

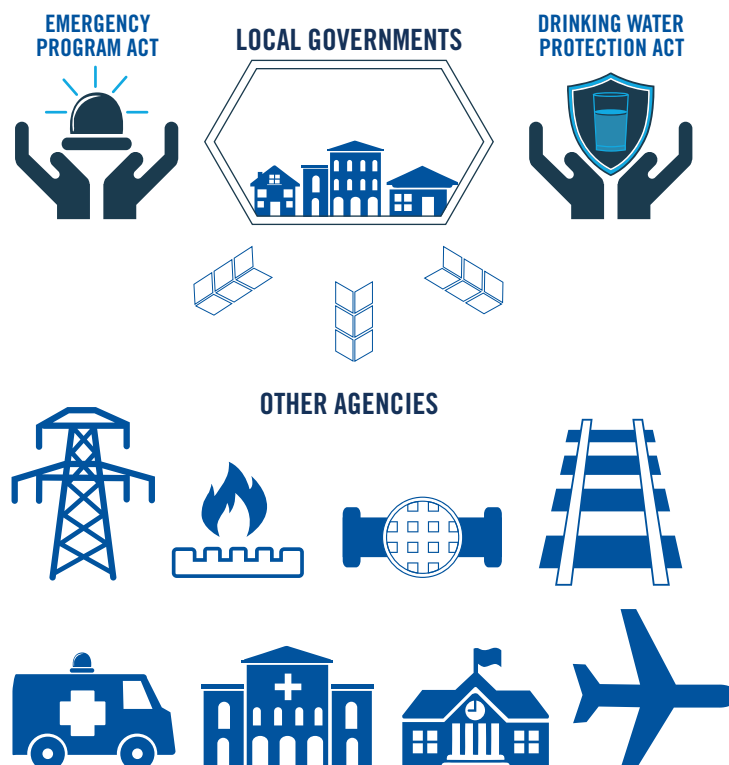
WHY IS STAKEHOLDER ENGAGEMENT IMPORTANT FOR DRINKING WATER EMERGENCY MANAGEMENT?

Drinking water is a critical service and local governments are required to have both an emergency management plan (under the *Emergency Program Act*) and emergency response and contingency plan (under the *Drinking Water Protection Act*).

An emergency can affect every aspect of a local government, from engineering and operations to information technology, communications and finance. Other levels of government, First Nations, and other agencies (such as power, gas, water-sewer, railways, roadway authorities, transit authorities, airport authorities, school boards, health services and hospitals) may also be involved in an emergency.

Active and effective inter-agency relationships are important in emergency response planning and are imperative when dealing with a crisis event. The quality of relationships can determine the quality of the response in a crisis. Emergency response plans need to be updated regularly (particularly contact information). They also need to be exercised with both table top and simulated live exercises. This allows all parties to become familiar with working together and understand their roles if an emergency occurs.

Previous experience has shown that the severity of some of the major drinking-water incidents in the past may have been aggravated by the absence of constructive (and communicative) inter-agency relationships. Local governments can not afford for their relationships with other key actors and agencies to be transient. Instead, they need to be nurtured and ready to be activated in the event of an incident.



INTERESTED IN LEARNING MORE

- For more detailed information on stakeholder engagement, see the forthcoming AGLG Perspectives booklet on integrated water management
- For more information on Emergency Management refer to the AGLG Perspectives booklet Improving Local Government Emergency Management
- POLIS Project on Ecological Governance Water Sustainability Project—Various resource guides on watershed governance poliswaterproject.org/
- Fraser Basin Council—Rethinking Our Water Ways guide—Community Collaboration and Engagement www.rethinkingwater.ca/community_collaboration.html#collaboration
- Community Futures British Columbia Aboriginal Engagement Toolkit
- The First Nations Summit Community to Community Forums Program www.fns.bc.ca/c2c-community-forums
- Fraser Valley Regional District's policy First Nations Engagement on FVRD Land use by-laws and other matters with statutory requirement to engage www.fvrd.ca/assets/About~the~FVRD/Documents/FN%20Referral%20Policy.pdf
- BC Water & Waste Association—Position statement on Watershed Management Planning www.bcwwa.org/resourcelibrary/Watershed%20Management%20Planning_final%20rev%20%2006-01-2013.pdf
- Environmental Operators Certification Program (British Columbia) www.eocp.ca



PAYING FOR WATER: UNDERSTANDING SUSTAINABLE FINANCING

SUSTAINABLE FINANCING: WHAT IS IT AND WHY DO IT

There are costs associated with every stage of drinking water provision: construction and maintenance, treatment, monitoring, pumping, operations, source protection, labour and staffing.

Many local governments are dealing with challenges such as underinvestment in water infrastructure, a backlog of maintenance, rising system costs, urbanization, changing regulations requiring system upgrades and a history of relatively low water prices.

Most local governments charge users a price for drinking water that is less than the full cost of providing drinking water. Decades of underfunding (both in terms of operations and in capital works) have reached the point where many drinking water systems may not be sustainable using current funding models.

Users have benefited from paying low fees for drinking water and may lack full appreciation of the value of the service.²¹ Most people do not think about drinking water until there is some type of crisis.

The disparity between the price charged and the actual full cost of providing drinking water can create infrastructure deficits and is widely regarded as unsustainable. This can lead to gaps in infrastructure upkeep and pose risks to freshwater supplies and drinking water quality.

It is critical that local governments have their finances in order. Tools that can assist local governments to ensure the long-term financial sustainability of drinking water include:

- Asset management
- Full cost-recovery, full cost-accounting and full cost-pricing
- Performance management and continuous improvement

More detail is provided on each of these topics in our forthcoming booklets that are directed at local government senior management and staff.

DRINKING WATER ISSUES MANY LOCAL GOVERNMENTS FACE

Lack of sufficient data which leads to inaccurate costing

Incomplete inventories of water system infrastructure assets

Maintenance backlogs which can compound into major problems if small problems are left unattended for too long

Aging infrastructure failure could create unforeseen, immediate and substantive costs

Inadequate pricing which leads to inadequate funding of the system

Declining revenues due to decreased water consumption arising from successful conservation efforts

Insufficient reserves leading to the need for crisis financing to deal with the unexpected

Increased system costs as with other services

Changing regulations that require system upgrades and the need to comply with new requirements

Population growth which can result in increased demand

Changing climate such as an increasing incidence of drought and floods, which affects demands on the system.

