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*Agenda Item 9*
REPORT #RWSC 2012-02

**REPORT TO REGIONAL WATER SUPPLY COMMISSION**
**MEETING OF WEDNESDAY, FEBRUARY 1, 2012**

**SUBJECT** **WATER QUALITY TRENDS IN SOOKE RESERVOIR IN NOVEMBER AND DECEMBER 2011**

## ISSUE

To provide information on the water quality conditions observed in Sooke Reservoir during November and December 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 was 3.7 m below full pool at the beginning of November and gradually increased through the end of December to a level about 1.6 m below full pool (**Figure 1**).

*Water Temperature*. Throughout November, the water temperature was similar to the long term average. In early December, the two low temperature points on the chart show the difference when the water supply entering the Japan Gulch Treatment Plant was switched from Sooke Reservoir to the colder Goldstream Reservoir system. The water temperature returned to more normal conditions at the end of the year when the water supply from Sooke Reservoir was restored (**Figure 2**). (**Note**: The small circles on the chart show the extent of water temperature variation in previous years.)

### Water Clarity

*Turbidity.* Throughout November and December, the turbidity of the water in Sooke Reservoir was slightly lower than the 10-year average throughout the reservoir and well below the 1.0 NTU turbidity limit (**Figure 3**).

*Water Transparency*. As for turbidity, throughout November and December, the transparency of the water in 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 water level in the reservoir.

### Bacteria

*Total Coliform Bacteria*. In November and December, 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 slightly below levels observed in 2010, except for early December (December 05-12) when the water from the Goldstream Reservoir system was used as the source water (**Figure 5**). *E. coli* concentrations remained low throughout the November-December period, except for mid-December (December 05-12) and continued to fall below the USEPA limit to remain an unfiltered supply (see **insert in Figure 5**).

### Nutrients

*Phosphorus*. In both the south and north basins, the total phosphorus concentrations were lower than the 10-year average in November and December (**Figures 6 and 7**).

*Nitrogen*. Broadly, the total nitrogen levels in both the south and north basins were similar to the 10-year average (**Figures 8 and 9**).

**Chlorophyll-a**

In November and December, 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**

Sooke Reservoir algae were sampled once in November and no algal samples were collected in December. In November, similar to previous years *Asterionella formosa*, *Tabellaria fenestrata* and *Synedra radians* (all diatoms) dominated the algal flora. Despite their dominance, concentrations were within the range of previous years and there were no associated water quality issues.

## CONCLUSION

The water quality tests conducted for Sooke Reservoir in November and December 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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**Figure 1. Water Level Elevation in Sooke Reservoir, 2008-2011**

