



**REPORT TO REGIONAL WATER SUPPLY COMMISSION  
MEETING OF WEDNESDAY, MAY 21, 2014**

---

**SUBJECT**    **WATER QUALITY REPORT FOR SOOKE LAKE RESERVOIR  
NOVEMBER 2013 - FEBRUARY 2014**

**ISSUE**

To present the monitoring results for water quality conditions observed in Sooke Lake Reservoir during the period from November 2013 through February 2014.

**BACKGROUND**

The Capital Regional District (CRD) supplies drinking water for the majority of residents in the region, which also includes many small systems in the electoral areas. Staff from the Water Quality program monitor the quality of the drinking water in Greater Victoria and in CRD operated small water systems. As a requirement under the BC Drinking Water Protection Act, staff monitor water quality to ensure the region's drinking water supply is safe and potable.

All public drinking water systems in British Columbia must comply with the BC *Drinking Water Protection Act* and the BC Drinking Water Protection Regulation. In addition, the CRD relies upon water quality parameters in the Guidelines for Canadian Drinking Water Quality, as well as guidelines developed by the US Environmental Protection Agency to guide and inform our water quality monitoring program.

The results of the monitoring are presented on a regular basis, directly to the Commission and Island Health, and to the general public through our CRD website.

A summary of monitoring results for Sooke Lake Reservoir for the period November 2013 through February 2014 are attached as Appendix A. Graphs comparing data with previous years and long-term averages are attached as Appendix B. Note: In all charts, 2014 data are shown in red.

Staff are also preparing a comprehensive annual report that summarizes data, trends and actions for the water quality monitoring programs across all services.

**ALTERNATIVES**

Alternative 1 - That the Regional Water Supply Commission receive the staff report for information and direct staff to post the information for public release.

Alternative 2 – That the Regional Water Supply Commission not receive the report but request additional information prior to public release.

**ECONOMIC IMPLICATIONS**

The budget for reporting on the water quality results in the Sooke Lake Reservoir is included in the main regional water supply budget. No additional funds are required.

**ENVIRONMENTAL IMPLICATIONS**

Water quality monitoring is one of the cornerstones of the multi-barrier approach to providing safe, potable drinking water to the residents of the region. The monitoring program ensures proper integration of an understanding of source waters, treatment process, distribution infrastructure and maintenance, and the delivery of water to customers, and also ensures that any potential risks or concerns can be effectively managed to ensure a safe drinking water supply.

**CONCLUSION**

The water quality tests conducted for Sooke Lake Reservoir from November 2013 through to February 2014 continue to show good quality source water with no water quality issues. The monitoring program remains effective for ensuring oversight of the drinking water system.

**RECOMMENDATION**

That the Regional Water Supply Commission receive the staff report for information and direct staff to post the information for public release.

---

Glenn Harris, Ph.D., R.P.Bio.  
Senior Manager, Environmental Protection

---

Larisa Hutcheson, P.Eng.  
General Manager  
Parks & Environmental Services  
Concurrence

---

Ted Robbins, B.Sc., C. Tech.  
General Manager, Integrated Water Services  
Concurrence

GH:cam

Attachments: 2

## SUMMARY OF WATER QUALITY IN SOOKE LAKE RESERVOIR November 2013 – February 2014

---

### Physical Parameters

*Water Levels.* Due to a very dry fall and early winter, the water level in Sooke Lake Reservoir (Figure 1) did not rise as usual through December, resulting in a much lower level than usual (183.41 m, 74.6% of full pool level of 186.75 m) at the end of 2013.

In January and February, increased precipitation led to a sharp rise in the reservoir level, which was at 186.38 m (97.1% of full pool level) at the end of February. (Note: In all charts, 2014 data are shown in red.)

