

Progress Report for the Drinking Water Management Plan

for the GVWD and Member Municipalities

**drinking
water**
quality on tap



**metro
vancouver**

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1. Drinking Water Supply in Greater Vancouver

The Greater Vancouver Water District (GVWD) and member municipalities work together to supply clean, safe drinking water to over two million people and associated businesses. The sources of water supply are the Capilano, Seymour and Coquitlam Watersheds. Dams in each watershed impound water and provide releases to the drinking water system and to downstream rivers for fish and wildlife.

In September 2005, the Greater Vancouver Water District Board approved the Drinking Water Management Plan for the GVWD and member municipalities (dated August 2005). The Plan was amended slightly in July 2007 with the addition of a new goal to fully incorporate watershed management. The revised Drinking Water Management Plan (DWMP) contributes to a healthy sustainable region through wise stewardship of our drinking water resources. The DWMP takes an adaptive management approach that includes providing a progress report every two to three years. This is the second progress report.

The 2005 Drinking Water Management Plan with the 2007 amendment has the following goals:

- **Provide Clean, Safe Drinking Water**
- **Watersheds that Provide Clean, Safe Water and Are Managed and Protected as Natural Assets**
- **Ensure the Sustainable Use of Water**
- **Ensure the Efficient Supply of Water**

To achieve each of the above goals the DWMP has strategies, actions, and performance measures. Grouped by goal, section 2 of this progress report:

- summarizes trends in performance measures and progress in achieving the goals of the plan; and,
- reviews progress on implementing the plan actions.

Next Steps in Building a Sustainable Region

The Sustainable Region Initiative provides an ongoing process for linking the Drinking Water Management Plan with other regional plans like the recently approved Integrated Liquid Waste and Resource Management Plan. Major reviews are currently underway for other plans such as the Regional Growth Strategy and Integrated Solid Waste and Resource Management Plan. The following Metro Vancouver websites provide additional information:

- Sustainable Region Initiative – www.metrovancouver.org/about/sri/Pages/default.aspx
- Water quality and treatment – <http://www.metrovancouver.org/services/water/qualitytreatment/Pages/default.aspx>
- Water conservation - <http://www.metrovancouver.org/buildsmart/design/Pages/WaterConservation.aspx>
- Smartsteps – business tools for sustainability - <http://www.metrovancouver.org/SmartSteps/Pages/default.aspx>
- Tap Water Campaign – <http://www.metrovancouver.org/region/tapwater/Pages/default.aspx>

2. GOALS, STRATEGIES, ACTIONS AND PERFORMANCE

Goal - Provide Clean, Safe Drinking Water

There are two strategies to achieve this goal: Use a Risk Management Multi-barrier Approach from Source to Tap, and Identify and Secure Additional Water Supplies for the Region.

Performance Measures for Goal – Provide Clean, Safe Drinking Water

The Drinking Water Management Plan identifies the following performance measures to monitor progress in providing clean, safe drinking water.

Treated water samples positive for total coliforms (striving for low percentages).

Water quality analysis of about 25,000 water samples per year indicates the drinking water provided by the GVWD is safe. Total coliform bacteria are used as an indicator of primary (or source) disinfection efficiency and bacterial regrowth in the water distribution system. Total coliform levels are low and have dropped significantly since improvements in the water distribution system rechlorination stations and water main flushing programs were implemented in 1998 (Figure 1).

