
To: Utilities Committee

From: Inder Singh, Director, Policy, Planning and Analysis, Water Services
Andrew Wood, Director, Operations and Maintenance, Water Services

Date: April 4, 2016 Meeting Date: April 14, 2016

Subject: **Water Supply Forecast and Water Consumption Update for Summer 2016**

RECOMMENDATION

That the GVWD Board receive for information the report titled “Water Supply Forecast and Water Consumption Update for Summer 2016”, dated April 4, 2016.

PURPOSE

To provide the Committee and Board with the annual update on the current water supply and water consumption situation in advance of the approaching summer peak demand period.

BACKGROUND

Water supply and water consumption status reports have normally been provided to the Committee and Board each spring.

Current Source Water Supply Situation

Snowpack

Snowpack measurements are taken at five separate locations across the Capilano, Seymour and Coquitlam watersheds. The late March 2016 survey results indicate that the depth and water equivalent of the current snowpack is approximately 75% and 83% of historical average respectively for that time of year indicating the likelihood of slightly below normal spring runoff from snowmelt. However, current snowpack levels are well above the record low levels (less than 10% of historical average) measured in spring 2015.

While snowpack is important, it should be noted that our region’s water supply is not solely dependent on snowpack. Overall precipitation in the form of rainfall through the fall, winter and spring contributes to the water levels in the three reservoirs that serve Metro Vancouver.

Stored Water - Source Lakes

a) *Capilano Lake*

At the time of writing, Capilano Lake is 95 percent full. The lake is currently being refilled in stages and is expected to be 100 percent full by mid-May.

b) *Seymour Lake*

Seymour Lake is currently being managed under the spring operating protocol with the lake currently at 85 percent of full summer storage capacity. It is expected that the lake will be at 100 percent of full summer storage capacity by early June.

c) *Coquitlam Lake*

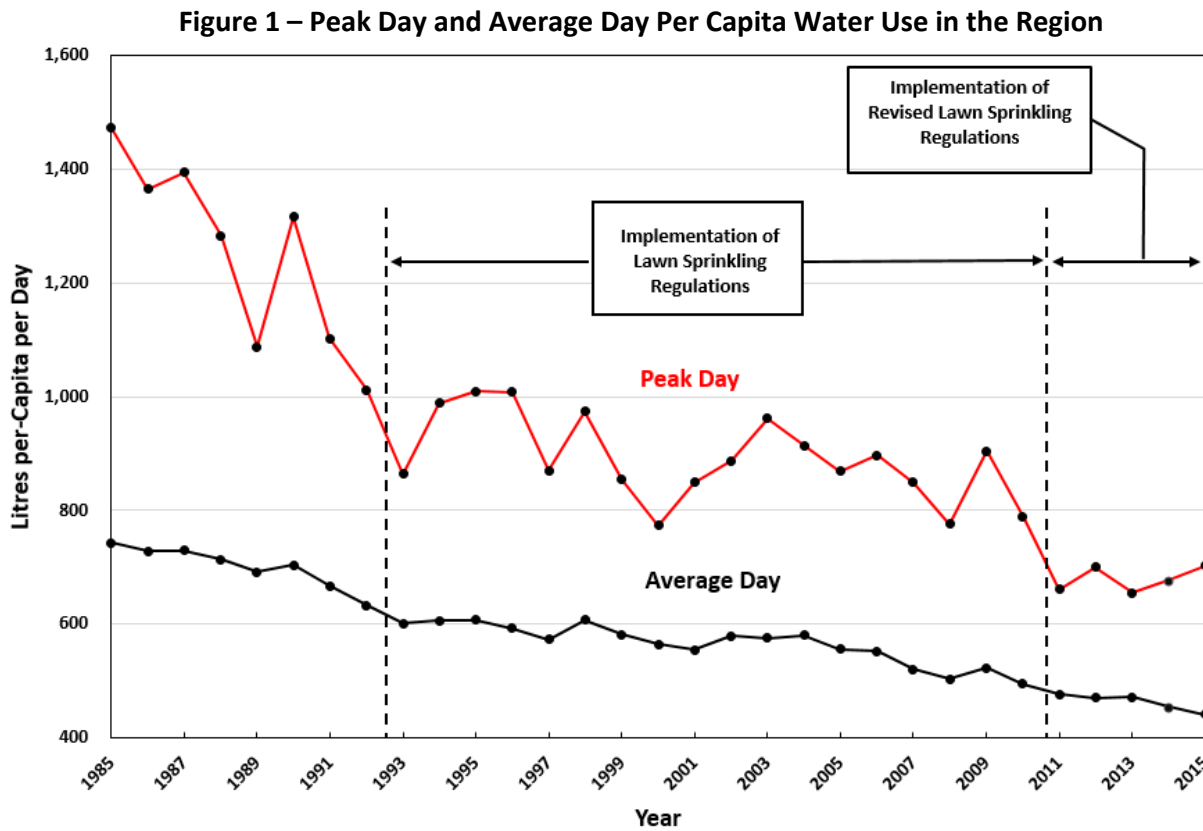
The Coquitlam Lake level is controlled by B.C. Hydro within criteria established by agreement with the GVWD. It is anticipated that BC Hydro will have Coquitlam Lake sufficiently full to provide for adequate summer domestic water supply and the necessary allocation for fisheries flows in the Coquitlam River.