Smaller water systems may face additional challenges such as:

Difficulty accessing laboratory services in a timely manner for water quality testing

Little to no real-time monitoring and alarm equipment in place

Trouble attracting and retaining trained and certified operators

Source: Canadian Water Network, Canadian Municipal Water Priorities Report—Towards Sustainable and Resilient Water Management 2015

²¹Source: Canadian Water Network, *Canadian Municipal Water Priorities Report—Towards Sustainable and Resilient Water Management 2015*



WHAT IS ASSET MANAGEMENT AND WHY IS IT IMPORTANT?

An asset management program is a system in which a full inventory of all assets (e.g. pipes, pumps, reservoirs, meters, service vehicles, mechanical equipment, etc) is created along with information such as age, condition, rate of depreciation, vulnerabilities and replacement value. Using this information, a local government can estimate the ongoing investment required to offset the depreciation of the assets, or to maintain a given level of service in the system.

An asset management program is an important starting point for any discussion about partial or full cost recovery of drinking water services.

A local government needs an asset management program for drinking water in order to determine whether to take a full cost recovery approach that ensures sustainable funding for drinking water.

Many local governments do not have sufficient data on the condition of their buried infrastructure and do not have a complete understanding of revenue and expenditures associated with their services. Before any local government can make informed financial decisions about drinking water provision, it needs to gain an understanding of its drinking water assets and their condition. An asset management program is a critical tool to develop this understanding.



**PUMPS, FILTERS & SMALL
MECHANICAL PARTS**

**EXPECTED
SERVICE-LIFE
5 to 15
YEARS**

Most water supply infrastructure needs to be rehabilitated or replaced regularly because the expected service-life of pumps, filters and other small or mechanical parts is five to 15 years. Pipes and water tanks are expected to last from 50 years or more if installed and maintained correctly.

Source: Anita Milman, Anne Short *Incorporating resilience into sustainability indicators: An example of the urban water sector in the journal Global Environmental Change 18 (2008) pg 761*

**EXPECTED
SERVICE-LIFE
50+
YEARS**



PIPES & WATER TANKS



WHAT IS FULL COST RECOVERY AND WHY IS IT IMPORTANT?

To ensure sustainable funding for the provision of drinking water, local governments need to consider how much revenue is needed in order to cover the full costs of operating.

Full cost recovery means the generation of sufficient revenue to cover all the costs associated with the provision of drinking water service through user rates and other charges. These “full costs” include:²²

- Operation, maintenance, and administration of the system
- Funding of system depreciation identified by the asset management system, related to long term upcoming capital works
- Capital works which involve upgrading, adapting (e.g. to extreme events and climate change) rehabilitating, renewing and expanding of the system²³
- Decommissioning of any portions of the services no longer in use

The following graphic gives definitions for some of the key terms associated with full cost recovery.

Full cost accounting

Records all the costs incurred to provide drinking water to customers including operations and maintenance, administration, overhead, reserves, costs of compliance with regulations, financial costs (such as depreciation, debt servicing, etc.), capital costs, conservation and environmental management and source water protection costs



Full cost recovery

Generates sufficient revenue to cover all the costs of providing drinking water through user rates, grants and taxes

Full cost pricing

Covers all the costs of providing drinking water through user rates and charges (price does not include grants and taxes)



²²Source: Federation of Canadian Municipalities and National Research Council, *Water and Sewer Rates: Full Cost Recovery*

²³Any capital works project for drinking water includes planning, pre-design, testing, design, and land acquisition.



HOW CAN WATER METERING SUPPORT SUSTAINABLE FINANCING?

Metering is a tool that may provide additional benefits to a community, and can greatly assist in the development of a comprehensive pricing program. A water service provider that does not have universal metering usually has flat rate pricing. This typically does not foster conservation of water because no matter how much water the customer uses they pay the same rate.

Metering can assist local governments to link usage with the price users pay and also help determine leakage in drinking water systems. Metering can also provide operational efficiencies, raise consumer awareness of water use and assist in planning and evaluation of conservation efforts.

Many local governments in B.C. have not introduced metering. By not doing so, local governments may not be able to collect valuable data that can assist in recouping costs equitably while helping to preserve their future water supplies through changing consumer behaviour.

By developing a detailed business case on the benefits and costs of metering, a local government can determine if meters are the best choice for a community.

APPROXIMATELY
32.6%
OF **RESIDENTIAL**
CUSTOMERS



IN **B.C.** ARE
METERED*

*Source: Brandes, O.M, Renzetti, S. and Stinchcombe, E. (2010). *Worth every penny: A primer on conservation-oriented water pricing*. POLIS project (UVic): Victoria, B.C. pg 5



HOW DOES PERFORMANCE MEASUREMENT HELP?

Performance measurement is an essential element of effective utility management that provides opportunities for a local government to improve water utility management and operations. It is also the foundation for continuous improvement and sound strategic planning.

Performance targets or benchmarks help a local government to set standards of performance it wishes to achieve.

