



**REPORT TO REGIONAL WATER SUPPLY COMMISSION  
MEETING OF WEDNESDAY, SEPTEMBER 21, 2011**

---

**SUBJECT**      **WATER QUALITY TRENDS IN SOOKE RESERVOIR IN MAY THROUGH AUGUST 2011**

**ISSUE**

To provide information on the water quality conditions observed in Sooke Reservoir during May through August 2011 and compare these data with those from previous years and long-term averages.

**BACKGROUND**

**Physical Parameters**

*Water Levels.* The water level in Sooke Reservoir remained at full pool for most of May and then declined through the end of August to a level about 2.7 m below full pool, similar to the level in 2010 (**Figure 1**).

*Water Temperature.* In May 2011, the weekly average temperature of the water entering the Japan Gulch Disinfection Plant was similar to the 10-year average. However, in June and July the temperature of the water was about one degree cooler than the 10-year average and cooler than in 2010 (**Figure 2**). In late July, the water entering Japan Gulch Disinfection Plant rose above the 15°C mark and rose about one degree higher than the 2010 average for the same time period. **Note:** The small circles on the chart show the extent of water temperature variation in previous years.

**Water Clarity**

*Turbidity.* In May through August, 2011, the turbidity of the water in Sooke Reservoir was generally lower than the 10-year average throughout the reservoir and well below the 1.0 NTU turbidity limit (**Figure 3**).

*Water Transparency.* In May through August 2011, the transparency of the water throughout Sooke Reservoir continued to be better (clearer) than the 10-year average (**Figure 4**) and appears to be returning to the very clear water observed prior to raising the reservoir.

**Bacteria**

*Total Coliform Bacteria.* In May through August 2011, the total coliform concentrations in the raw source water entering the Japan Gulch Disinfection Plant from Sooke Reservoir continued to be well below the 10-year average and well below levels observed in 2010 (**Figure 5**). *E. coli* concentrations remained low throughout this period, well below the USEPA limit to remain an unfiltered supply (see **insert in Figure 5**).

**Nutrients**

*Phosphorus.* In the south basin, the total phosphorus concentrations were lower than the 10-year average with the exception of one higher phosphorus value in late June. In the north basin, the total phosphorus concentrations were lower than the 10-year average with the exception of two higher phosphorus values in mid to late May (**Figures 6 and 7**).

*Nitrogen.* Broadly, the total nitrogen levels in both the south and north basins continued to be similar to the 10-year average with slightly higher values for the north basin in May and August (**Figures 8 and 9**).

### Chlorophyll-a

In May through August 2011, chlorophyll-a concentrations were similar to the 10-year average throughout Sooke Reservoir (**Figures 10-12**). These concentrations are relatively low for a surface water reservoir and reflect the low levels of nutrients (especially phosphorus) in this water body.

### Algae

*Asterionella formosa* and *Tabellaria fenestrata* (colonial diatoms) were dominant in Sooke Reservoir from May to mid-July. Despite their dominance, concentrations were lower than in previous years. *Uroglena* spp. (colonial golden-brown), which is commonly present in Sooke Reservoir at low levels, became abundant in mid-July. The organism developed first in the North Bay then dispersed throughout the Reservoir. *Uroglena* spp. peaked in the beginning of August when it began to dominate the entire algal flora. Historically there have only been two previous years (2002 and 2006) where *Uroglena* spp. was recorded to be dominant in Sooke Reservoir. Compared to the historical years the concentrations observed in August were much lower and there were no associated taste or odour issues. *Uroglena* spp. decreased to barely detectable levels by the third week of August when *Dinobryon* spp (colonial golden brown) became dominant. Between May and August there were no significant water quality issues attributed to the algae of Sooke Reservoir.

### CONCLUSION

The water quality tests conducted for Sooke Reservoir in May through August continue to show good quality source water with no water quality issues.

### RECOMMENDATION

That the Regional Water Supply Commission receive the staff report for information.



Stewart Irwin, MSc  
Senior Manager, Water Quality Division  
Environmental Sustainability



Larisa Hutcheson, P. Eng.  
General Manager, Environmental Sustainability  
Concurrence



J. A. (Jack) Hull, MBA, P. Eng.  
General Manager, Integrated Water Services  
Concurrence











