Metro Vancouver

Drinking Water Management Plan

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metrovancouver

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VISION

THE DRINKING WATER MANAGEMENT PLAN

Metro Vancouver and member municipalities work together to supply clean, safe drinking water to more than 2.3 million people and associated businesses in the Metro Vancouver region. The Drinking Water Management Plan (DWMP) ensures that our region's water needs will be met affordably and sustainably. This will be done by using water more efficiently so that the water supply stretches out into the future even as the region's population continues to grow and increasing supply from the Coquitlam Lake reservoir.

The investments in water treatment, supply and conservation programs included in this plan will increase the cost of drinking water but the benefits include consistently higher quality drinking water, improved supply reliability, and greater environmental protection.

Metro Vancouver commits to provide clean, safe drinking water and ensure its sustainable use.

PART ONE: PLAN OVERVIEW

Metro Vancouver Sustainability Framework

Since 2002 Metro Vancouver has formally put the concept of sustainability at the centre of its operating and planning philosophy and advanced its role as a leader in the attempt to make the region one which is explicitly committed to a sustainable future. This comprehensive endeavour became known as the Sustainable Region Initiative, or more familiarly as the 'SRI'. In 2008, Metro Vancouver's Board adopted a Sustainability Framework outlining its vision, mission, values, sustainability imperatives, and sustainability principles. Depicted in Figure 1, the Sustainability Framework provides the foundation for Metro Vancouver's suite of plans, including the Drinking Water Management Plan (DWMP).

Regional Vision

Metro Vancouver has an opportunity and a vision to achieve what humanity aspires to on a global basis – the highest quality of life embracing cultural vitality, economic prosperity, social justice and compassion, all nurtured in and by a beautiful and healthy natural environment.

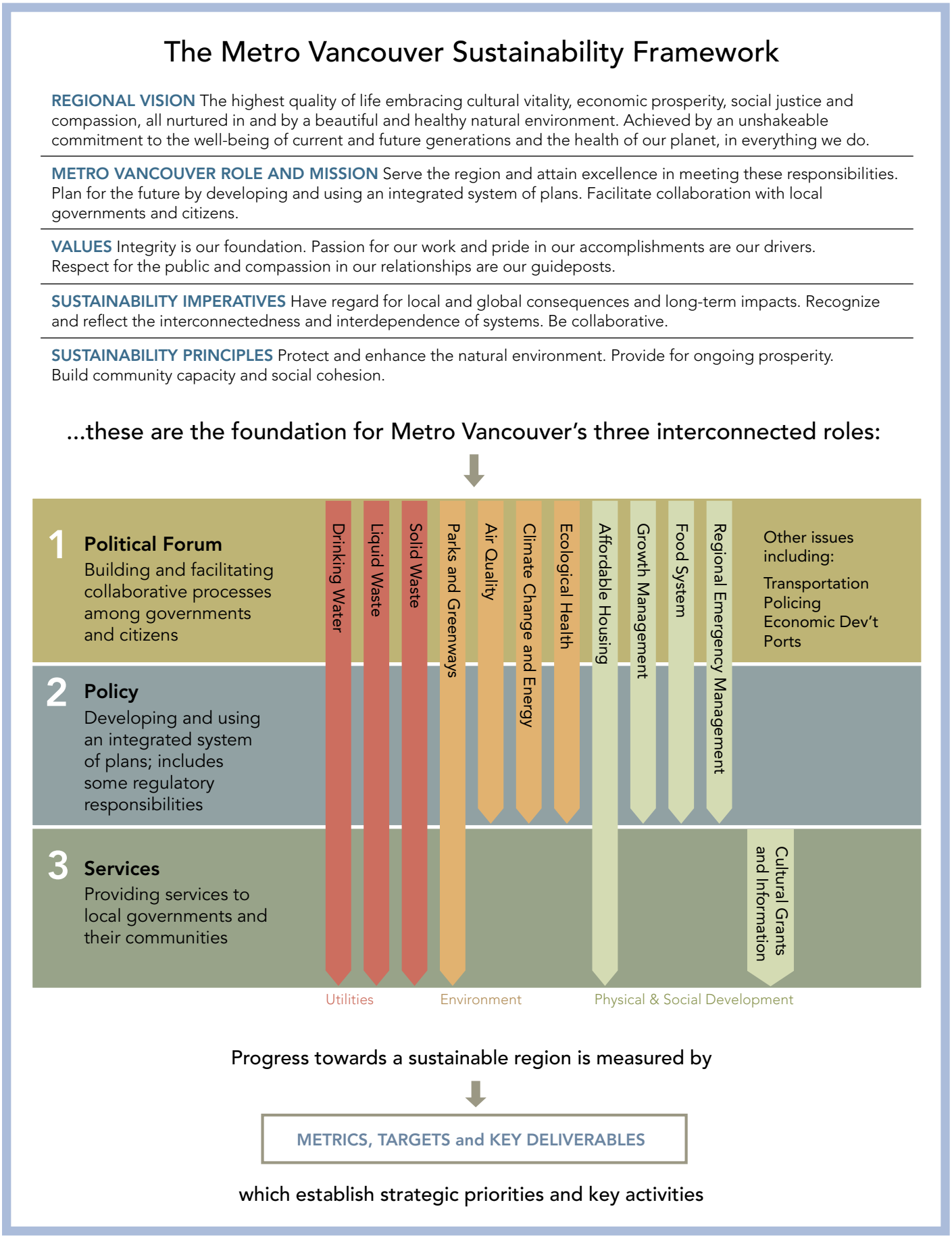
We will achieve this vision by embracing and applying the principles of sustainability, not least of which is an unshakeable commitment to the well-being of current and future generations and the health of our planet, in everything we do.