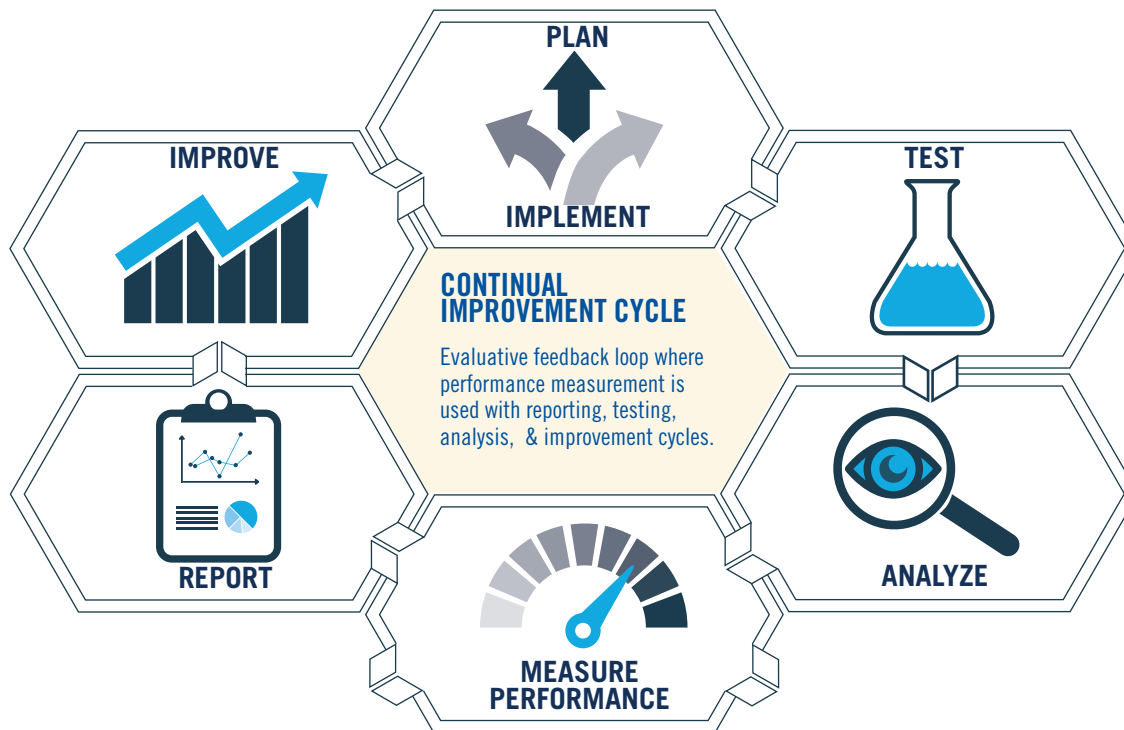
By advocating and supporting performance management in relation to water services, a local government can learn where to focus its priorities and resources, facilitate decision-making, clarify expectations for staff and the public and demonstrate accountability by communicating these measures internally and externally. It also facilitates education around the value of water and the activities a local government must conduct to make this vital service available to its community.

WHY IS CONTINUOUS IMPROVEMENT IMPORTANT?

Continuous improvement is a learning process where lessons learned through performance measurement are used to adjust and make improvements to processes with the intention of meeting or exceeding performance targets.

When a local government integrates this system into its everyday approach to management and operations, it is able to further reinforce and demonstrate the work it does to bring value to its community on a continual basis.

Continuous improvement should be a cycle—an evaluative loop where performance measurement is used with reporting, testing, analysis and improvement activities.



- WATER USAGE (PER CAPITA, PER HOUSEHOLD, SEASONAL, USE)
- WATER SERVICE DISRUPTION
- SUPPLY DISRUPTION
- OPERATING AND MAINTENANCE COST PER WATER VOLUME TREATED OR DELIVERED
- NUMBER OF WATER LEAKS REPAIRED
- WATER NOT ACCOUNTED FOR

- EFFICIENCY SAVINGS
- LOCAL SUPPLY VS DEMAND
- BILLING ERRORS PER NUMBER OF ACCOUNTS
- RATIO OF PLANNED MAINTENANCE TO TOTAL MAINTENANCE
- EMPLOYEE TRAINING MEASURES
- COMMUNITY ENGAGEMENT DAYS
- CUSTOMER COMPLAINTS

INTERESTED IN LEARNING MORE

- For more detailed information on the content of this section—including asset management, full cost recovery, performance management and continuous improvement—see forthcoming AGLG Perspectives booklet on sustainable financing in drinking water management
- Auditor General for Local Government—Asset Management for Local Governments—Key Considerations for Local Government Council, Board Members and Staff to Help You Manage Your Infrastructure Assets
www.aglg.ca/app/uploads/sites/26/2017/04/Asset_Management_For_Local_Governments.pdf
- Asset Management BC—Asset Management for Sustainable Service Delivery: A B.C. Framework
www.assetmanagementbc.ca/
- Canada's Ecofiscal Commission—Only the Pipes Should Be Hidden: Best Practices for Pricing and Improving Municipal Water and Wastewater Services
www.ecofiscal.ca/reports/pipes-hidden-best-practices-pricing-improving-municipal-water-wastewater-services/
- POLIS Project on Ecological Governance water sustainability project—Worth Every Penny: A Primer on Conservation-Oriented Water Pricing
- BC Water & Waste Association—Position statement on Water Service Rate Setting
www.bcwwa.org/resourceLibrary/RateSetting%20Position%20Statement%20rev%20%2024-06-2013_final.pdf
- BC Water & Waste Association—Position statement on Water Metering
www.bcwwa.org/resourceLibrary/2012%20June%2026%20Water%20Metering_final%20rev%20%2006-01-2013.pdf
- Union of BC Municipalities: Best Practice Guidelines for Approving New Small Water Systems: Setting the Stage for Sustainable Water Service Provision
[www.ubcm.ca/assets/Resolutions~and~Policy/Policy/Environment/Small%20Water%20System%20BPG%20Report%202014.pdf#search=drinking water](http://www.ubcm.ca/assets/Resolutions~and~Policy/Policy/Environment/Small%20Water%20System%20BPG%20Report%202014.pdf#search=drinking%20water)

ADDITIONAL REFERENCES AND RESOURCES

Alberta Environment and Parks (2018) | [Full Cost Accounting for Municipal Drinking Water Facilities](#) | Alberta Environment and Parks

Akhmouch, A., Clavreul, D. & Glas, P. (2017) | [Introducing the OECD Principles on Water Governance](#), *Water International*, 43:1, pp 5-12

Auditor General for Local Government (2015) | [Asset Management for Local Governments](#) | Auditor General for Local Government: Surrey, B.C.

Auditor General for Local Government (2018) | [Emergency Management: Considerations for Local Government Council and Board Members](#) | Auditor General for Local Government: Surrey, B.C.

Brandes, O.M, Renzetti, S. and Stinchcombe, E. (2010) | [Worth Every Penny: A Primer on Conservation-Oriented Water Pricing](#) | POLIS Project (UVic): Victoria, B.C.

