



**REPORT TO REGIONAL WATER SUPPLY COMMISSION
MEETING OF WEDNESDAY, NOVEMBER 20, 2013**

SUBJECT WATER QUALITY TRENDS IN SOOKE LAKE RESERVOIR IN SEPTEMBER AND OCTOBER 2013

ISSUE

To provide information on the water quality conditions observed in Sooke Lake Reservoir during September and October 2013 and compare these data with those from previous years and long-term averages.

BACKGROUND

Physical Parameters

Water Levels. The water level in Sooke Lake Reservoir (**Figure 1**) continued to decline throughout early and mid-September and then began to rise at the end of September which was earlier than in previous years. However, this rise was short lived as the water level continued to decline in October. At the end of October, the water level was 3.4 m below full pool. This level was higher than 2012 and similar to October 2010 and 2011. (**Note:** In all charts, 2013 data are shown in red.)

Water Temperature. Similar to September 2011 and 2012 (**Figure 2**), the weekly average water temperature in Sooke Lake Reservoir in September 2013 rose slightly above the long-term average and then in late September and early October, in concert with the inflow of water from the tributary streams, dropped below the long-term average. At the end of October, the water temperature was identical to the long-term average. (**Note:** The small circles on the chart show the extent of water temperature variation in previous years.)

Water Clarity

Turbidity. During September and October, the turbidity in Sooke Lake Reservoir continued to remain well below the 1.0 NTU turbidity limit and was lower than the long-term average (**Figure 3**).

Water Transparency. Similar to turbidity, the transparency of the water in Sooke Lake Reservoir in September and October continued to be much better (clearer) than the long-term average (**Figure 4**) and was broadly similar to that in 2010-2012. The transparency of the water is continuing 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 increased in September and October. This is similar to the past several years and the long-term average (**Figure 5**). *E. coli* concentrations remained low in September and October and below the USEPA limit to remain an unfiltered supply (see insert in **Figure 5**).

Nutrients

Phosphorus. In September 2013, the total phosphorus level in both the south (**Figure 6**) and north (**Figure 7**) basins of Sooke Lake Reservoir rose to above the long-term average and then dropped in October to a level similar to that of the long-term average and similar to or higher than the level seen in October 2010-2012. The increased phosphorus levels coincided from the inflows of water from the tributary streams in September.

Nitrogen. In the north basin in September and October, nitrogen levels remained lower than the long-term average and similar to or lower than that in 2010-2012 (**Figures 8 and 9**). In the south basin, the nitrogen level increased to be similar to that in the same period in 2011 and to the long-term average and then dropped below the long-term average in October.

Chlorophyll-a

In September, chlorophyll-a concentrations throughout Sooke Lake Reservoir were lower than the long-term average (**Figures 10-12**) and similar to or lower than the levels in Sept 2010-2012. In October the chlorophyll concentration rose to a level similar to that of the long-term average and similar to or slightly higher than the concentration levels in October 2010-2012. 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

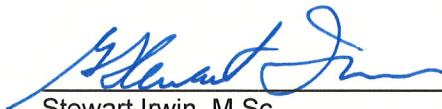
Through September and October, algal concentrations were relatively low and the species present were typical of what has been observed in previous years. Through September the usual transition of species recorded in July and August (the diatoms *Asterionella* and *Aulacoseira*) were gradually replaced by the cooler water golden-brown alga *Dinobryon*. There were no algae-related water quality issues through September and October, reflecting the generally low nutrient levels.

CONCLUSION

The water quality tests conducted for Sooke Lake Reservoir in September through late October 2013 continue to show good quality source water with no water quality issues.

