

<http://www.metrovancouver.org/services/water/planning/Documents/DraftDrinkingWaterManagementPlan.pdf>

# Drinking Water Management Plan

for Metro Vancouver and Member Municipalities

# drinking water

*Nature's health drink, always on tap*



*Working DRAFT  
April 4, 2011*



**metro  
vancouver**

# **2011 Drinking Water Management Plan – WORKING DRAFT**

## **Vision Statement**

### **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.

### **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.

*Nature's health drink, always on tap*

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## Part 1: Plan Overview

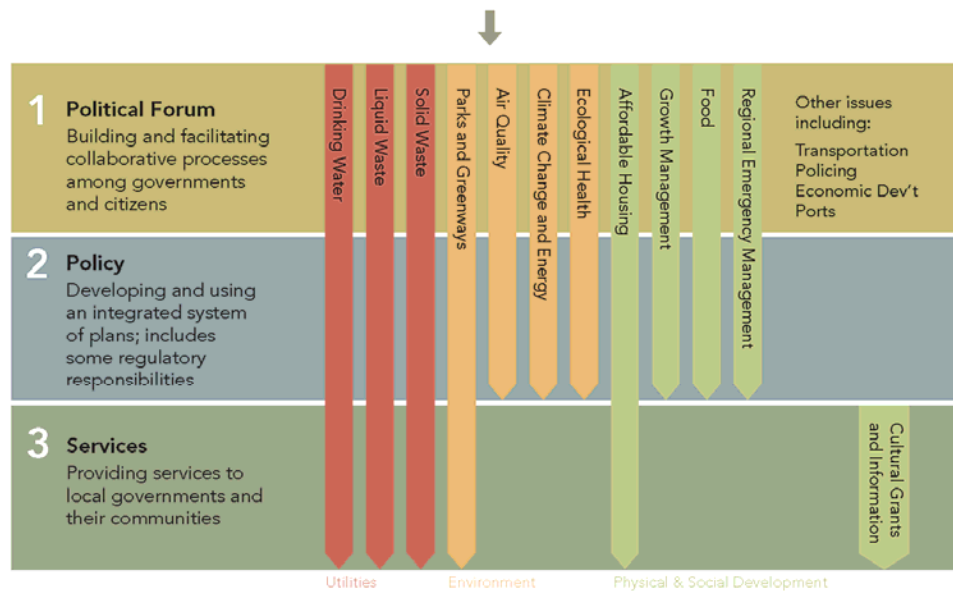
### The Metro Vancouver Sustainability Framework

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).

Figure 1. The Metro Vancouver Sustainability Framework

<b>REGIONAL VISION</b>	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. Achieved by an unshakeable commitment to the well-being of current and future generations and the health of our planet, in everything we do.
<b>METRO VANCOUVER ROLE AND MISSION</b>	Serve the region and attain excellence in meeting these responsibilities. Plan for the future by developing and using an integrated system of plans. Facilitate collaboration with local governments and citizens.
<b>VALUES</b>	Integrity is our foundation. Passion for our work and pride in our accomplishments are our drivers. Respect for the public and compassion in our relationships are our guideposts.
<b>SUSTAINABILITY IMPERATIVES</b>	Have regard for local and global consequences and long-term impacts. Recognize and reflect the interconnectedness and interdependence of systems. Be collaborative.
<b>SUSTAINABILITY PRINCIPLES</b>	Protect and enhance the natural environment. Provide for ongoing prosperity. Build community capacity and social cohesion.

...these are the foundation for Metro Vancouver's three interconnected roles:



Progress towards a sustainable region is measured by

**METRICS, TARGETS and KEY DELIVERABLES**

which establish strategic priorities and key activities

## **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 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. 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**

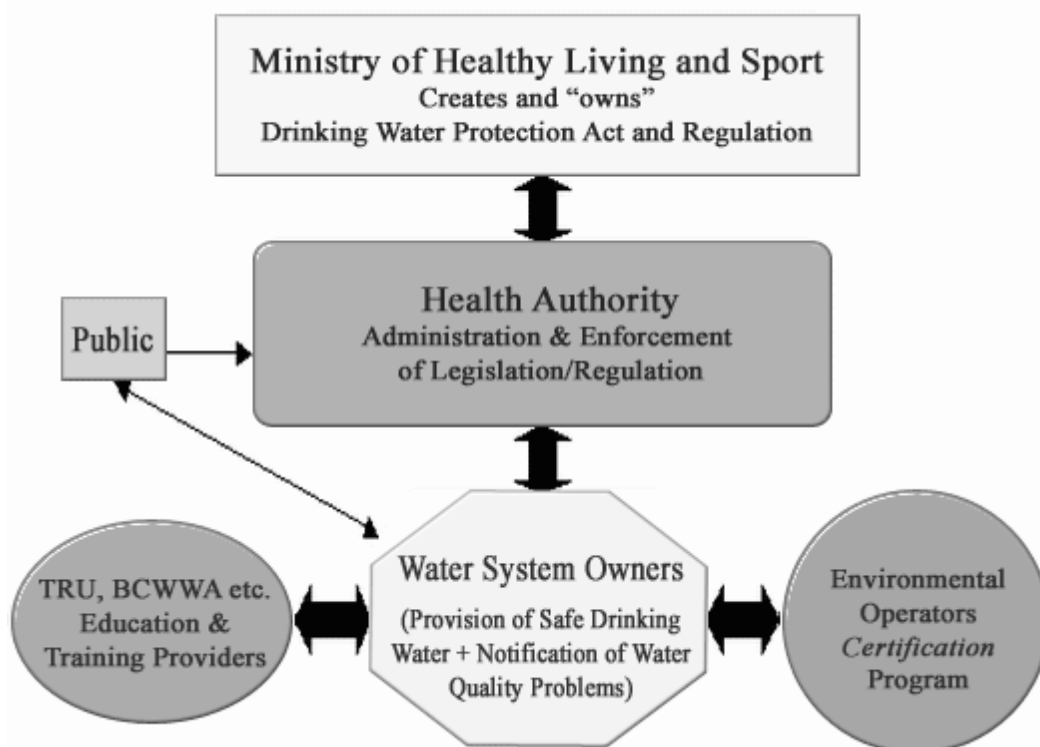
Metro Vancouver and its member municipalities work together to supply clean, safe drinking water to more than 2.3 million people and associated businesses in the Metro Vancouver region. Metro Vancouver owns and operates the water supply, treatment and regional water supply system while municipalities own and operate the local water distribution systems to supply water to residents and businesses. Metro Vancouver and its member municipalities are taking steps to improve the accuracy of 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. 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 drinking water officers provide surveillance and monitoring of those aspects of 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 (graphic below).