British Columbia Government (2001) | [Public Health Officers Report](#)

British Columbia Government, (2015) | [B.C. Water & Wastewater Sector Workforce Profile](#)

British Columbia Government, (2010) | [Updated Procedure for Meeting Legal Obligations When Consulting First Nation](#), May 2010 | as retrieved from www.gov.bc.ca

British Columbia Government (2016) | [BC Climate Change Indicators](#) | as retrieved from www.gov.bc.ca

Canada's Ecofiscal Commission (2017) | [Only the Pipes Should be Hidden](#) | as retrieved from www.ecofiscal.ca

Canadian Water Network (2018) | [Balancing the Books: Financial Sustainability for Canadian water Systems](#) | Canadian Water Network: Waterloo, ON.

Canadian Water Network (2017) | [Leveraging asset management data for improved water infrastructure planning—A national report](#) | Canadian Water Network: Waterloo, ON.

Canadian Water Network (2015) | [Canadian Municipal Water Priorities Report: Towards Sustainable and Resilient Water Management](#) | Canadian Water Network: Waterloo, ON.

Charrois, J. (2010) | [Private Drinking Water Supplies: Challenges for Public Health](#) | *Canadian Medical Association Journal*, 182:10, pp 1061-1064

Council of Canadian Academies (2009) | [The Sustainable Management of Groundwater in Canada: Report of the Expert Panel on Groundwater](#) | Council of Canadian Academies: Ottawa, ON

Federation of Canadian Municipalities and National Research Council | [Water and Sewer Rates: Full Cost Recovery](#) | retrieved from: fcm.ca

Grover, R., Copes, R., Mavinic, D., and Teschke, K (2012) | [Part 3 - Section 7: Boil Water Advisory Protocol \(BWAP\)](#) | In, Dunn, G., (Ed.), *Water Security Guidance document* | Program on Water Governance, UBC.

Health Canada | [Guidelines for Canadian Drinking Water Quality](#) | as retrieved from www.canada.ca

Hrudey, S. (2011) | [Safe Drinking Water Policy for Canada—Turning Hindsight into Foresight](#) | C.D. Howe Institute Commentary: The Water Series No.323, pp 1-29

National Water and Wastewater Benchmarking Initiative, as retrieved from www.nationalbenchmarking.ca

Office of the Auditor General of British Columbia (2010) | [Guide for Developing Relevant Key Performance Indicators for Public Sector Reporting](#) | as retrieved from www.bcauditor.com

Organisation for Economic Cooperation and Development (OECD) (2015) | [Stakeholder Engagement for Inclusive Water Governance](#) | OECD Studies on Water | OECD Publishing: Paris

Organisation for Economic Cooperation and Development (OECD) (2018) | [Implementing the OECD Principles on Water Governance: Indicator Framework and Evolving Practices](#) | OECD Studies on Water | OECD Publishing: Paris

Safe Drinking Water Foundation (2017) | [Water Consumption Fact Sheet](#) | as retrieved from www.safewater.org

United Nations World Water Assessment Programme (2015) | [The United Nations World Water Development Report 2015: Water for a Sustainable World](#) | UNESCO: Paris

Value of Water Campaign | [What's the Value of Water? Communications Tools and Resources](#) | as retrieved from www.beta.thevalueofwater.org/mediakit/preview

Water Research Foundation (2013) | [Risk Governance: An Implementation Guide for Water Utilities 2013](#) | as retrieved from www.waterrf.org

Water Research Foundation (2014) | [Performance Benchmarking for Effectively Managed Water Utilities](#) | as retrieved from www.waterrf.org

DEFINITIONS / GLOSSARY OF TERMS

Aquifer: A permeable rock that stores groundwater, which can flow readily into a supply well. Aquifers can be recharged (replenished) by rainfall or snowmelt, which infiltrates the ground. This process can be rapid or take thousands of years.

Asset management: Asset management is the process of managing a local government's capital assets cost effectively. It involves analyzing the lifecycle and capacity of each asset with detailed information about the condition of the assets (including the assets' vulnerabilities), service levels, remaining service life, the timing of replacements and new asset needs. (See *AGLG 2015 Perspectives booklet, Asset Management for Local Governments*)

Board means the board of directors of a regional district or board of trustees for an improvement district.

Council means the Council of a municipality.

Demand management: measures and techniques to reduce water demand. For example, pricing, metering, building codes, leakage control, metering, education on efficient water use and water saving technology (e.g. water efficient devices).

Full cost accounting: Recording all the costs incurred to provide drinking water to customers including operations and maintenance, administration, overhead, reserves, costs of compliance with regulations, financial costs such as depreciation, debt servicing, etc., capital and environmental costs.

Full cost pricing: Covers all the costs of providing drinking water through user rates and charges (price does not include grants and taxes).

Full cost recovery: Generates sufficient revenue to cover the full costs of providing drinking water through user rates, grants and taxes.

Governing body means a municipal council or a regional district board, as the case may be.

Greywater: Refers to untreated wastewater from showers, baths and washing machines. Typically it contains relatively few pathogens compared with so-called black water, which comes from kitchen sinks and toilets. Greywater can be used for landscape irrigation and toilet flushing, which represents 30 to 40 per cent of indoor water use.

Groundwater: Occurs in permeable rocks (such as chalk) known as aquifers.

Local governments (as defined by the *Auditor General for Local Government Act*) are municipalities, regional districts, greater boards, commissions, corporations or other organizations that are financially controlled by one or more municipalities, regional districts or greater boards and any other local body that may be prescribed by regulation at some point in the future.

Multi-barrier approach: Aims to reduce the risk of drinking water contamination to protect public health. Central to the multi-barrier approach is the assessment and management of risks to water safety that can be added at each barrier in the water supply system (from the water source all the way through to the customer's tap). The six barriers are: source water protection; effective water treatment; secure water distribution system; water quality monitoring (at source, treatment plant and tap); operator training and emergency response procedures.

Resilience: Systems (e.g., people, communities and ecosystems) that are prepared for and able to withstand natural and man-made catastrophic events and can bounce back quickly and adapt (to 'new normal').