RECOMMENDATION

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



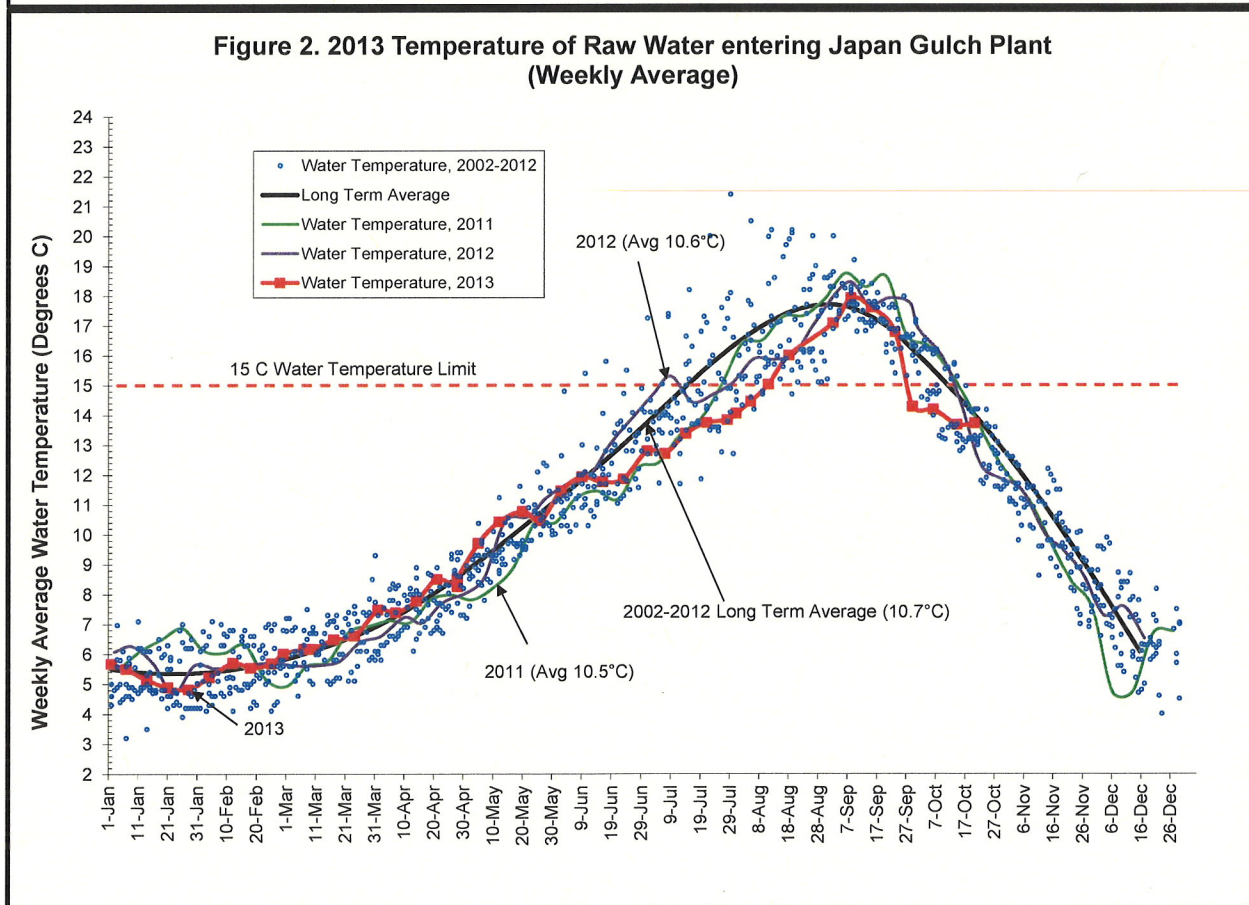