As we share our efforts in achieving this vision, we are confident that the inspiration and mutual learning we gain will become vital ingredients in our hopes for a sustainable common future.

Metro Vancouver is a political body and corporate entity operating under provincial legislation as a 'regional district' and 'greater boards' that delivers regional services, planning and political leadership on behalf of 24 local authorities. It comprises of:

CITY OF ABBOTSFORD
VILLAGE OF ANMORE
VILLAGE OF BELCARRA
BOWEN ISLAND MUNICIPALITY
CITY OF BURNABY
CITY OF COQUITLAM
CORPORATION OF DELTA
CITY OF LANGLEY
ELECTORAL AREA A (UNINCORPORATED AREA)
TOWNSHIP OF LANGLEY
VILLAGE OF LIONS BAY
DISTRICT OF MAPLE RIDGE
CITY OF NEW WESTMINSTER
CITY OF NORTH VANCOUVER
DISTRICT OF NORTH VANCOUVER
CITY OF PITT MEADOWS
CITY OF PORT COQUITLAM
CITY OF PORT MOODY
CITY OF RICHMOND
CITY OF SURREY
TSAWWASSEN FIRST NATION
CITY OF VANCOUVER
DISTRICT OF WEST VANCOUVER
CITY OF WHITE ROCK

Figure 1 Metro Vancouver's Sustainability Framework



Context for the Drinking Water Management Plan

History

The forested Capilano, Seymour, and Coquitlam Watersheds are the source of water supply for Metro Vancouver. Access to these mountainous watersheds is restricted and these protected watersheds have long been a key component in the region's water supply system. In 2005, the Board of the Greater Vancouver Water District approved the Drinking Water Management Plan (DWMP) for Metro Vancouver and its member municipalities. In 2007, the Plan was amended to fully incorporate management of the source watersheds. Since that time, a number of changes have occurred to improve the quantity and quality of water, the most notable being the commissioning of the Seymour-Capilano Filtration Plant.

Trends, Challenges, Opportunities

Metro Vancouver currently has sufficient quantities of water from its source watersheds to meet the region's needs until at least mid-century. Water continues to be a key economic, social, and environmental driver but demand for this resource will increase with time. The region is expected to grow by 35,000 people per year for the next few decades. Population growth will place demands not only on water supply, but also on water infrastructure if not carefully planned. While climate change predictions do not show a large shift in the amount of precipitation for the region, they do indicate that snow packs at lower elevations will decrease, springs will be earlier, and summers will be longer. These predicted changes in climate may place more stress on the drinking water supply system. In addition, predicted increases in storm activity during the rainy season may result in increased slope failures and river channel instability leading to increased turbidity in source reservoirs and increased treatment costs. Further opportunities can be identified to continue the trend of declining per-capita water use.