Risk assessment for drinking water: Identification of hazards and threats to water quality and quantity (existing and potential) throughout the local government's services, facilities and assets. Threats can include sources of contamination, human error, technical failures and malicious acts. Local government estimates the likelihood of each threat occurring, how often it might occur and identifies possible response strategies [see risk management]. Can be a formalised process (e.g., through Hazard Analysis and Critical Control Point [HACCP] or Water Safety Plan [see below]) or informal conducted on an ad hoc basis.

Risk management for drinking water: Risk management refers to decisions to address the issues (the control options to reduce or mitigate risk) identified in a risk assessment. Risks need to be balanced with available mitigation options that can be undertaken with available resources.

Source to tap: The components of the water supply system (from source protection to the treatment and distribution of drinking water to consumers) are understood and managed as a whole. Also related to the multi-barrier approach.

Sustainability: Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable water management: Protecting and conserving water resources and encouraging ways of living that neither deplete resources nor degrade environmental quality.

Water abstraction: Water abstractions refer to freshwater taken from ground or surface water sources, either permanently or temporarily and conveyed to the place of use.²⁴

Water conservation: An absolute reduction in the amount of water taken from the environment.

Water efficiency: Using less water to accomplish a given task. Note efficiency does not necessarily mean that less water is used overall. A low-flow shower head would use water more efficiently but if longer showers were taken the same amount of water could be used.

Water governance: The set of rules, practises, and process through which decisions for the management of water resources and services are taken and implemented, and decision-makers are held accountable.²⁵

Water management: The operational approach (e.g., models, principles and information) used to inform the decisions made about water.

Water safety plan: A preventative risk-based approach to managing drinking water safety from catchment to consumer (source-to-tap). This is a formalized and routine process whereby the threats to the system; the capacity of the system to cope with threats; the ability to respond if barriers fail; and measures to improve the system are all characterized and incorporated into planning.

Water security: The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.²⁶

²⁴source: www.oecd.org/publications/factbook/34416097.pdf

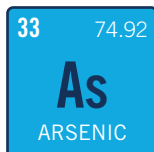
²⁵source: www.oecd.org/env/watergovernanceprogramme.htm

²⁶source: www.unwater.org/publications/water-security-infographic/

APPENDIX 1: Some of the most common chemicals in drinking water

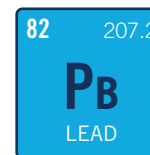
Arsenic: A natural element found widely in the earth's crust that can occur naturally (when mineral deposits or rocks containing arsenic dissolve) or through the discharge of industrial wastes and by the deposit of arsenic particles in dust, or dissolved in rain or snow.*

*Source: Health Canada web content



Lead: Lead is a metal contaminant with well-documented adverse health effects in humans. The main source of lead contamination of drinking water is from lead pipes used in water distribution. Lead exposures from contaminated soil, lead-based paint, air emissions and lead contaminated food are generally much higher than drinking water exposures to lead*.

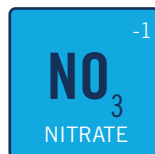
*Source: Hrudey, *Safe Drinking Water Policy for Canada*, 2011

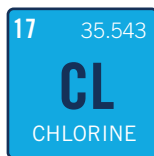


Nitrate: Nitrate occurs naturally, is widespread in the environment and is found more often in groundwater than in surface water. It makes its way into well water through sources such as agricultural activities (e.g., application of chemical fertilizers and animal manure, storage and feedlots); leaking sewage lines or improperly functioning septic systems and industrial process. Nitrate is commonly found in shallow wells that are located in agricultural areas. Nitrate levels in ground water may change over time, especially after a heavy rainfall*. Nitrate in drinking water is a concern if it exceeds the Guidelines for Canadian Drinking Water Quality and pose the greatest risks to infants causing methaemo-globinaemia, which may result in morbidity and death from short exposures.** It is important to note that boiling water can increase the amount of nitrate in water.

*Source: Health Canada web content

**Source: World Health Organization web content





Chlorine: All water supplies should be disinfected. Chlorine is the most commonly-used drinking water disinfectant (world-wide) to reduce or eliminate microorganisms because it is reasonably efficient and inexpensive. The addition of chlorine to drinking water greatly reduces the risk of waterborne diseases. All chemical disinfectants (including chlorine) used in drinking water can be expected to form by-products that could affect human health. Scientific data shows that the benefits of chlorinating drinking water are much greater than any health risks from by-products from chlorine, such as trihalomethanes (THMs). Best practices in water treatment can minimize the creation of disinfection by-products.

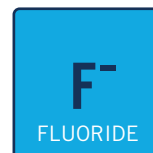
Alternatives to chlorine treatment to disinfect water include ozone. However, even when ozonation treatment is used, small amounts of chlorine are necessary to maintain disinfection in the distribution system.

Fluoride: A mineral that can occur naturally in groundwater or is added to drinking water supplies to prevent tooth decay.* Fluoride is endorsed by Health Canada as a safe, effective and equitable way to prevent and reduce tooth decay for all members of a community.** Above the recommended consumption levels, fluoride can cause discolouration of tooth enamel, and at levels (greater than about 14 milligrams per day) serious adverse skeletal effects occur.***

*Source: Health Canada web content

**Source: Health Canada—The addition of fluoride to drinking water is not common in B.C. but is common in many other provinces

***Source: World Health Organization web content



Emerging contaminants: Refers to contaminants of emerging concern that potentially pose risks to human health. For example, Pharmaceutical and Personal Care Products (PPCP) include ingredients in prescription drugs, over-the-counter medications, veterinary drugs, and products used for cosmetic or health reasons (fragrances, soaps, lotions, sunscreens, etc). Endocrine Disrupting Compounds (EDCs) are compounds that disrupt the endocrine system, possibly by mimicking or blocking the function of natural hormones in the body. A wide range of natural and man-made substances are thought to cause endocrine disruption, including pharmaceuticals, flame retardants, pesticides, plasticizers, and hormones excreted by humans and animals. These may be found in many everyday products, including plastic bottles, detergents, furniture, food, toys, and cosmetics. PPCP and EDCs can enter wastewater systems and ultimately end up in water sources. Detection, monitoring and treatments to address the potential health risks is expensive and acceptable levels have yet to be determined (the science informing these risks continues to evolve).*