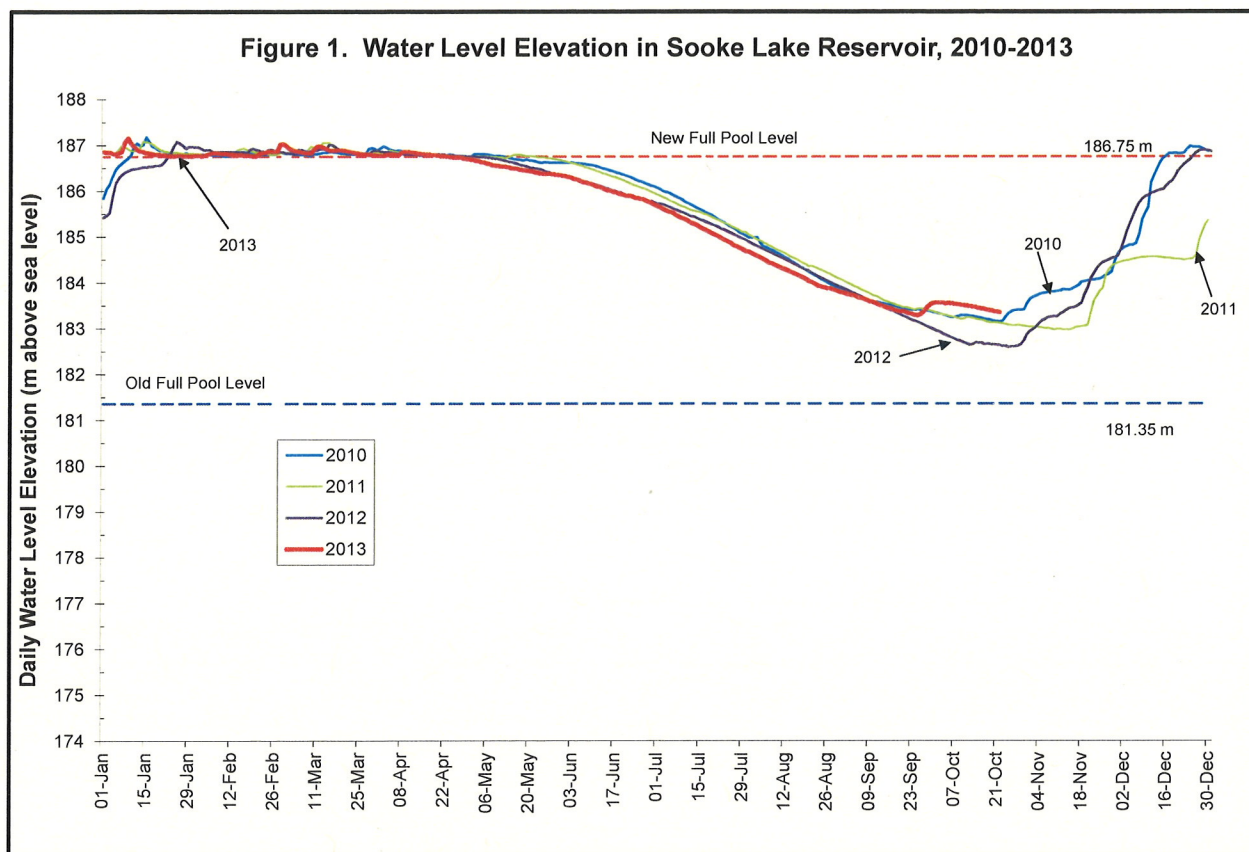
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