*Water Temperature.* Similar to 2011 (Figure 2), the weekly average water temperature in Sooke Lake Reservoir in November 2013 dropped lower than the long-term average and that of 2012. As of February, the water remains colder than the long-term average and the average February temperatures from the previous three years (2011-2013). (Note: The small circles on the chart show the extent of water temperature variation in previous years.)

### Water Clarity

*Turbidity.* In November and December 2013, the turbidity in Sooke Lake Reservoir continued to remain well below the 1.0 NTU turbidity limit and the long-term average, similar to the turbidity recorded in the same period of 2010 and 2012. Turbidity in January and February 2014 also remained lower than the long-term average and that of 2010, and was similar to the turbidity seen in 2011-2013 (Figure 3).

*Water Transparency.* Similar to turbidity, the transparency of the water in Sooke Lake Reservoir from November through December continued to be much better (clearer) than the long-term average (Figure 4). It was also better than that in the same period of previous years.

In late January and February, the clarity of the water decreased somewhat, due to two weeks of heavy precipitation; however, the transparency of the water in January and February 2014 continues to be better than the long-term average. The transparency of the water continues to return to the very clear water observed prior to raising the water level in the reservoir.

### Bacteria

*Total Coliform Bacteria.* As in previous years, the total coliform concentration in the raw source water entering the Japan Gulch Disinfection Plant from Sooke Lake Reservoir decreased in November and December 2013, except for the short time (02-05 December 2013) when the supply was switched to Goldstream Reservoir during the annual inspection of the Kapoor Tunnel.

Total coliform concentrations remained low in January and February 2014. This is similar to the past several years and the long-term average (Figure 5). *E. coli* concentrations remained low from November 2013 to the end of February 2014, and well below the USEPA limit for an unfiltered supply (see insert in Figure 5).

## Nutrients

*Phosphorus.* In November 2013, the total phosphorus level in both the south (Figure 6) and north (Figure 7) basins of Sooke Lake Reservoir was similar to the long-term average and that of November 2010-2011 but was higher than that seen in 2012. In December, the levels in both basins dropped to below the long-term average and were similar to the level seen in December 2012.

In January and February, phosphorus levels in both basins remained lower than the long-term average and similar to the levels seen for the same period in 2010-2012.

*Nitrogen.* In the south basin from November 2013 through to January 2014, nitrogen levels were similar to the long-term average and 2010, and slightly higher than the levels seen in 2011 and 2012 (Figures 8 and 9).

In late January and February 2014, the nitrogen level in the south basin dropped to a level well below the long-term average and that of 2010-2012, and similar to that in the same period in 2013. In the north basin in November and December 2013, the nitrogen levels were similar to the long-term average and the levels of 2010-2012; however, in January there were two results above the long-term average and previous years, although still within the range of historical results. By February, the level had returned to one similar to the long-term average and similar to that of 2010-2012.

## Chlorophyll-a

From November 2013 through to February 2014, chlorophyll-a concentrations throughout Sooke Lake Reservoir were similar to the levels seen in the same period in 2010-2012 (Figures 10-12). These concentrations are relatively low for a surface water reservoir and reflect the normally low levels of nutrients (especially phosphorus) in this water body.

## Algae

With declining water temperatures and light levels in October and November, algal concentrations also declined from the numbers seen earlier in the autumn. The late October dominant species was the golden-brown alga *Dinobryon* and was replaced by the diatoms *Asterionella* and *Tabellaria*.

During the first week of December, the CRD drew water from the Goldstream system during maintenance of the intake tower and Kapoor tunnel. The algal numbers from the Goldstream system were low although with different dominant species than were present in Sooke Reservoir. A minor shift in dominant species in Sooke Reservoir was noted in December and January but again dominated by diatoms that generally cause no problems with taste or odour and are generally indicative of good water quality conditions.

Numbers of algae were also low in January and February with the dominants being the typical cold water diatoms *Synedra*, *Urosolenia* and *Tabellaria*.

### Water Quality Trends in Sooke Lake Reservoir September to December 2013