*Source: Water Research Foundation web content

APPENDIX 2: Legislation involving local governments and water (Principal)

Environmental Management Act, SBC 2003, c. 53

- Prohibits environmental contamination
- Contains regulatory regime for liquid and solid waste management
- Deals with contaminated site remediation

ENVIRONMENTAL MANAGEMENT ACT



ENVIRONMENTAL MANAGEMENT ACT



Municipal Wastewater Regulation, B.C. Reg. 87/2012 Under the **Environmental Management Act**

- Conduct an environmental impact study as required
- Address issues involving reclaimed water (water that has been treated by wastewater facility and made suitable for reuse—done to reduce demand on potable water supply)
- Prohibit combined sewer (waste water and storm water) systems (§ 38)
- Develop and implement measures to eliminate combined sewer overflows eventually (§ 42) (Provincial government policy to eliminate all combined sewer systems)
- Categorize the uses of reclaimed water
- Describe how a local government may use reclaimed water in place of treated potable water such as irrigation, replenishment of a potential water source, etc. (Part 7)

DRINKING WATER PROTECTION ACT



Drinking Water Protection Act, SBC 2001, c. 9

- Principal piece of legislation to deal with drinking water supply in the province but it is in addition to any other requirements set out in other pieces of legislation
- Main responsibility—water suppliers must provide potable water
- Additional requirements
 - obtain permits for the various aspects of providing potable water
 - prepare written emergency responses and contingency plans for potable water
 - monitor the system and reporting threats to potable water
 - prepare water system assessments and plans
 - work with provincial health officers to develop drinking water protection plans
 - persons who operate and maintain the water supply system must be qualified in accordance with the regulations (or supervised by a qualified person)

Forest and Range Practices Act, SBC 2002, c. 69 (Replaces the Forest Practices Code of BC Act, RSBC 1996, c. 159)

- Continues the designation of areas established as community watersheds, areas with significant downstream fisheries values, areas with significant watershed sensitivity, and lakeshore management zones
- Prescribes the objectives in relation to water, fish, wildlife, biodiversity, recreation resources, and resource features (not a complete list)
- Establishes rules for community watersheds such as designation of areas in a watershed as a community watershed, water quality objectives in relation to community watersheds and regulating community watersheds
- Identifies watersheds with significant downstream fisheries values and significant watershed sensitivity and specifies objectives in relation to those areas
- Designates lakeshore management zones and establishes objectives for these zones



Local Government Act, RSBC 2015, c. 1, Community Charter, SBC 2003, c. 26

- Establishes local governments and delegates authority to local governments
- Among other things, enables the local government bodies to manage development, services, and deal with municipal finances

LOCAL GOVERNMENT ACT/ COMMUNITY CHARTER



Riparian Areas Protection Act, SBC 1997, c. 21 (formerly known as Fish Protection Act, SBC 1997, c. 21)

- Comply with regulations for the protection and enhancement of riparian areas
- Riparian Areas Regulation 376/2004
 - comply with directive established to protect riparian areas from development to provide natural features, functions and conditions that support fish life processes
 - work with Fisheries and Oceans Canada to deal with development approvals or allowances in riparian areas
- Cooperate with the Ministry of Environmental Protection and Sustainability and Fisheries and Oceans Canada in developing strategies to obtain certificates, monitor and enforcement to ensure assessment reports properly prepared, and public education
- protect riparian areas within its authority in accordance with the regulations

Water Sustainability Act, SBC 2014, c. 15

- Defines the purposes in respect of which water may be diverted from a stream or aquifer
 - Does not apply to geothermal resources as defined in *Geothermal Resources Act*
 - Vests water in the government in terms of the use and flow of all the water at any time in a stream in B.C. and the use, percolation, and flow of groundwater, wherever found
 - Must not divert water from a stream or aquifer unless authorized by licence or by regulation
 - Establishes the precedence of rights among the license holders
 - ranks purposes from highest to lowest in terms of priority
- | | |
|-------------------|-------------------|
| domestic | oil and gas |
| waterworks, | power |
| irrigation | storage |
| mineralized water | conservation |
| mining | land improvements |
| industrial | |
- if there is a declaration of significant water storage which applies to streams, comptroller can determine the critical environmental flow threshold which takes precedence over the other rights

**WATER
SUSTAINABILITY ACT**
Since February 2016



Water Sustainability Act, SBC 2014, c. 15

- Establishes mechanisms to create treaty First Nation water reservations
- Establishes regulations for protecting water resources, streams, wells, and groundwater
- Designates areas which are subject to Water Sustainability Plans which assists in preventing or addressing conflicts between water users, needs of water users and environmental flow needs, risks to water quality or risks to aquatic ecosystem health or identify restoration measures in relation to a damaged aquatic ecosystem

Regulations under the Water Sustainability Act

- Water Sustainability Regulation 30/2016
 - regulates changes in and about a stream and protective measures for water quality, aquatic ecosystem, and other water users
 - deals with short term diversions or use of water for well drilling
 - addresses the use of deep groundwater
- Dam Safety Regulation – 40/2016
 - requires a dam emergency plan
- Groundwater Protection Regulation – 39/2016
- Water Districts Regulations – 38/2016
- Water Sustainability Fees, Rentals and Charges Tariff Regulation – 37/201

APPENDIX 2: Legislation involving local governments and water (Associated)

Dike Maintenance Act, RSBC 1996, c. 95

- › Deals with constructions, repairs, replacements, improvement, or removal of dikes

DIKE MAINTENANCE ACT



LOCAL GOVERNMENT GRANTS ACT



Local Government Grants Act, RSBC 1996, c. 275

- › Establishes the regulations for conditional grants for infrastructure projects which includes the review, study, plan or construction of water supply and distribution facilities, sewage collection and disposal facilities