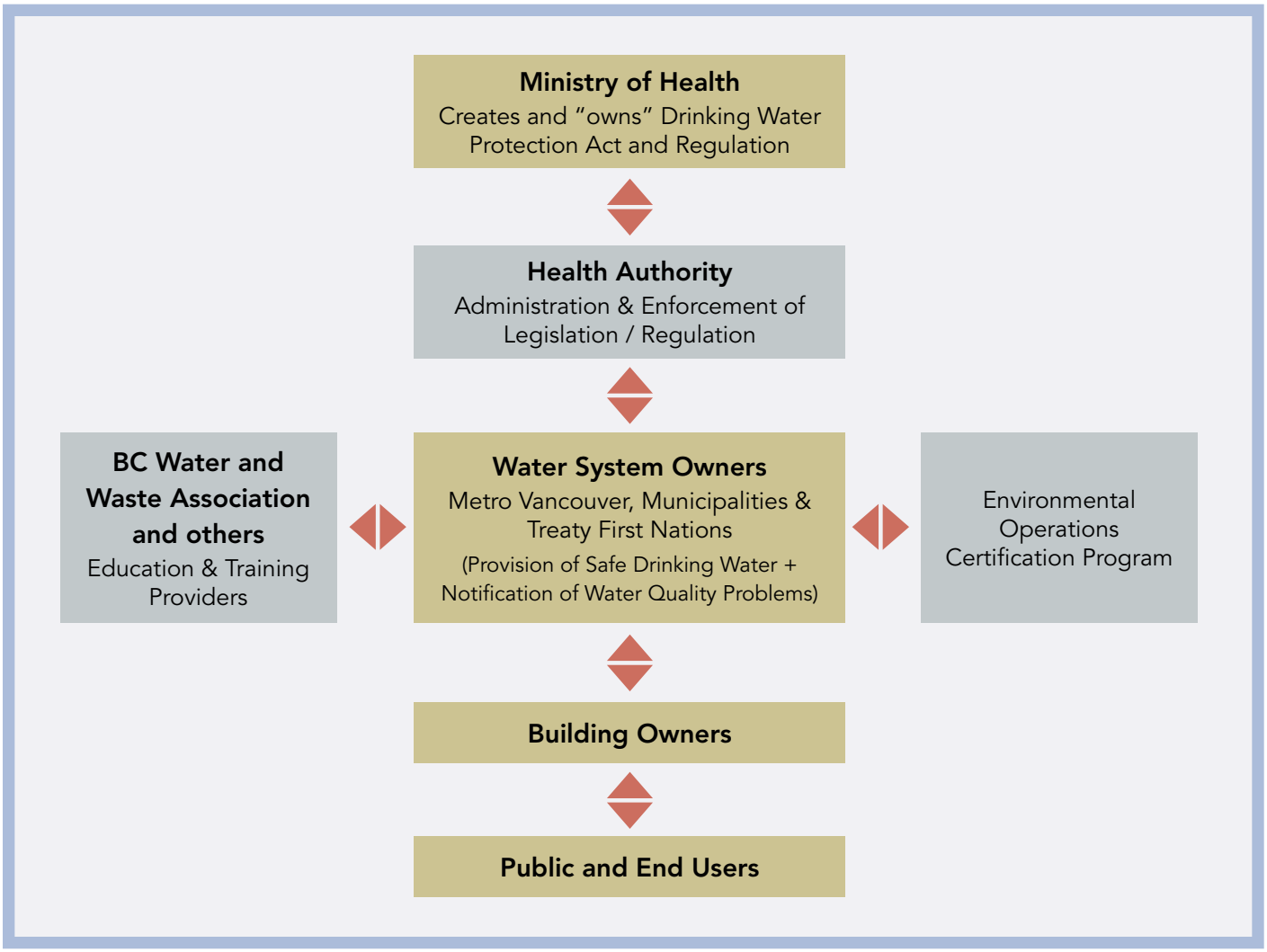
Roles and Responsibilities

Metro Vancouver and its municipalities work together to supply clean, safe drinking water to more than 2.3 million people and associated businesses in the Metro Vancouver region. In this Drinking Water Management Plan reference to Metro Vancouver usually means the Greater Vancouver Water District (GVWD) and reference to municipalities means GVWD member municipalities and member treaty first nation, Tsawwassen First Nation. Metro Vancouver owns and operates the water supply, treatment and regional water supply system while municipalities own and operate the local water distribution systems to supply water to residents and businesses. Homeowners, building owners, industry, commercial businesses, and institutions also have a role and responsibility in ensuring their piping systems are in good order once water enters their property. Metro Vancouver and its municipalities are taking steps to improve water monitoring and metering systems, to improve energy efficiency, and to implement what can be considered the 5Rs of resource management (reduce, reuse, reclaim, recover, and respect the use of water for other purposes). This updated DWMP provides the direction and priority for drinking water initiatives in a sustainable context.

Provincial Government Oversight of Drinking Water Systems

British Columbia's health authorities have a key role in providing provincial government oversight of drinking water systems. In particular, provincial government direction on provision of safe drinking water is administered locally by drinking water officers, public health engineers and medical health officers through issuance of an operating permit. The Metro Vancouver drinking water system is built and operated as one water system with portions of the system in the two Health Authorities that cover the Lower Mainland; Vancouver Coastal Health, and Fraser Health. The Vancouver Coastal Health drinking water officers provide surveillance and monitoring of those aspects of Metro Vancouver's drinking water systems that may affect public health. They also administer and enforce the Drinking Water Protection Act, the Drinking Water Protection Regulation and the Health Act (Figure 2).