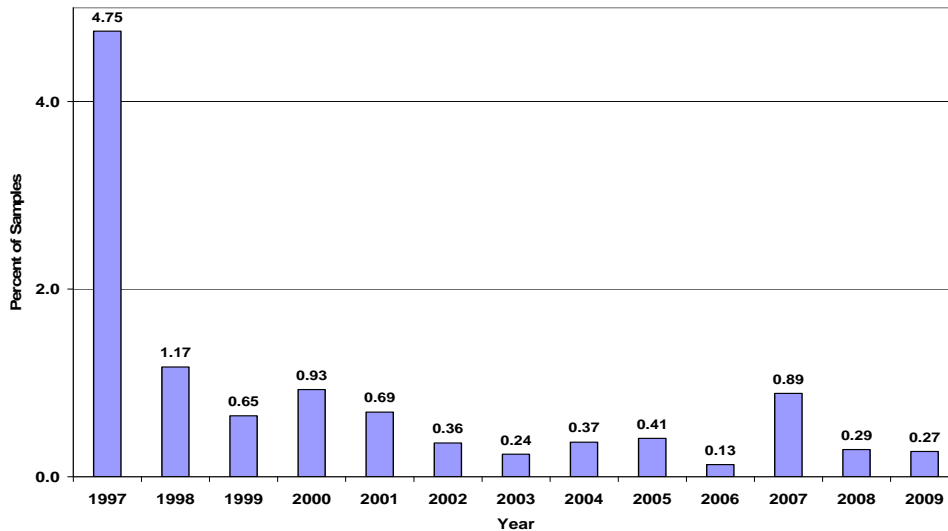


Figure 1: Percent of Municipal Samples Positive for Total Coliform Bacteria

Percentage of water supplied with optimum primary disinfection despite events such as turbidity, power outage or similar event (striving for 100 percent).

Primary disinfection facilities for the three water supplies were effectively operated with very few interruptions over the 2007 to 2009 period, especially during high turbidity periods. The primary chlorine disinfection for Seymour and Capilano sources operated effectively 99.98 percent of the time, while Coquitlam was at 100 percent when in use. The ozone disinfection facility for Coquitlam operated effectively 99.74 percent of the time when in use.

Treated water samples positive for *E. coli* bacteria (striving for zero).

The detection of *Escherichia coli* (*E. coli*) bacteria, in a treated water sample, triggers a protocol which involves immediate notification of health and municipal officials, resampling and an investigation into the possible cause. In 2007, no treated water samples tested positive for *E. Coli* bacteria. However, one sample in 2008 and one sample in 2009 tested positive. Repeat samples were negative in both cases and investigations indicated the samples were likely contaminated during sampling.

Progress on Actions to: Provide Clean, Safe Drinking Water

Progress is being made on upgrading the GVWD's water treatment system to meet 2005 revisions to the Canadian drinking water guidelines and to provide more reliable treatment during turbidity events and power outages. The Seymour-Capilano Filtration Plant went into service in December 2009 and early results indicate that the plant is operating successfully. One preliminary but significant result is the improvement of the chlorine residual levels in the water distribution system receiving filtered water.

Work continues on the twin tunnels linking the Capilano source with the Seymour-Capilano Filtration Plant with completion expected in mid 2013. Once finished, the tunnels will allow water from the Capilano source to be treated at the filter plant. Since 2000, the water from the Coquitlam source has been treated with ozone for primary disinfection. Ultraviolet light is being added as another primary disinfectant at this source with the upgraded plant expected to be operational in late 2012.

The following provides an update on some of the actions that will increase the water supply capacity of the regional system:

- completion of the Capilano Twin Tunnels in mid 2013 will increase the ability to drawdown and supply water from the Capilano Reservoir; and,
- construction of a new second intake on the Coquitlam source that along with associated treatment and transmission facilities, will increase the supply from the Coquitlam source. Due to decreasing per-capita water use the start up date for this second intake system has been delayed until 2025. Conceptual engineering of the second intake system is ongoing.

Priorities

Giving priority to the following assessments will improve progress towards this Goal:

- The GVWD and its member municipalities will reassess the chlorine residual levels and secondary disinfection system for areas receiving treated water from the Seymour-Capilano Filtration Plant. As the GVWD gains more experience with the water quality from the filtration plant it is expected that chlorine doses can be reduced resulting in fewer taste and odour concerns for the consumer and a reduction in disinfection byproduct levels.
- GVWD is continuing to assess climate change impacts on the regional drinking water system and take adaptation actions.