ENVIRONMENTAL ASSESSMENT ACT



Environmental Assessment Act, SBC 2002, c. 43aqua

- › Obtain environmental assessment certificates for reviewable projects which includes (a) dams, (b) dykes, (c) water diversion projects, (d) groundwater extraction projects; (e) shoreline modification projects, and (f) local government liquid waste management facilities

Water Protection Act, RSBC 1996, c. 484

- › Defines major watersheds
- › Places restrictions on water removal and large-scale transfers between major watersheds
- › Requires registered licences for water removal

WATER PROTECTION ACT



Land Act, RSBC 1996, c. 245

- › Establishes natural boundaries of bodies of water
- › Prohibits the disposition by crown grant of land located below the natural water boundary
- › Permits crown land which is greater than 520 ha to be disposed of by lease for watershed purposes
- › Retains water privileges for any other disposition of Crown land

LAND ACT



PUBLIC HEALTH ACT



Public Health Act, SBC 2008 c. 28

- › Public health planning and reporting
- › Preventing disease and other health hazards
- › Inspections and Orders
- › Emergency powers
- › Health Officials
- › *Drinking Water Protection Act*

APPENDIX 2: Legislation involving local governments and water (Other)

OTHER ACTS



Farm Practices Protection (Right to Farm) Act, RSBC 2996, c. 131

- Protects normal farm practices from nuisance claims

Fish and Seafood Act, SBC 2015, c. 14 (Replaces the Fisheries Act, RSBC 1996, c. 149)

- Ensures that those people involved with fish or aquatic plants
 - are under a duty to ensure food safety - that is to say that the fish or the aquatic plants are safe for human consumption
 - obtain the necessary licences

Geothermal Resources Act, RSBC 1996, c. 171

- Prescribes measures governing the drilling of wells and the production and conservation of geothermal resources (the natural heat of the earth including steam, water, and water vapour heated)

Integrated Pest Management Act, SBC 2003, c. 58

- Prescribes the processes for managing pest populations that includes managing the associated ecosystems

Livestock Act, RSBC 1996, c. 270

- Prevails over local government over bylaws which may have an impact on drinking water

Mines Act, RSBC 1996, c. 293

- Establishes that detrimental environmental impact occurs when quality of air, land, or water substantially reduces the usefulness of the environment or its capacity to support life
- Permit holders must file plans outlining the proposed work and the program for the protection and reclamation of the land and watercourses before any work in, on or about a mine proceeds
- Chief inspector may set conditions to protect or mitigate damage to watercourses
- Chief inspector may enter onto land and cause work to be done to abate pollution of land and watercourses affected by an abandoned mine

Park Act, RSBC 1996 c. 344

- The Minister may manage and administer the land, trail, path, or waterway available for use by the public.
- Subject to this Act, Wildlife Act applies on any land, trail, path, or waterway comprised in an order under section 6(1) and in parks, conservancies, and recreation areas
- Need a permit to
 - flood any part of a park, conservancy, or recreation area; or
 - impound, divert, or distribute water in a park, conservancy, or recreation area

Petroleum and Natural Gas Act, RSBC 1996, c. 361

- Requires permits for exploratory drilling for petroleum or natural gas
- Lease holders have the right to store or dispose of natural gas and the water produced in relation to the production of petroleum or natural gas

OTHER ACTS



Range Act, SBC 2004, c. 71

- Minister may enter into agreements granting rights over Crown range (which includes Crown lands whether or not covered by water) in form of grazing licences, grazing permits, hay cutting licences, and hay cutting permits

Transportation Act, SBC 2004, c. 44

- Minister may require remedial action be taken for land which is part of a provincial public undertaking (which includes any improvement or other work of public utility that relates to transportation including canals, ditches, drains, drainage, irrigation works and earthworks involving highways and public works)

Water Utility Act, RBC 1996, c. 485

- Defines what a water utility is (a person who owns or operates equipment or facilities for diverting, developing, pumping, impounding, distributing, or furnishing water, for compensation to 5 or more persons or to a corporation)
- However, this does not include a municipality for services furnished by the municipality, improvement district or regional district

Water Users' Communities Act, RBC 1996, c. 483 (formerly known as Water Act, RBC 1996, c. 483)

- Regulates the incorporation of water users' communities and the ability of water users' community to have exclusive control and operation of works constructed or used under the licences set out in the incorporation

Wildlife Act, RBC 1996, c. 488

- Minister may designate wildlife management areas which are not in a park, a conservancy, or recreation area and critical wildlife areas

APPENDIX 3: Summary table comparing characteristics of the different types of governing bodies

CHARACTERISTICS	MUNICIPALITY	REGIONAL DISTRICT	IMPROVEMENT DISTRICT
Principal Legislation	Community Charter	Local Government Act	Local Government Act – Part 17
Status	Corporate body with natural person powers	Corporate body	Corporate body
Governing Body	Council	Board of Directors	Board of Trustees
How Governing Body is established	Council members are elected by the citizens	Municipal directors are appointed by their municipal council Electoral area directors are elected by electoral area residents	Board members are elected by improvement district residents
Terms of office	4 years	Municipal directors – at the pleasure of Council Electoral area directors – 4 years	3 years
Governance proceedings	Council meetings	Board Meetings	Annual general meeting with the residents Board meetings throughout the year
Ability to close a meeting	Community Charter, s. 90	Local Government Act, s. 226 (See Community Charter, s. 90)	Minister has ability to pass regulations requiring these Boards to close meeting as if pursuant Community Charter, s. 90 No such regulations in effect
Reporting to the public	Council meetings and minutes Public notices Annual report	Board meetings and minutes Public notices	Board meetings and minutes Annual General Meeting
Subject to Freedom of Information and Protection of Privacy Act	Yes	Yes	Yes
Powers exercised	By bylaw or by resolution, depending upon the provisions of the legislation	By bylaw or by resolution, depending upon the provisions of the legislation	By bylaw or resolution, depending upon the provisions of the legislation Most powers such as financial powers, entering into contracts, regulating distribution and use of water regulating works and services by bylaw Some bylaws must be registered with the Inspector of Municipalities