d) *Alpine Lakes*

The GVWD's three alpine lakes, Palisade, Burwell and Loch Lomond, which are used as reserves for Capilano and Seymour Lakes during the late summer period, are all expected to be at 100 percent of capacity by mid to late May.

Trends in Water Consumption/Use

This section discusses trends in water consumption/use, as well as some of the factors affecting water use. Figure 1 shows water use in the region in litres per capita per day for the years 1985 to 2015. This is total water use in the region inclusive of all water users.



The upper (red) line in Figure 1 is the peak day water use, or the highest day of water use for the year. The peak day usage occurs on a hot-dry summer day when many people in the region are sprinkling their lawns. Peak day water use, and to a lesser extent average day water use, vary depending on summer weather conditions, being higher in years with hot, dry summers such as 2003, 2009 and 2015 and lower in years with cool-wet summers such as 2011 and 2013.

The Board established a target for reduction in peak day per capita water use of 1% per year, compared to 2010 levels. During the overall period since 2010, peak day per capita water use has declined by an average of about 2% per year, exceeding the Board's target.

Lawn sprinkling regulations have long been used by the GVWD and local governments to reduce peak demands on the regional and municipal water systems, respectively. These restrictions help to:

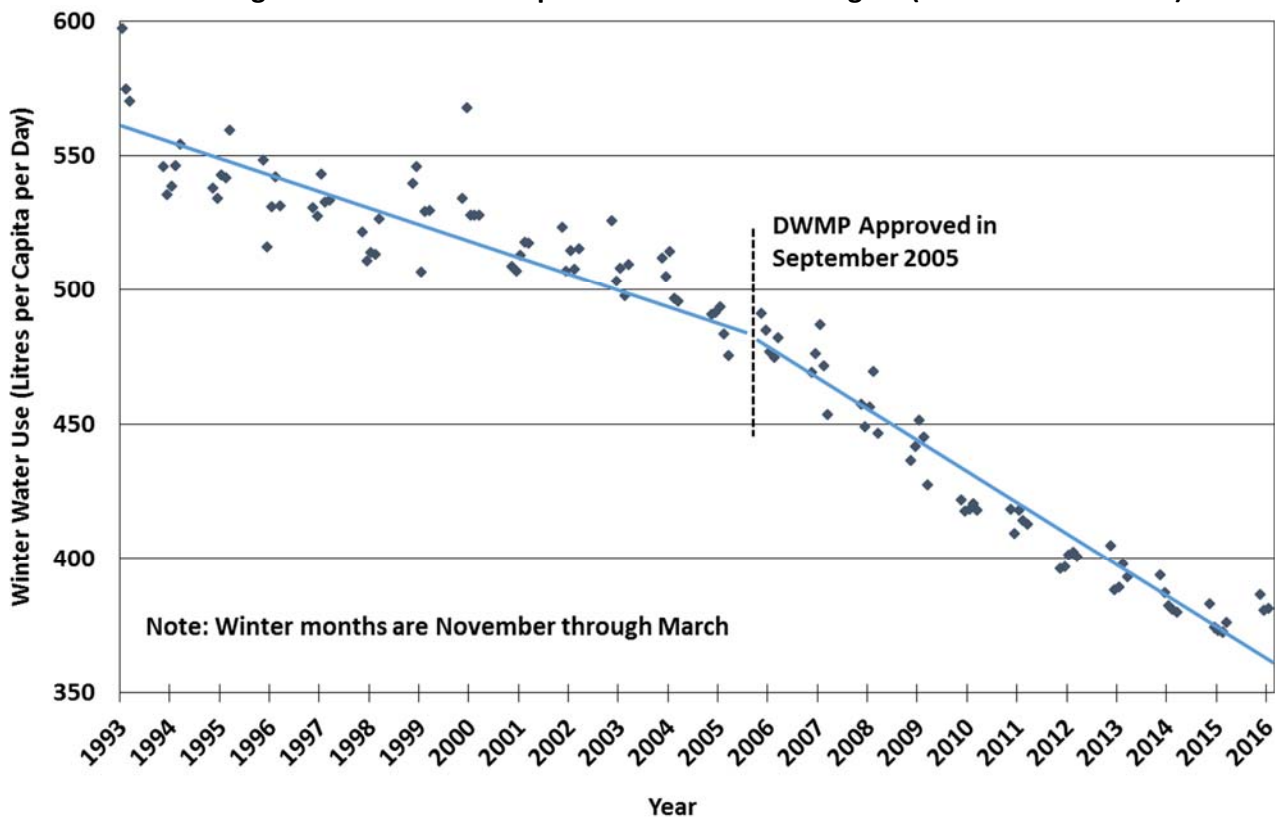
- Manage overall water use throughout the summer to conserve water storage in the source lakes;
- Reduce peak water demands; and,
- Reduce pumping and other operational costs and defer costly new supply infrastructure.