Seymour-Capilano Filtration Plant



Coquitlam Glacier

2. GOALS, STRATEGIES, ACTIONS AND PERFORMANCE

Goal – Watersheds that provide clean, safe water and are managed and protected as natural assets

The Capilano, Seymour, and Coquitlam watersheds are the region’s “Jewel in the Crown” in providing clean, safe water and protecting natural resource values. The closed and protected watersheds are the first barrier in place to ensure the best possible source water quality and ultimately clean, safe drinking water. These pristine watersheds provide source water that is untouched by contaminants found in watersheds with industrial, agricultural, or residential developments. With source water coming straight from nature in the form of rainfall and snowmelt, Metro Vancouver promotes its tap water as “mountain fresh”.



Tap Water Campaign

The watershed lands are also an immense resource and repository of terrestrial and aquatic biological diversity. Protecting watershed lands and associated biological diversity as part of the region’s conservation areas significantly contributes to the region’s sustainability objectives (Figure 2).

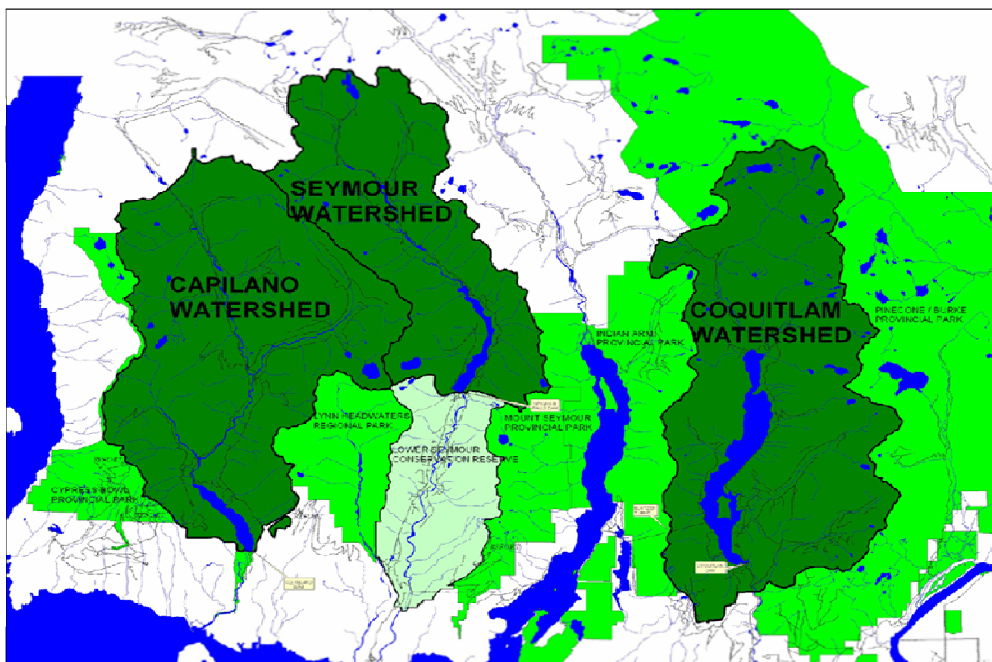


Figure 2: Protected Watersheds and Adjoining Conservation Areas

Proposed Performance Measure for Goal - Watersheds that Provide Clean, Safe Water and Are Managed and Protected as Natural Assets

Percent of Source Water Samples Exceeding 20 *E. coli*/100 mL (striving for low percentage).

The quality of the source water is an indicator of the degree of contamination, and the treatment required to ensure a safe drinking water supply. Canadian water quality guidelines suggest that for unfiltered sources, prior to treatment, the number of *E. coli* bacteria in the source water can exceed 20/100 mL in not more than 10% of the weekly samples from the previous 6 months. Source water samples from 2005 to 2009 indicate excellent source water quality (Figure 3). Wildlife is the likely source of the *E. coli* detected in the source water.