Figure 2 Roles and responsibilities in the provision of safe drinking water sourced from Metro Vancouver's watersheds



Drinking water officers and public health engineers are contacted prior to the alteration of the drinking water system regarding construction permits and changes to operating permits. Water suppliers, such as Metro Vancouver and municipalities, have the water from their systems analyzed for the presence of microbiological pathogens and other indicator organisms by laboratories approved by the Provincial Health Officer.

From a water allocation or water quantity perspective, the *Provincial Water Act* is central to the water governance framework. The Provincial Water Act was last changed in 2004, driven primarily by growing concerns for the protection of drinking water quality. In addition to a new *Drinking Water Protection Act*, the 2004 Water Act amendments provided B.C. with its first mechanisms to protect groundwater and a process for watershed management planning to address or prevent conflicts among or between water users and the environment, and the protection of water quality.

Aligning with Provincial Initiatives

The strategies and actions identified in the Drinking Water Management Plan (DWMP) align with the following recent Provincial initiatives:

ACTION PLAN FOR SAFE DRINKING WATER IN BRITISH COLUMBIA

This plan includes comprehensive legislation and measures to protect drinking water from source to tap by improving monitoring, treatment, reporting, and accountability to the public. The Province's Action Plan sets out specific principles and actions to ensure British Columbians enjoy safe, clean, healthy drinking water as effectively, efficiently, and reliably as possible. The DWMP addresses all these concerns and continues to update them as required as best management practices evolve.

LIVING WATER SMART: BRITISH COLUMBIA'S WATER PLAN

Water Smart objectives supported by the DWMP include supporting rainwater harvesting and water reclamation actions, helping to address the impacts of climate change, and implementing actions that result in matching water quality to usage requirements.

WATER SUSTAINABILITY ACT (PROPOSED REVISION TO THE WATER ACT)

This proposed new act would revise the Water Act to lessen our water footprint and transition to a new way of managing water. This includes a number of water policies that propose to improve water use efficiency, conservation, protect stream health and aquatic environments, and regulate water during scarcity.

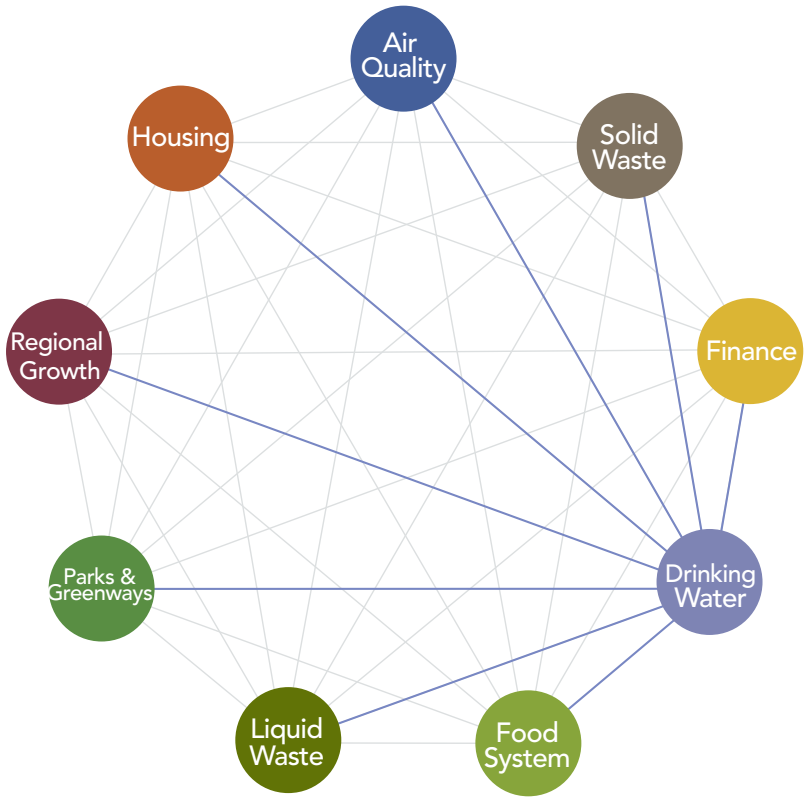
BC CLIMATE ACTION PLAN

This Plan sets a provincial target of 33 percent less greenhouse gas emissions by 2020 and 80 percent by 2050. The DWMP contributes to meeting these targets by prioritizing gravity systems where possible, assessing hydropower at existing reservoir dams, recovering energy where feasible and upgrading pump technologies.

INTEGRATED RESOURCE RECOVERY

Integrated Resource Recovery (IRR), formally defined by the Province in 2008 in a report titled Resources from Waste: A Guide to Integrated Resource Recovery, is a concept and approach that integrates the management of water, wastewater, energy, and solid waste services to recover resources and value to help increase resiliency.