In 2011, to help reduce peak hour and peak day demands, the Board revised the Water Shortage Response Plan to spread lawn sprinkling over seven days of the week and restrict permitted times for lawn sprinkling to morning hours only.

The lower (black) line in Figure 1 is the average daily water use over the year. Since 1993, municipalities and Metro Vancouver have progressively increased their water conservation actions contributing to a decline of 28 percent in average day per capita water use between 1993 and 2015. The Board also established a target for average day per capita water use to trend downward by one percent per year, compared to 2010 levels. The downward trend between 2010 and 2015 is about 2% per year, which exceeds the regional target.

During the winter, outdoor water use is minimal and water use is insensitive to weather conditions. Figure 2 shows winter per capita water use between 1993 and early 2016.

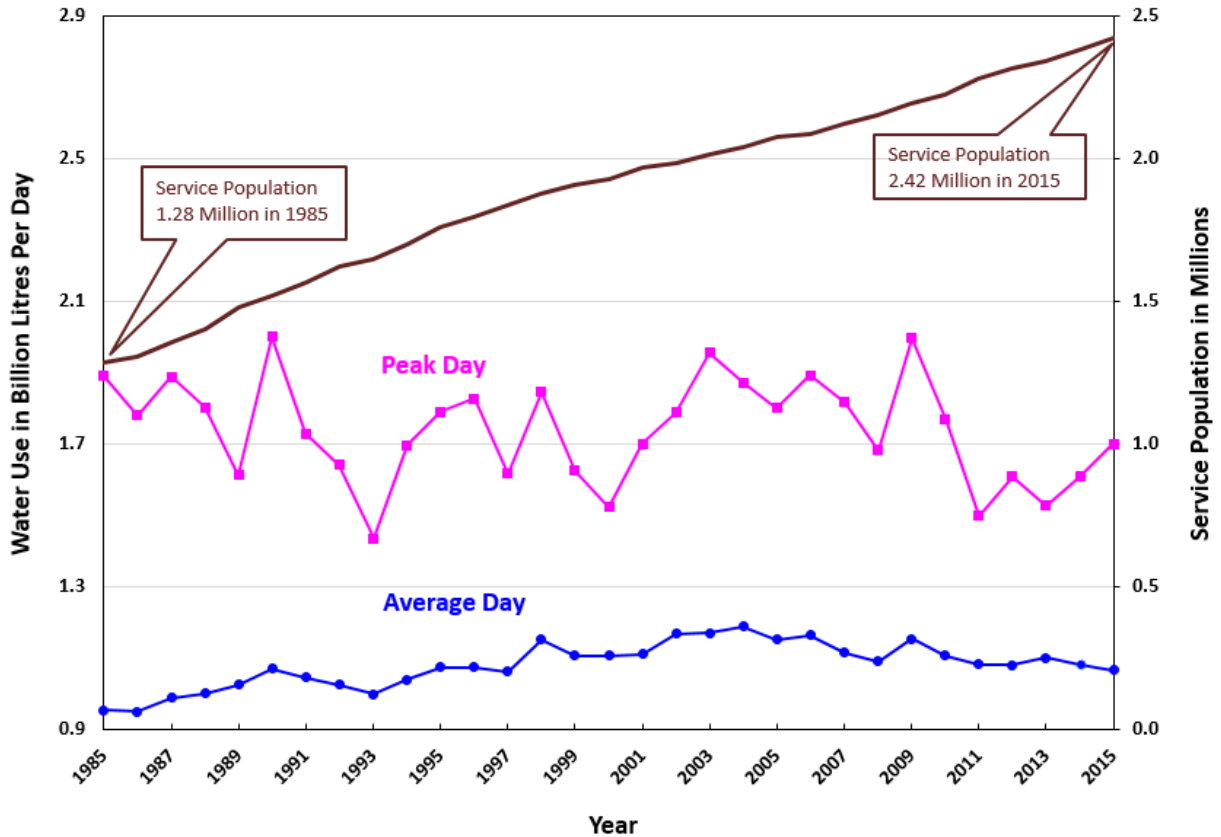
Figure 2 – Winter Per Capita Water Use in the Region (inclusive of all users)