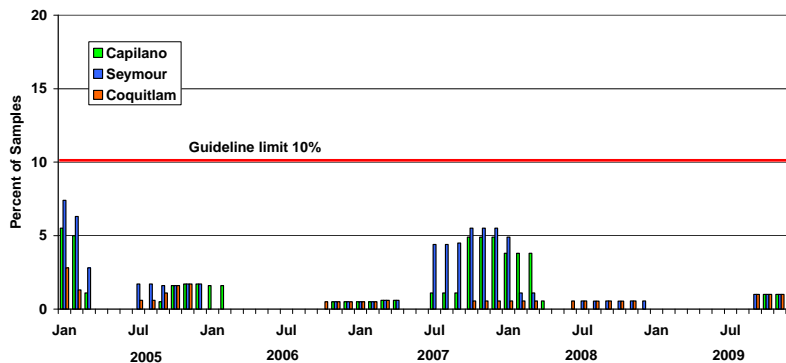


Figure 3: Percent of Source Water Samples Exceeding 20 *E. coli*/100 mL

Progress on Watershed Management Actions

Metro Vancouver continues to improve its monitoring and forecasting capabilities to provide reliable and timely information on source water quality and watershed snowpack, stream flow, and fire risk. This information is used in managing the source reservoirs and optimizing water treatment. In 2009 additional turbidity monitoring stations were added to Coquitlam Reservoir to provide earlier indication of turbidity events.

To minimize the risk of landslides and erosion and reduce long-term maintenance costs, Metro Vancouver is deactivating un-needed watershed roads. Many of the steeper roads at highest risk of erosion have been deactivated. About 100 kilometres of road have been deactivated or two-thirds of the roads ultimately slated for deactivation.

Priorities

Protection of the source watersheds continues to adapt to new risks. In recent years, motorized recreational use of the Eagle Mountain area adjacent to the Coquitlam Watershed was increasing and so in 2010 the Province, with support from the City of Coquitlam and Metro Vancouver, established a Managed Area restricting motorized recreational use in this area.



Coquitlam Lake Reservoir

2. GOALS, STRATEGIES, ACTIONS AND PERFORMANCE

Goal - Ensure the Sustainable Use of Water

There are two strategies to attain this goal: Use Drinking Water Sustainably and Match Water Quality to Usage Requirements.

Performance Measures for Goal – Ensure the Sustainable Use of Water

The plan includes the following performance measures to monitor progress in ensuring the sustainable use of water.

Peak day per capita water use by all customers (trend over time and compare to other jurisdictions).

The upper line in Figure 4 shows peak day water use in litres per-capita per day for the years 1985 to 2009. This is total water use in the GVWD, inclusive of water system leakage and all water uses at home, work and school. Peak day water use is responsive to summer weather conditions, being higher in years with hot-dry summers such as 2003 and 2009 and lower in years with cool-wet summers such as 2000. The lawn sprinkling regulations, implemented every summer since 1993, are attributed to reductions in peak day per-capita water use of 25 percent.

Average day per capita water use by all customers (trend over time and compare to other jurisdictions).

The lower line in Figure 4 shows the average day water use in litres per-capita per day for the years 1985 to 2009. Water use in the GVWD in 2004 was lower than the average day per capita water use in other regions of British Columbia, Canada, and the United States by 12 percent, 7 percent, and 13 percent, respectively, according to the most recent statistics (2004).