CHARACTERISTICS	MUNICIPALITY	REGIONAL DISTRICT	IMPROVEMENT DISTRICT
Expropriation powers	Yes	Yes	Yes
Types of applicable bylaws involved in water provision	Official Community Plans Zoning Bylaw Subdivision Servicing Bylaw Water Bylaw	Regional Growth strategy Official Community Plans Zoning Bylaw Subdivision Servicing Bylaw Local Area Service Bylaws	varies
Mandatory Staff Members	Corporate Officer Finance Officer	Corporate Officer Finance Officer	Corporate Officer Finance Officer
Other Staff Members	Chief Administrative Officer Other staff members as determined necessary	Chief Administrative Officer Other staff members as determined necessary	Chief Administrative Officer Other staff members as determined necessary
Services provided	Any deemed desirable by Council Can be extended outside of the boundaries in certain circumstances	Services provided only to those municipalities and electoral areas which agree to participate in that service	Limited only to those for which improvement district was established. Usually, provision of a single service (e.g. water, fire protection, etc.)
Obligation to convey or supply water	Yes, unless exempt by the bylaw	Yes, if within the service area, unless exempt by bylaw	No (LGA s. 707(1))
Forms of revenue available to finance water	Property taxes Parcel taxes Local service area taxes Development cost charges Fees and charges Reserve funds Latecomer charges and cost recovery for excess or extended services	Local service area taxes Development cost charges Reserve funds Latecomer charges and cost recovery for excess or extended services	Taxes on the basis or parcels, values, or areas User Rates (tolls) and charges Developer charges (capital expenditure charges) Reserve funds Sinking funds Connection charges Latecomer charges and cost recovery for excess or extended services
Tax Sale to recover taxes	Yes	Yes	Yes

CHARACTERISTICS	MUNICIPALITY	REGIONAL DISTRICT	IMPROVEMENT DISTRICT
Financial Backing for Loans	Get support from rest of Regional District Goes through Municipal Finance Authority	Get support from rest of Regional District Goes through Municipal Finance Authority	Generally on its own, but Cabinet may guarantee improvement district securities under certain conditions. Can access pooled leasing and short-term investment pool services from Municipal Finance Authority
Electoral approval required for long term borrowing	Yes	Yes	No (However, often required as a condition of approval by the Ministry)
Insurance	Through Municipal Insurance Association	Through Municipal Insurance Association	Not through Municipal Insurance Association
Access to grant programs	Yes	Yes	No

***Other drinking water suppliers include;**
private wells, water users' community,
irrigation waterworks and First Nations
Communities

*If the organization is supplying potable water, it is subject to the requirements of provincial legislation

APPENDIX 4: Summary of authorities and processes that guide water decisions with neighbouring First Nations

KEY CONCEPTS

The government of British Columbia defines a water right as the authorized use of surface water or groundwater. The Province considers all water in British Columbia as owned by the Crown on behalf of the residents of the province.²⁷

First Nations consider access to water, or title to water, an aspect of Aboriginal title, which in turn provides them the right to use it and govern its use.²⁸

Different systems for recording water rights: The provincial water management and licensing system was established in 1865, before B.C. joined the Confederation in 1871. Federal rules over water and sub-surface rights differed from the province and there were conflicting systems and protocols for recording water records. First Nations' water rights associated with their existing reserves and traditional territories were and are still being defined in provincial legislation, treaty settlements and in courts.

WATER GOVERNANCE ARRANGEMENTS²⁹

The federal government is responsible for water systems and water standards on First Nation reserves that are not self-governing. The three federal agencies involved are:

- *Indigenous Services Canada:* Provides funding and advice for water systems on First Nations reserves
- *Health Canada:* Sets standards and monitors water quality
- *Environment Canada:* Protection of source waters and drinking water quality monitoring

ADDITIONALLY

- *Chiefs and Councils:* Manage the day-to-day water and wastewater systems on reserves including sampling, monitoring, issuing advisories as well as planning and developing infrastructure needs.
- *First Nations Health Authority:* Has responsibility for providing independent public health advice and guidance to many B.C. First Nations communities and provides funding and technical support to enable effective monitoring programs for drinking water quality.
- *Local Governments:* Some First Nations may purchase water (through agreements) from a neighbouring local government, improvement district, or other water providers. Other First Nations may run their own water systems, or residents simply draw from wells and other sources.
- *Environmental Operators Certification Program:* Classifies water facilities and certifies operators in most First Nations communities.

OFF-RESERVE ACTIVITIES—NATURAL RESOURCES AND SOURCE WATER PROTECTION³⁰

A range of off-reserve activities can impact reserve water quality and quantity, and decisions are often made at the municipal or provincial level. The Province of B.C. is legally obligated to consult and accommodate First Nations on land and resource decisions that could impact their Indigenous interests. Local governments are required to consult by statute when developing, amending or repealing an Official Community Plan.

²⁷Source: www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights

²⁸Source: British Columbia Assembly of First Nations *Governance Toolkit Part 1/Section 3.3.1 Water*

²⁹Source: www.aadnc-aandc.gc.ca *Water in First Nation communities—Roles and responsibilities*

³⁰Source: www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/consulting-with-first-nations

LEGISLATION

A key piece of federal legislation that relates to First Nations is the *Safe Drinking Water for First Nations Act* (S.C. 2013, c.21). This framework was put in place to regulate drinking water and wastewater on all First Nations reserves that are not self-governing (pg 10 and 11). The *Act* includes using provincial water standards and regulatory systems. (Part 1, Section 3.31, page 12)

The key pieces of provincial legislation that relate to First Nations include the *Water Sustainability Act* (S.C. 2013, c.21); the *Environmental Management Act* (S.B.C. 2003, c.53); the *Drinking Water Protection Act* (S.B.C. 2001, c.9); and the *Forest Range Practices Act* (S.B.C. 2002, c.69). (Part 1, Section 3.31, page 3)

USEFUL RESOURCES

British Columbia Ministry of Environment, Water Stewardship Division report on provincial water licenses on Indian Reserves

Health Canada Protocol for Safe Drinking Water for First Nation Communities

Health Canada Procedure Manual for Safe Drinking Water in First Nations Communities

2018 Metro Vancouver Profile of First Nations

AGLG contact information

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