Figure 3 Metro Vancouver's Interconnected Management Plans



Coordinating with other Metro Vancouver Plans

The Drinking Water Management Plan is one plan among a suite of interconnected management plans developed around Metro Vancouver's Sustainability Framework (Figure 3). The following section summarizes key links between Metro Vancouver's plans and outlines where actions identified in other Metro Vancouver plans affect the Drinking Water Management Plan, and conversely where actions in this DWMP make a contribution to the goals of other Metro Vancouver plans.

Table 1 Metro Vancouver Management Plan Linkages

Linkages Between Metro Vancouver Plans

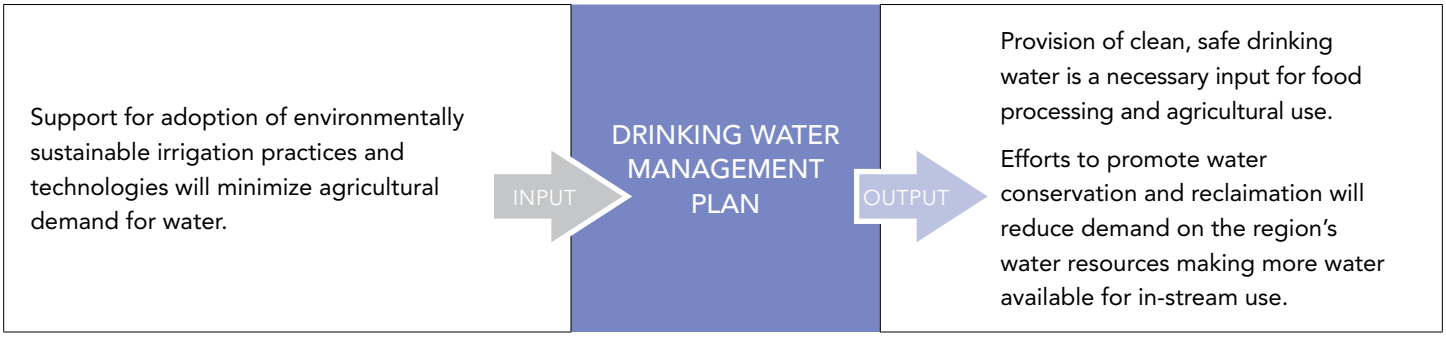
INTEGRATED LIQUID WASTE AND RESOURCE MANAGEMENT PLAN

REGIONAL GROWTH STRATEGY

INTEGRATED SOLID WASTE AND RESOURCE MANAGEMENT PLAN

Linkages Between Metro Vancouver Plans

REGIONAL FOOD SYSTEMS STRATEGY



AIR QUALITY MANAGEMENT PLAN

REGIONAL PARKS AND GREENWAYS PLAN

PART TWO:
GOALS, STRATEGIES and ACTIONS

Goal 1:
Provide Clean, Safe Drinking Water

Metro Vancouver and its municipalities are committed to providing reliable access to adequate quantities of clean, safe drinking water to the citizens and businesses of Metro Vancouver.

Strategy 1.1 Use a risk management multi-barrier approach from source to tap

Beginning with protected source watersheds, the region's water supply system provides multiple barriers to contamination. Projects such as the Seymour-Capilano Filtration Plant and the addition of the ultraviolet treatment plant at Coquitlam will further reduce the risks to water quality.

METRO VANCOUVER WILL:

1.1.1 Complete the Seymour-Capilano Filtration Project. 2013
1.1.2 Improve the primary disinfection treatment of Coquitlam source water for Cryptosporidium by adding ultraviolet treatment. 2013
1.1.3 Complete the reassessment of the secondary disinfection system after completion of the Seymour-Capilano Filtration Project. 2016

ON-GOING ACTIONS

1.1.4 Preserve water quality in the Metro Vancouver system by utilizing best management practices that include urban reservoir cleaning and circulating water to maintain appropriate chlorine levels.
1.1.5 Monitor water supply and water quality and use this information to optimize source water treatment, operation of the Metro Vancouver water system and rechlorination programs, and communicate system changes to agencies and municipalities as appropriate.

1.1.6 Implement, administer, and maintain backflow prevention and cross-connection control programs within the Metro Vancouver system to protect the public water system from hazards originating on customers' premises or from temporary connections.

1.1.7 Ensure continuous improvement for the management and operation of the Metro Vancouver water system by ongoing application of Metro Vancouver's Management System for Drinking Water.

1.1.8 Present an annual Metro Vancouver Water Quality Report to the Board of Directors.

MUNICIPALITIES WILL:

1.1.9 Complete the reassessment of the secondary disinfection system within the municipal distribution network in coordination with Metro Vancouver after completion of the Seymour-Capilano Filtration Project. 2016

ON-GOING ACTIONS

1.1.10 Monitor water quality in the municipal distribution systems and use this information to optimize water quality through operation of the municipal water system.