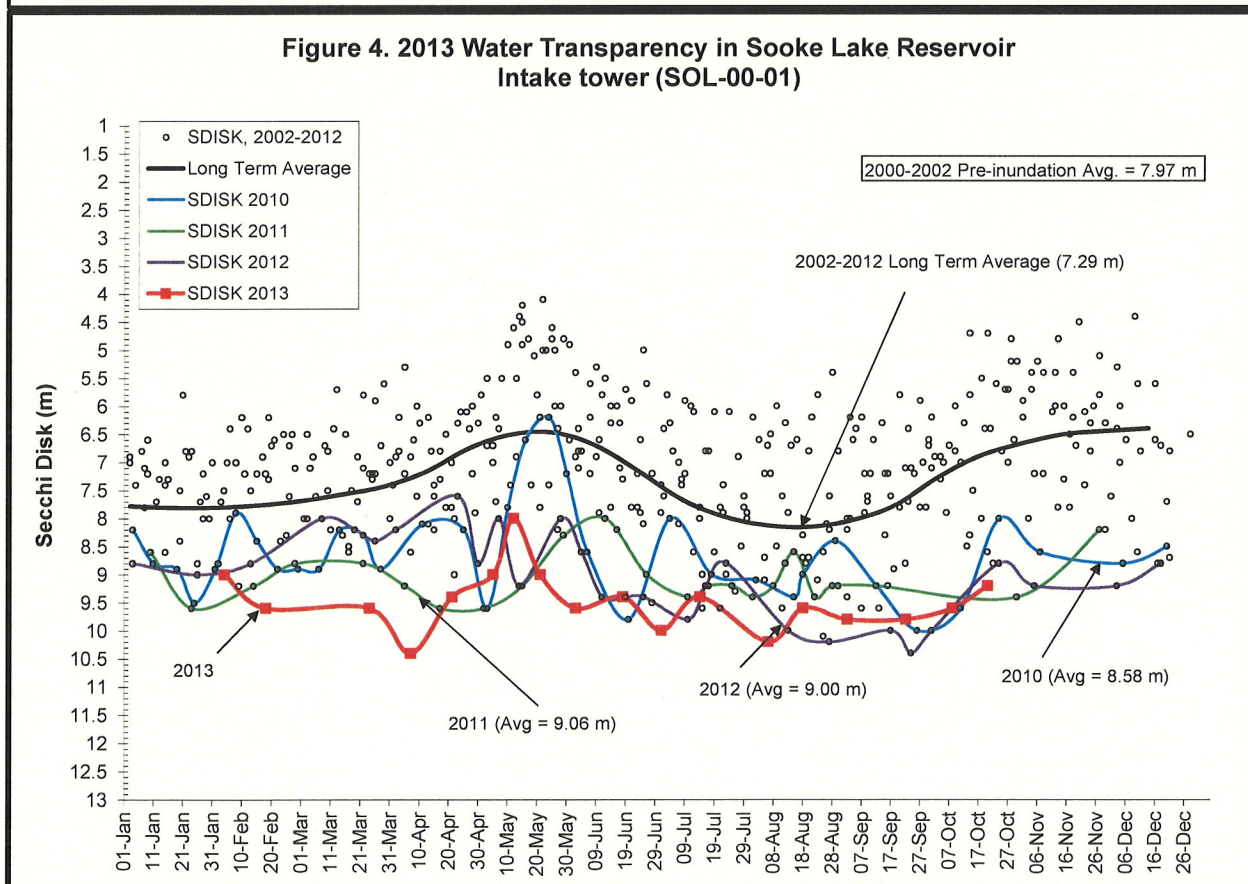
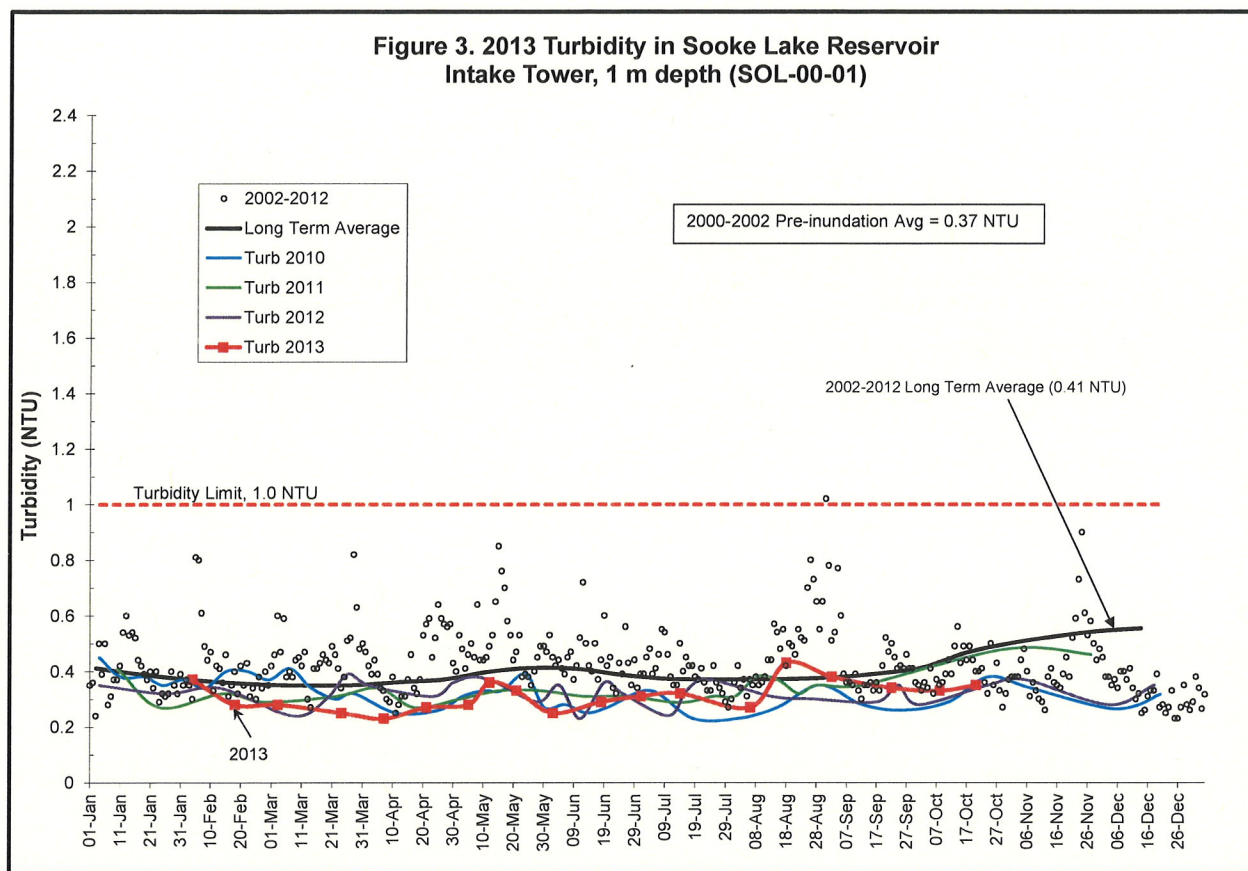