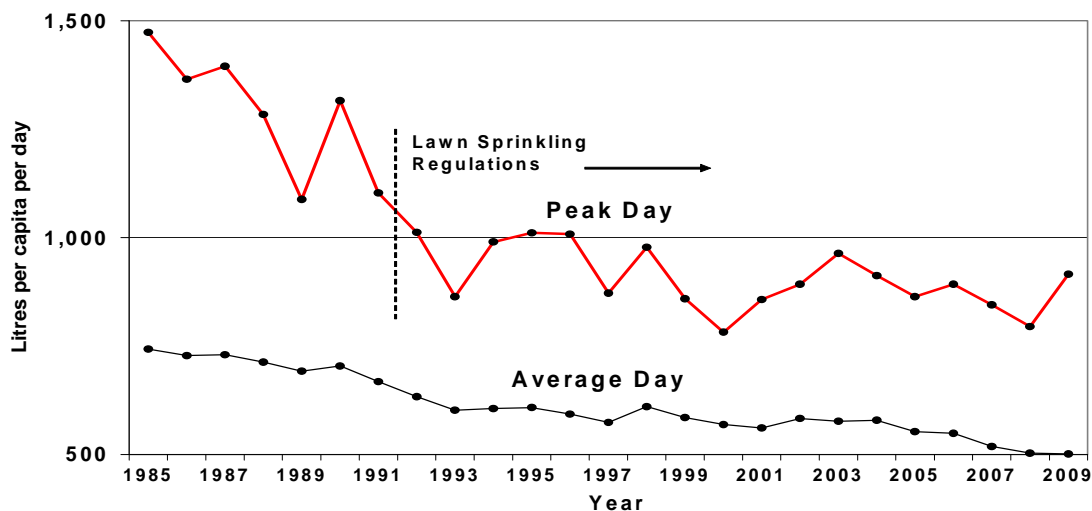


Figure 4: GVWD Peak Day and Average Day Water Use (inclusive of all users)

As average day water use, is responsive to weather conditions, winter water use was analyzed to determine trends in water use when outdoor water use is minimal and water use is insensitive to weather conditions. Figure 5 shows the monthly GVWD per-capita water use for the winter months of November to March for 1993 to 2010. Over the 1993 to 2010 period, winter per-capita water use declined at a rate of over 1% per year.

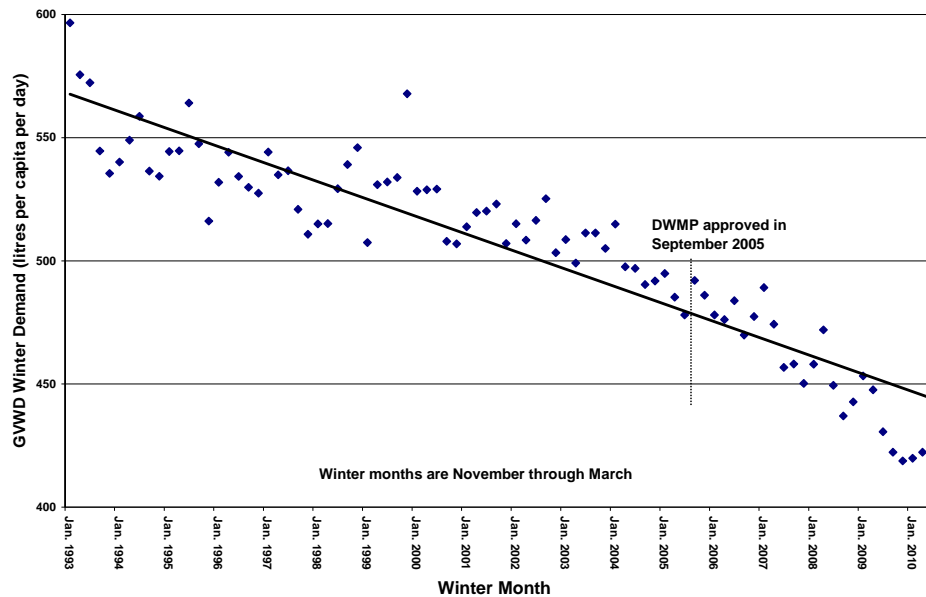


Figure 5: Monthly GVWD Winter Per-Capita Water Use

As expected, implementation of the Drinking Water Management Plan in September 2005 is speeding the decline in per-capita winter water use. Since 2005, per-capita winter water use has been declining at the rate of over 2% per year due to the following:

- actions to reduce the liters per flush volume of toilets from 20 litres (pre-1995 regulation) to 6 litres (2005 DWMP) to 4.8-litre (October 2010);
- regulations requiring more energy efficient and water efficient fixtures and appliances;
- water conservation education programs aimed at schools, businesses, and the public;
- improvements to water metering and leak reduction programs.