1.1.11 Preserve water quality in the distribution system through proactive maintenance programs that include water main flushing, cleaning of municipal reservoirs, and eliminating dead-ends where possible.

1.1.12 Implement, administer, and maintain backflow prevention and cross-connection control programs within the municipal distribution system to protect the public water system from hazards originating on customers' premises or from temporary connections.

Strategy 1.2 Manage watersheds to provide clean, safe water

Metro Vancouver's closed and protected watersheds minimizes human access and human activity and significantly reduces the risk from microbiological or chemical contamination and fires.

METRO VANCOUVER WILL:

1.2.1 Where feasible and appropriate, restore disturbed areas and deactivate watershed roads that are no longer required to minimize the risk of landslides and erosion, and reduce long-term maintenance costs. 2013

ON-GOING ACTIONS

1.2.2 Provide reliable and timely information on source water quality, stream flow, and fire risk to minimize risks to water quality, manage source reservoirs and optimize water treatment.

1.2.3 Manage the watersheds with a minimum intervention approach. Intervention is only necessary for building infrastructure or if there are risks to water quality or human safety.

1.2.4 Work in cooperation with adjoining municipalities and other organizations with infrastructure on watershed lands to minimize risks to water quality.

1.2.5 Reduce the risk from microbiological or chemical contamination by restricting access to the source watersheds as specified in Metro Vancouver's Watershed Access Policy.

Strategy 1.3 Identify and secure additional water supplies for the region

By making greater use of the storage capacity of Coquitlam reservoir our present sources of water offer a secure water supply that will meet our needs until about mid-century.

METRO VANCOUVER WILL:

1.3.1 Complete the Seymour-Capilano Filtration Project and initiate conceptual design of the new Coquitlam intake facility to access additional water supplies. 2013

1.3.2 Provide for additional capacity by securing full access to the Coquitlam source under the Coquitlam Water Use Plan and the current forecast predicts expanding storage capacity in Seymour and Capilano Watersheds by 2050. The schedule for storage expansion will be monitored and storage expanded as needed.

ACTIONS REQUESTED OF OTHER GOVERNMENTS AND AGENCIES (ON-GOING ACTION)

1.3.3 That senior governments, universities, and research agencies continue to assess the potential impacts of climate change on the need for additional water supplies or storage capacity and advise Metro Vancouver on the results of this research.

Goal 2: Ensure the Sustainable Use of Water Resources

By ensuring the sustainable use of water resources, the region can continue to grow and prosper while sustaining our quality of life and our environment.

Strategy 2.1 Use drinking water sustainably

Metro Vancouver and its municipalities are committed to pursuing demand management strategies where using water more sustainably will contribute to economic prosperity, community well-being and environmental integrity.

METRO VANCOUVER WILL: (ON-GOING ACTIONS)

2.1.1 Deliver education programs promoting behaviour change by means of:

- sustainability education resources;
- watershed field trips;
- sustainability initiatives at schools;
- information outreach programs promoting behaviour change and sustainable use of water.

2.1.2 Implement a region wide water conservation program targeting the industrial, commercial, institutional and agricultural sectors in partnership with municipalities. Program elements include water audits, informative resources and case studies.

2.1.3 Deliver the Tap Water Campaign to educate people about Metro Vancouver's high quality drinking water and to reduce the environmental impact of bottled water.

2.1.4 Set the wholesale water rates and water rate structure to reflect the cost of regional water supply, and achieve water conservation and other sustainability objectives.

2.1.5 Work with the business sector on water conservation and water reuse initiatives in partnership with municipalities.

2.1.6 Develop the Seymour Water Treatment and Watershed Academy to support innovative research and demonstration projects.

MUNICIPALITIES WILL:

2.1.7 Reassess the merits of developing residential water metering programs and municipal rebate programs for water efficient fixtures and appliances. 2015

ON-GOING ACTIONS

2.1.8 Develop, implement and enforce consistent bylaws to encourage water efficiency and implement Metro Vancouver's Water Shortage Response Plan.

2.1.9 Work with the business sector on water conservation and water reuse initiatives in partnership with Metro Vancouver.

2.1.10 Achieve a retail water rate structure that reflects the cost of regional water supply and, if practical, the regional seasonal price structure.

2.1.11 Deliver education programs promoting behaviour change and sustainable use of water.

Strategy 2.2 Match water quality to usage requirements

Many of the purposes for which drinking water is currently used do not require use of water of potable quality.

METRO VANCOUVER WILL:

2.2.1 Install facilities for water reclamation at wastewater treatment plants to provide reclaimed water for use within and outside wastewater plants where feasible. 2011-2016

ON-GOING ACTION

2.2.2 Evaluate alternatives to potable water for specific purposes, including:

- rainwater harvesting for irrigation;
- greywater and reclaimed wastewater for residential, commercial, institutional, and agricultural use;
- groundwater for irrigation;
- river and sea water for waterfront businesses.