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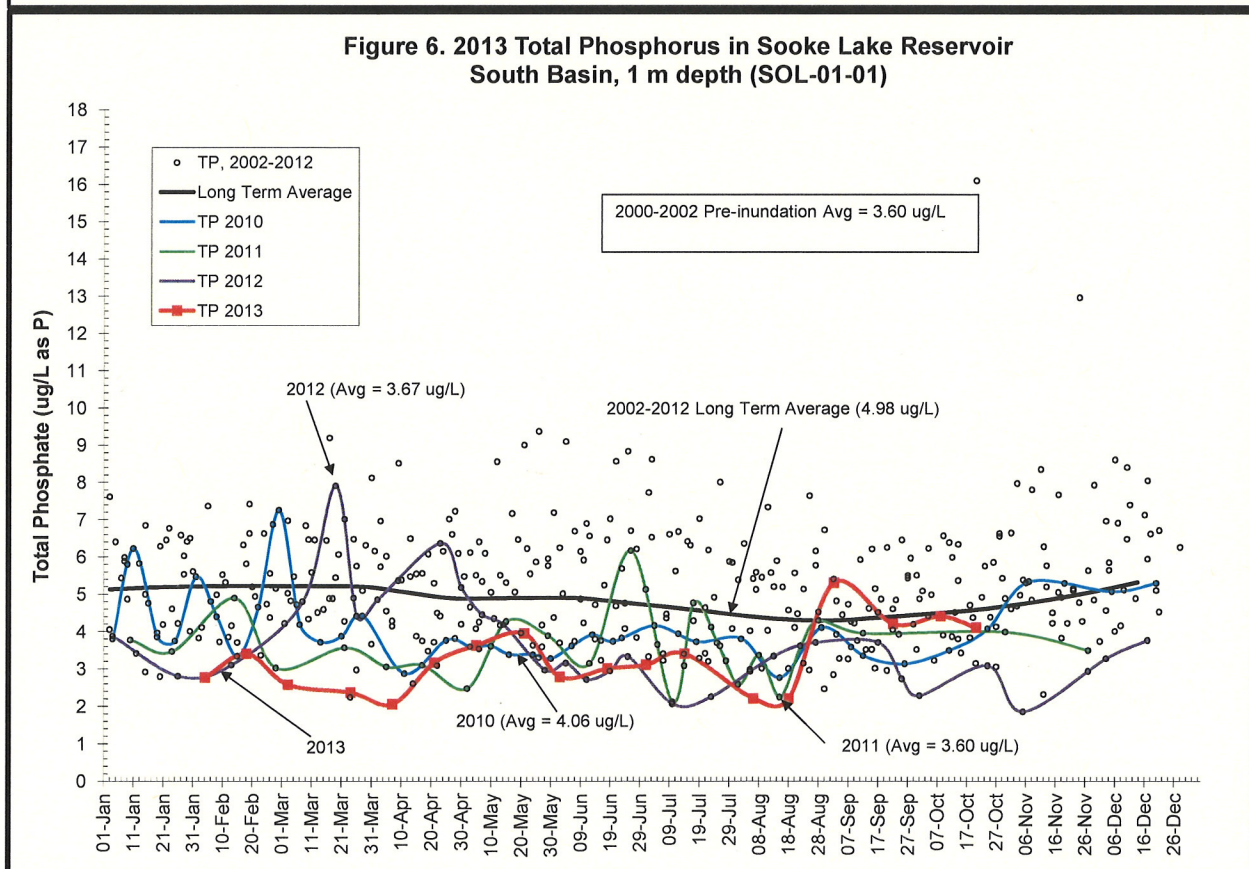
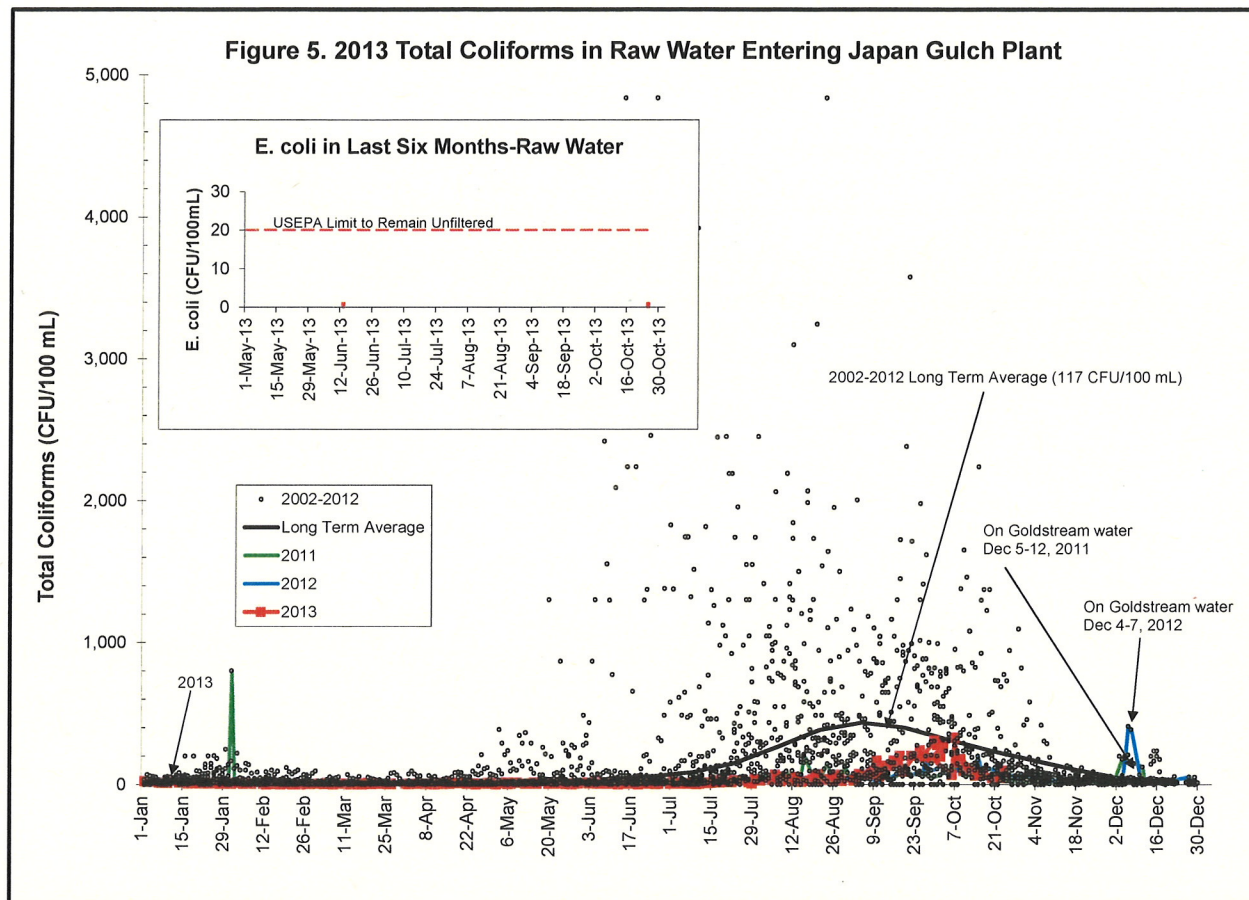