## Roles and Responsibilities in the Provision of Safe Drinking Water



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 member 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 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 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.

### **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% less greenhouse gas emissions by 2020 and 80% 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.



## 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. 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.

### ***Linkages Between Metro Vancouver Plans***

1. Integrated Liquid Waste and Resource Management Plan input to DWMP

Strategies supporting rainwater harvesting for landscape irrigation and water reclamation actions for non drinking water uses helps access alternatives to drinking water use where high quality drinking water is not needed. This helps support becoming more efficient in water uses.

2. DWMP output to Integrated Liquid Waste and Resource Management Plan

Ability to utilize non-potable water for alternative purposes. Also reduces the amount of water that has to be treated at the wastewater treatment plants.

3. Regional Growth Strategy input to DWMP

A compact urban area generally uses infrastructure more efficiently and places less demands on the overall system.

4. DWMP output to Regional Growth Strategy

Provision of clean, safe drinking water is integral to complete communities and a sustainable economy. In addition, protected watersheds protect the region's conservation lands.

5. Integrated Air Quality and Greenhouse Gas Management Plan input to DWMP

Reducing deposition of air contaminants will minimize the contamination of water resources and foster the provision of clean, safe drinking water.

6. DWMP output to Integrated Air Quality and Greenhouse Gas Management Plan

Ensuring that drinking water is produced, distributed, and used efficiently will minimize energy consumption and associated greenhouse gases.



## Part 2: The Strategic Action Plan

### Goals, Strategies, and Actions

The Drinking Water Management Plan has three primary goals:

1. Provide Clean, Safe Drinking Water

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

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.

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.

The key strategies and actions to achieve these goals are set out in the following sections.

### Goal 1: Provide Clean, Safe Drinking Water

There are three strategies to achieve this goal:

- 1.1 Use a Risk Management Multi-barrier Approach from Source to Tap;
- 1.2 Manage Watersheds to Provide Clean, Safe Water;
- 1.3 Identify and Secure Additional Water Supplies for the Region.

#### 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 Reassess the secondary disinfection system after completion of the Seymour-Capilano Filtration Project. 2013

*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 quality and use this information to optimize source water disinfection, operation of the Metro Vancouver water system and rechlorination programs.
- 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 Reassess the secondary disinfection system within the municipal distribution network in coordination with Metro Vancouver after completion of the Seymour-Capilano Filtration Project. 2013

*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 and cleaning of municipal reservoirs.
- 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 minimize 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 in 2011 and then expanding storage capacity in Seymour and Capilano Watersheds by 2050.

**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**

There are three strategies to achieve this goal:

- 2.1 Use Drinking Water Sustainably;
- 2.2 Match Water Quality to Usage Requirements;
- 2.3 Manage and Protect Watersheds as Natural Assets.

### **Strategy 2.1 Use Drinking Water Sustainably**

Metro Vancouver and its member 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. 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.
- 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 Assess 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 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 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 member 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 green zone 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**

There are two strategies to achieve this goal:

- 3.1 Manage Infrastructure Proactively; and,
- 3.2 Optimize Capacity through Effective Partnerships.

### **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 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 pressure reduction or pressure management programs to reduce leakage.
- 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 water transmission mains with high breakage rates or that are older than 50 years.
- 3.1.10 Implement pressure reduction or pressure management programs to reduce leakage.

**Strategy 3.2 Optimize Capacity through Effective Partnerships**

Gaining efficiency and optimizing capacity through more effective 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.

**Municipalities will:**

*On-going action*

- 3.2.5 Further enhance lawn sprinkling regulations to address both seasonal and peak day consumption issues.



## **Performance Measures**

The following performance measures will monitor progress in achieving the goals of the 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 positive for E. coli bacteria (striving for zero).
- 2) Treated water samples positive for total coliforms (striving for low 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 per cubic meter of delivered water (trend over time).

### **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 per cubic meter of delivered water (trend over time).

## **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.