Per capita water use by residential customers (trend over time and compare to other jurisdictions).

For the reasons discussed above, per capita water use by residential customers in the GVWD area is expected to be declining at about the same rate as that of total GVWD usage for all customers.

Progress on Actions to: Ensure the Sustainable Use of Water

Progress is being made on all ten actions related to this goal. Metro Vancouver and member municipalities are progressively implementing more “green” projects and Leadership in Energy and Environmental Design (LEED) certified buildings that conserve water and expand use of rainwater and reclaimed wastewater. Metro Vancouver is refining its standardized water audit process developed for Industrial, Commercial, and Institutional water users to also provide a carbon tag that building owners can use to obtain eco-certification (e.g. LEED certification).

Priorities

To further reduce peak per-capita summer water use Metro Vancouver is implementing more frequent and targeted water conservation communication for lawn sprinkling.

2. GOALS, STRATEGIES, ACTIONS AND PERFORMANCE

Goal - Ensure the Efficient Supply of Water

There are two strategies to attain this goal: **Manage Infrastructure Proactively, and Optimize Capacity through Effective Partnerships.**

Performance Measures for Goal – Ensure the Efficient Supply of Water

The plan identified the following performance measures to monitor progress in ensuring the efficient use of water.

GVWD budget (trend over time and compare changes in the GVWD to changes in other jurisdictions).

The annual budget for the GVWD has been increasing as the region’s population and demand for water grow and as regulatory requirements necessitate additional water treatment facilities and seismic upgrades (Figure 6). For example, the \$820 million Seymour-Capilano Filtration Project is required to meet new treatment requirements and has been the major reason for the increase in GVWD budget since 2004.

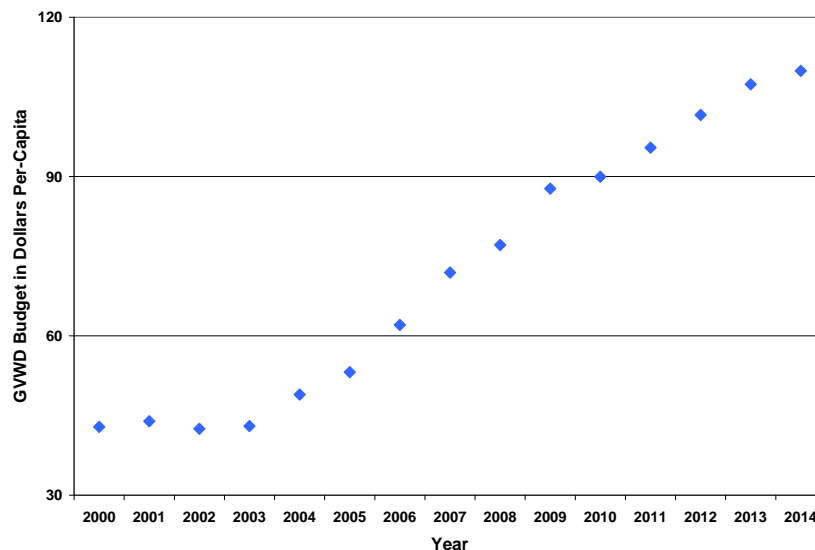


Figure 6: Projected GVWD Per-Capita Budget

GVWD Water Rate (trend over time and compare changes in the GVWD to changes in other jurisdictions).

The GVWD provides water on a wholesale basis to member municipalities. GVWD’s costs to provide water are higher in the peak summer season of June through September as the natural inflows to its source lakes are lower and the demand for water is higher. Consequently, in accordance with the Drinking Water Management Plan the GVWD began phasing in seasonal pricing in 2006. In 2010, the GVWD is charging member municipalities a summer season rate of about \$0.56 per cubic metre and an off-peak season rate of about \$0.45 per cubic metre (Figure 7). The water rates per cubic metre paid by residents and businesses in the Metro Vancouver region, include municipal water supply costs, and are typically in the range of \$0.7 to \$1.0 per cubic metre. Water rates in the Metro Vancouver region are still lower than other regions such as Seattle (\$1.23), Calgary (\$1.25), Edmonton (\$1.56), and Toronto (\$1.89).