Figure 7. 2013 Total Phosphorus in Sooke Lake Reservoir
 North Basin, 1 m depth (SOL-04-01)

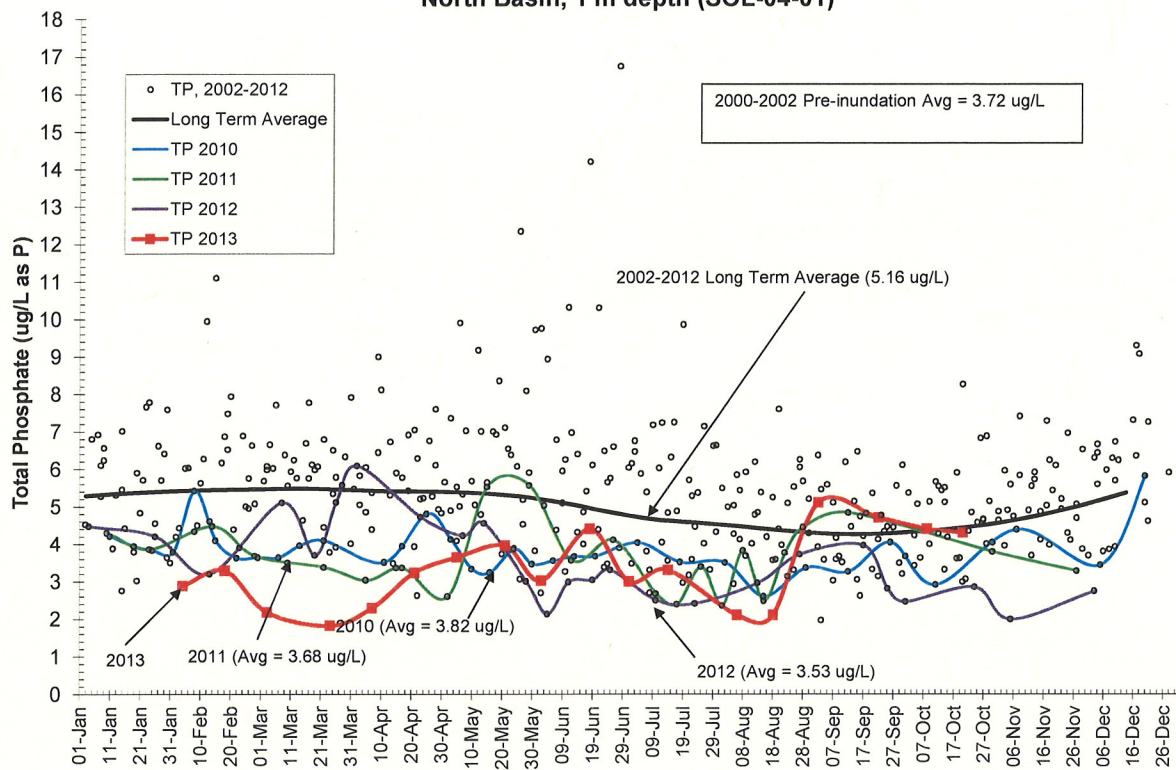
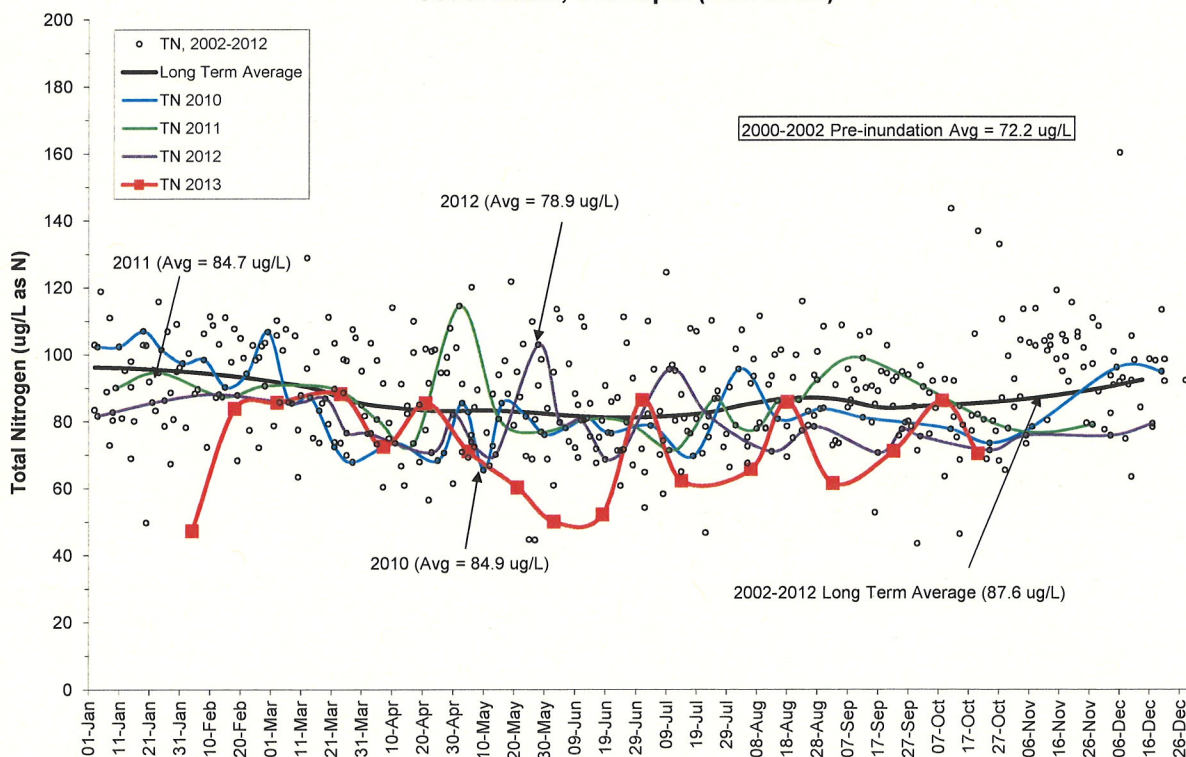
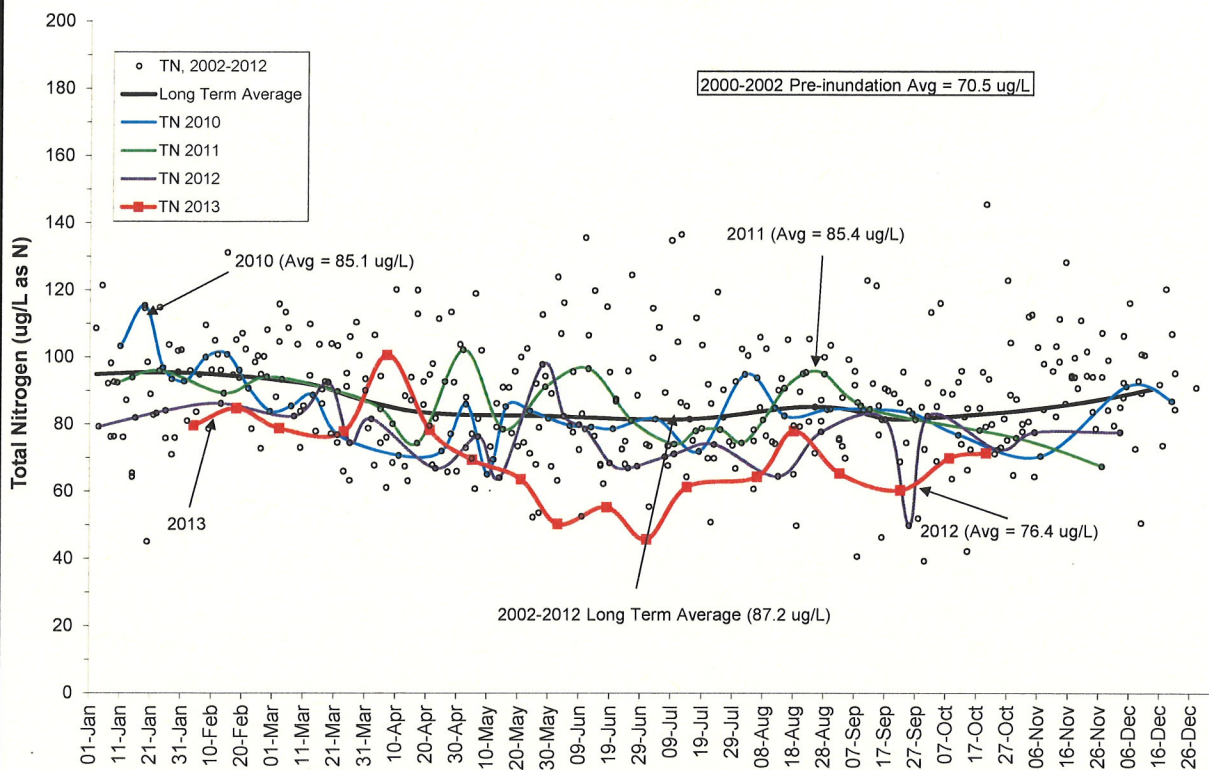