MUNICIPALITIES WILL:

2.2.3 Update municipal bylaws, utility design standards and neighbourhood design guidelines to enable and encourage on-site rainwater management as appropriate, so that it can be used for non-potable purposes such as irrigation. 2014

ACTIONS REQUESTED OF OTHER GOVERNMENTS, AGENCIES, AND ASSOCIATIONS: (ON-GOING ACTIONS)

2.2.4 Revise the provincial health regulations to allow specific residential and commercial uses of non-potable water (greywater and rainwater) after discussions with Metro Vancouver and municipalities.

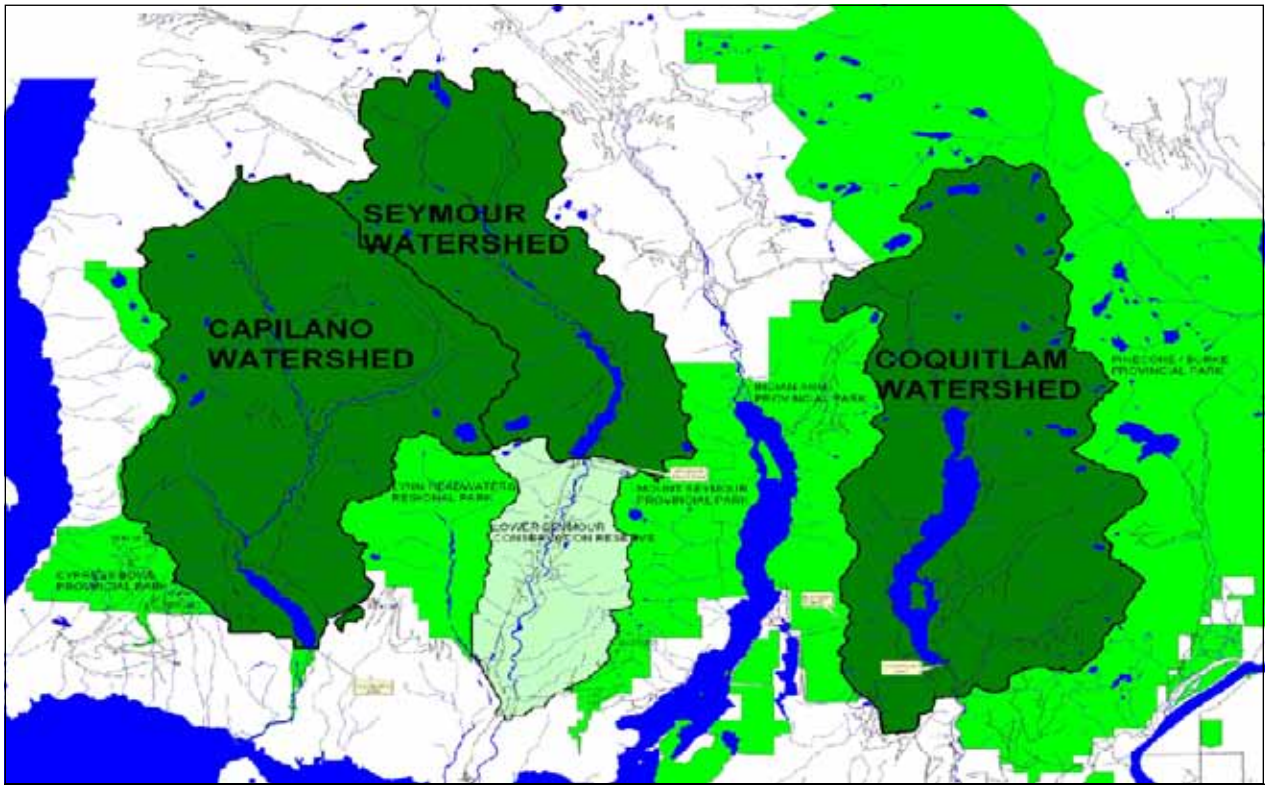
2.2.5 Facilitate networking for re-use of process wastewater with business associations, institutions, and non-governmental organizations.

Strategy 2.3 Manage and protect watersheds as natural assets

Managing and protecting watershed lands and their biological diversity as natural assets and as part of the region's conservation lands significantly advances regional sustainability

METRO VANCOUVER WILL: (ON-GOING ACTIONS)

2.3.1 Manage watershed lands and their biological diversity to advance regional sustainability.
2.3.2 Manage the on-drainage watershed lands with a minimum intervention approach.
2.3.3 Protect and conserve fish populations while continuing to provide clean, safe drinking water.
2.3.4 Provide non-motorized recreational opportunities on off-drainage watersheds lands where appropriate.
2.3.5 Develop and implement a Joint Water Use Plan for the Seymour and Capilano Watersheds.