Percentage of water supplied that is subject to unplanned supply interruptions (trend over time and compare GVWD levels to levels in other jurisdictions).

In recent years supply interruptions have been extremely rare and there was insufficient information to accurately calculate this performance measure.

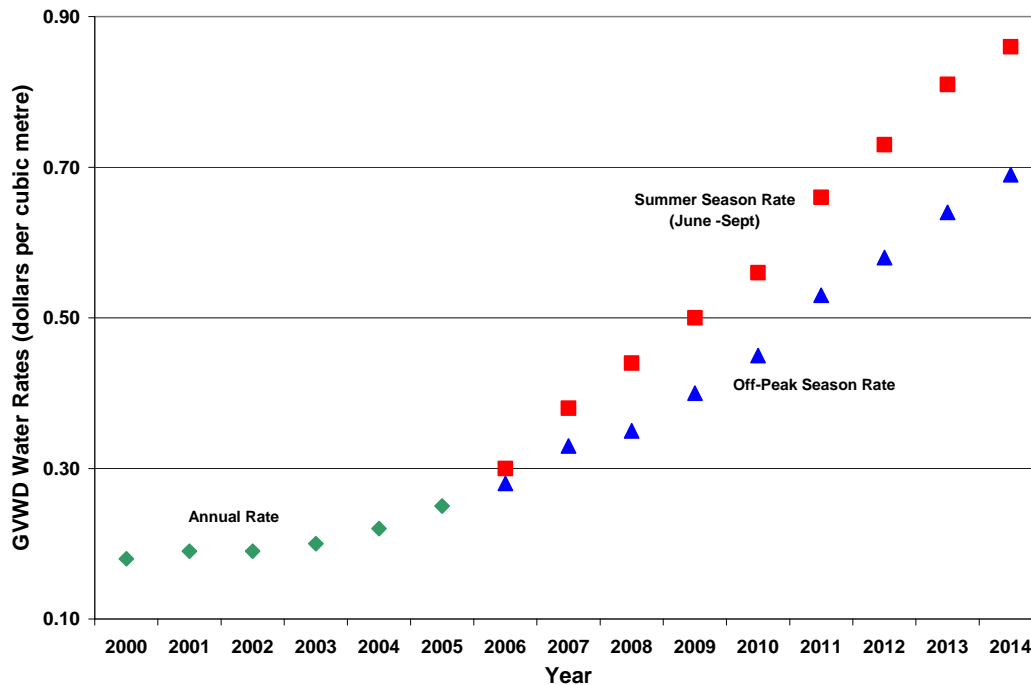


Figure 7: Projected GVWD Water Rate

Infrastructure Leakage Index (trend over time and compare GVWD levels to levels in other jurisdictions).

The Infrastructure Leakage Index is the ratio of the current annual losses to the unavoidable annual losses and shows how well the water system is being managed to control water losses. However, due to technical limitations in measuring water losses in the large buried pipes that comprise the GVWD's water system, this indicator has proven very difficult to measure and will be re-considered in future revisions of the DWMP.

Progress on Actions to: Ensure the Efficient Supply of Water

GVWD and municipal water system assets are being managed proactively in accordance with water utility best practices. Steps are being taken to be more energy efficient, to improve the accuracy of water monitoring and metering systems, and reduce leakage. The GVWD is continuing to assess risks to the water system and providing appropriate improvements on an ongoing basis.

Priorities

Giving priority to the following action will improve progress towards this Goal:

- Refine performance measures and indicators

Metro Vancouver is developing and refining its own corporate performance measures and regional sustainability indicators on an ongoing basis. The adaptive management approach adopted in the DWMP means that, with more experience, the performance measures can be refined and calibrated to provide a better assessment of progress on the Plan's goals.