Figure 8. 2013 Total Nitrogen in Sooke Lake Reservoir
 South Basin, 1 m depth (SOL-01-01)



**Figure 9. 2013 Total Nitrogen in Sooke Lake Reservoir
 North Basin, 1 m depth (SOL-04-01)**



**Figure 10. 2013 Chlorophyll-a in Sooke Lake Reservoir
 Intake Tower, 1 m depth (SOL-00-01)**

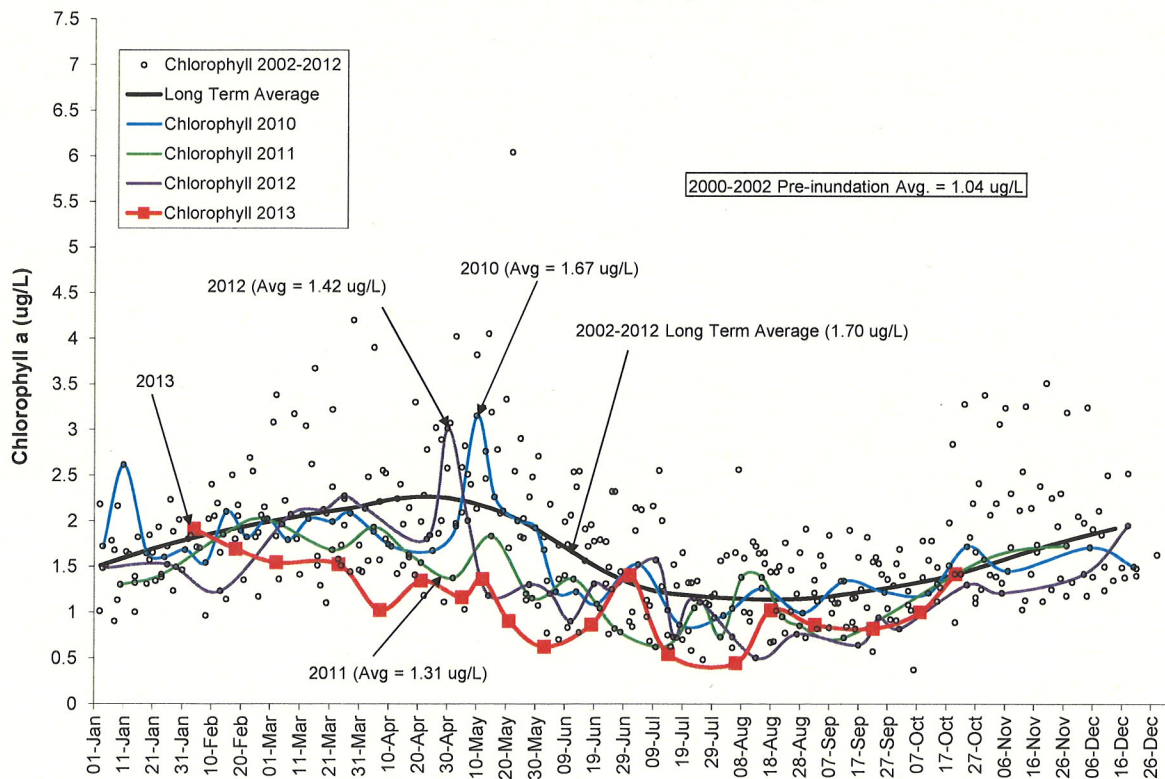


Figure 11. 2013 Chlorophyll-a in Sooke Lake Reservoir
 Intake Tower, 5 m depth (SOL-00-05)

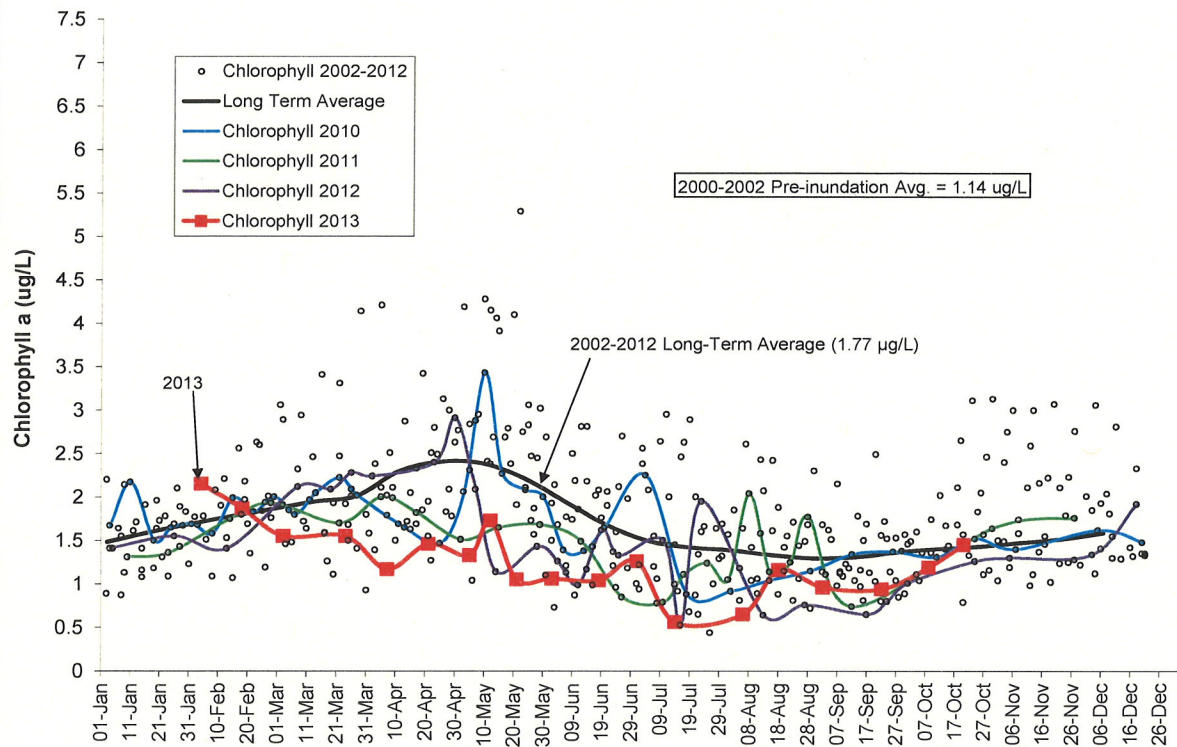


Figure 12. 2012 Chlorophyll-a in Sooke Lake Reservoir
 Intake Tower, 10 m depth (SOL-00-10)