Goal 3:
Ensure the Efficient Supply of Water

Efficient supply of water optimizes capacity and defers the need for new infrastructure and new water supply sources. Equally important is renewing and replacing the region's aging water transmission and distribution systems in an affordable way.

Strategy 3.1 Manage infrastructure proactively

Managing infrastructure proactively will ensure cost-effective, reliable and sustainable water supply.

METRO VANCOUVER WILL: (ON-GOING ACTIONS)

3.1.1 Develop and implement an Asset Management Plan targeted at maintaining delivery of reliable and cost-effective drinking water services to the region over the next 100 years.
3.1.2 Renew and replace aging infrastructure to maintain required levels of service based on risk analyses (including seismic risk) and cost-benefit priorities.
3.1.3 Undertake cost-effective leak identification and repair programs targeting water transmission mains with high breakage rates or that are older than 50 years.
3.1.4 Implement, where feasible and appropriate, pressure reduction or pressure management programs (including pressure transients) to reduce leakage and potentially extend the life of the infrastructure.
3.1.5 Conduct hazard assessments specific to trespassing, excavations over pipes and pressure loss and implement emergency and security programs to reduce risks.
3.1.6 Upgrade the energy efficiency of the system by prioritizing gravity systems and where possible recovering surplus energy and upgrading pump and motor efficiencies.
3.1.7 Upon completion of a Joint Water Use Plan for the Capilano and Seymour Watersheds, assess the feasibility of developing hydropower at the Cleveland and Seymour Falls dams.

MUNICIPALITIES WILL: (ON-GOING ACTIONS)

3.1.8 Renew and replace aging infrastructure to maintain required levels of service based on risk analyses and cost-benefit priorities specific to the needs of each municipality.
3.1.9 Undertake cost-effective leak identification and repair programs targeting the municipal water system.
3.1.10 Implement, where feasible and appropriate, pressure reduction or pressure management programs (including pressure transients) to reduce leakage and potentially extend the life of the infrastructure.

Strategy 3.2 Optimize capacity through effective partnerships

Gaining efficiency and optimizing capacity through more effective communications and partnerships enables more to be done with less.

METRO VANCOUVER WILL:

3.2.1 Maintain a system of seasonal pricing and confirm that the cost of providing water in the summer season continues to be 1.25 times the cost of providing water during the remainder of the year and make seasonal pricing adjustments accordingly. 2014

ON-GOING ACTIONS

3.2.2 Based on the projected growth in population and economic activity in Metro Vancouver's approved Regional Growth Strategy, plan and construct required Metro Vancouver facilities.

3.2.3 Install water meters on all new municipal system connections to Metro Vancouver's water mains.

3.2.4 Further enhance lawn sprinkling regulations to address both seasonal and peak day consumption issues in partnership with municipalities.

MUNICIPALITIES WILL: (ON-GOING ACTION)

3.2.5 Further enhance lawn sprinkling regulations to address both seasonal and peak day consumption issues in partnership with other municipalities and Metro Vancouver.

PERFORMANCE MEASURES

The following performance measures will monitor progress in achieving the goals of the Drinking Water Management Plan (DWMP). Performance should be considered in the context of industry standards and performance by other utilities in other jurisdictions.

Goal 1: Provide Clean, Safe Drinking Water

1. Treated water samples negative for E. coli bacteria (striving for 100%).
2. Treated water samples negative for total coli forms (striving for high percentages).
3. Percent of untreated source water samples exceeding 20 E. coli/100 ml (striving for low percentage).

Goal 2: Ensure the Sustainable Use of Water Resources

4. Per capita water use by residential customers (trend over time and compare to other jurisdictions).
5. Per capita water use by all customers (trend over time and compare to other jurisdictions).
6. Peak day per capita water use by all customers (trend over time and compare to other jurisdictions).
7. Greenhouse gases generated in treating and delivering water (per cubic meter of water delivered by Metro Vancouver and net of energy recovery).

Goal 3: Ensure the Efficient Supply of Water

8. Metro Vancouver's Water Rate (trend over time and compare changes in Metro Vancouver to changes in other jurisdictions).
9. Metro Vancouver's drinking water budget (trend over time and compare changes in Metro Vancouver to changes in other jurisdictions).
10. Kilowatt hours of energy used in treating and delivering water (per cubic meter of water delivered by Metro Vancouver and net of energy recovery).

Adaptive Management

As the region grows and changes, the science of water management improves, and public values evolve, the DWMP will be reviewed and revised. An adaptive management approach is proposed with a DWMP progress report every two years and a comprehensive review of the plan every five years.