The rate of decline in winter per capita water use has increased since the implementation of the Drinking Water Management Plan in 2005 and municipal water conservation actions, such as the requirement for low flow toilets in new construction.

Figure 3 shows service population and total water use in billions of liters per day. The decline in per capita water use in the region has offset the impact of population growth, keeping total consumption relatively steady.

Figure 3 – Population Growth and Water Use



System Operations Outlook for Summer 2016

Source Lake Capacity

Water usage patterns will be monitored throughout the summer period so adjustments can be made within the transmission system to meet the regional water demand appropriately across the three main source lakes. Additional withdrawals from Coquitlam Lake have also been secured from BC Hydro. As well, the completion of the Twin Tunnels and Capilano Pump Station will enable the use of Capilano water through the fall, when in the past it has been taken off-line due to turbidity. The three alpine lakes will also be utilized as required, to levels within their refillable storage limits.

Transmission System Capacity

Additional infrastructure continues to be required to meet the demand for water in the rapidly growing areas in the northeast sector and south of the Fraser River. A number of projects recently completed or currently in progress, including the Maple Ridge Main (West), Barnston/Maple Ridge Pump Station, Angus Drive Main and Port Mann Water Supply Tunnel will significantly improve the capacity of the transmission system to supply water to these areas during peak demand periods.

The Maple Ridge Main (West) was placed into service in early summer 2015 and the Barnston/Maple Ridge Pump Station and Angus Drive Main are both expected to be operational for summer 2016. The Port Mann Water Supply Tunnel is scheduled for completion in late 2016.

Meeting Peak Day Demands

Summer peak day and peak hour demands can challenge the ability of the transmission system to meet service levels in parts of the region. The last significant peak day demand occurred in summer 2009. The demand conditions experienced during the hot summer weather in July 2009 stretched the ability of the regional transmission system to meet minimum target service levels, most notably in the southern and eastern parts of the region. These areas are both geographically furthest from the sources and are experiencing the fastest growth in population. It should be noted that peak day demands are not spread equally across the region, but tend to be higher where less residential density exists and lower where densification is occurring and there are fewer lawns and gardens.

ALTERNATIVES

This is an information report; no alternatives are presented.

FINANCIAL IMPLICATIONS

During the hotter and drier summer months, the demand for water increases significantly over that in the winter, putting additional stress on the water supply system. Metro Vancouver's wholesale peak summer water rate is 25% higher compared to the off-peak period. This seasonal pricing reflects the cost of building larger infrastructure and higher operating costs such as increased pumping to meet peak summer demands.

SUMMARY / CONCLUSION

With the existing snowpack levels only slightly below average, and significantly above spring 2015 levels, it is expected that source lake storage will be sufficient to ensure adequate water supply for the 2016 summer season. Overall precipitation in the form of rainfall through the fall, winter and spring also contributes to the water levels in the three source reservoirs.

Per capita water use in the region continues to decline, off-setting the impact of population growth and keeping total consumption relatively steady. In November 2015, the Board amended the Water Shortage Response Plan to extend Stage 1 Lawn Sprinkling restrictions from June 1 – September 30 to May 15 – October 15. Metro Vancouver staff are working with municipal staff to implement a water conservation campaign in support of the May 15 initiation of the lawn sprinkling regulations. In the event of an extreme drought or unusually high demand for water, Metro Vancouver has the ability to implement additional demand management measures, if necessary.

Improvements in the transmission system, including the new Maple Ridge Main West, the Angus Drive Main and the Barnston/Maple Ridge Pump Station, will improve the capacity of the transmission system to supply water during peak demand periods.

17661868