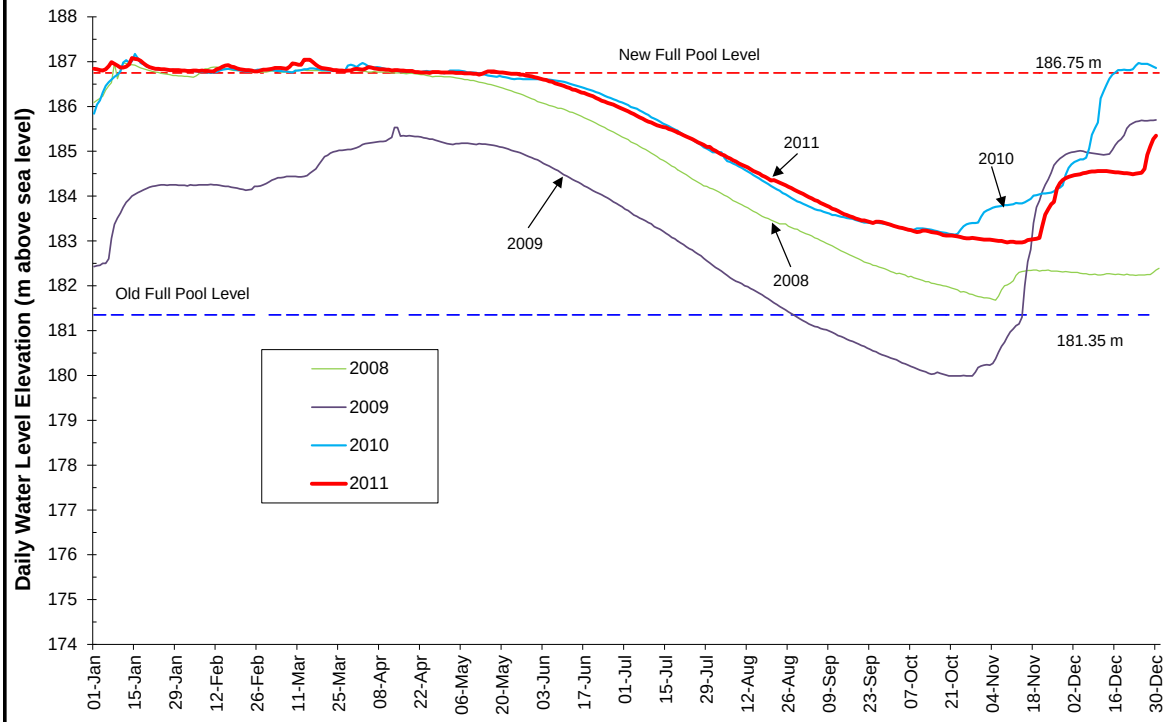


**Figure 2. 2011 Temperature of Raw Water entering Japan Gulch Plant (Weekly Average)**

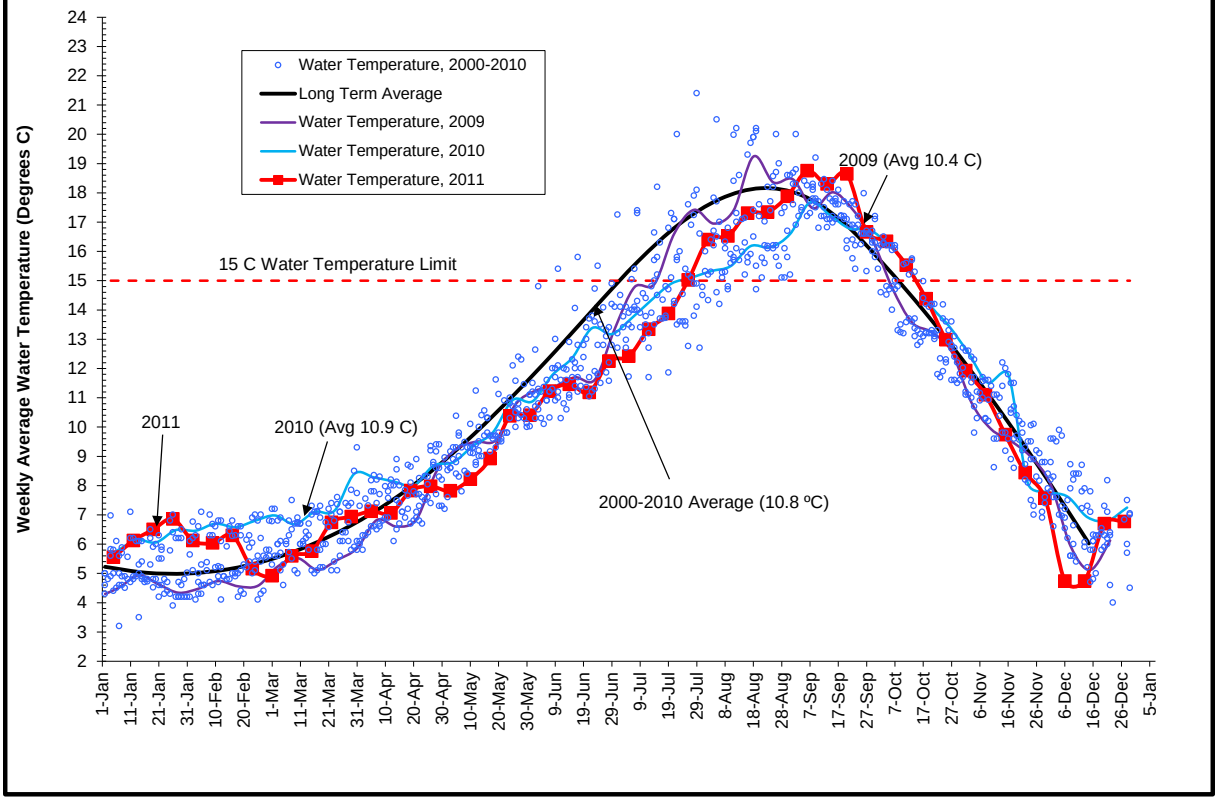

**Figure 3. 2011 Turbidity in Sooke Reservoir Intake Tower, 1m depth (SOL-00-01)**

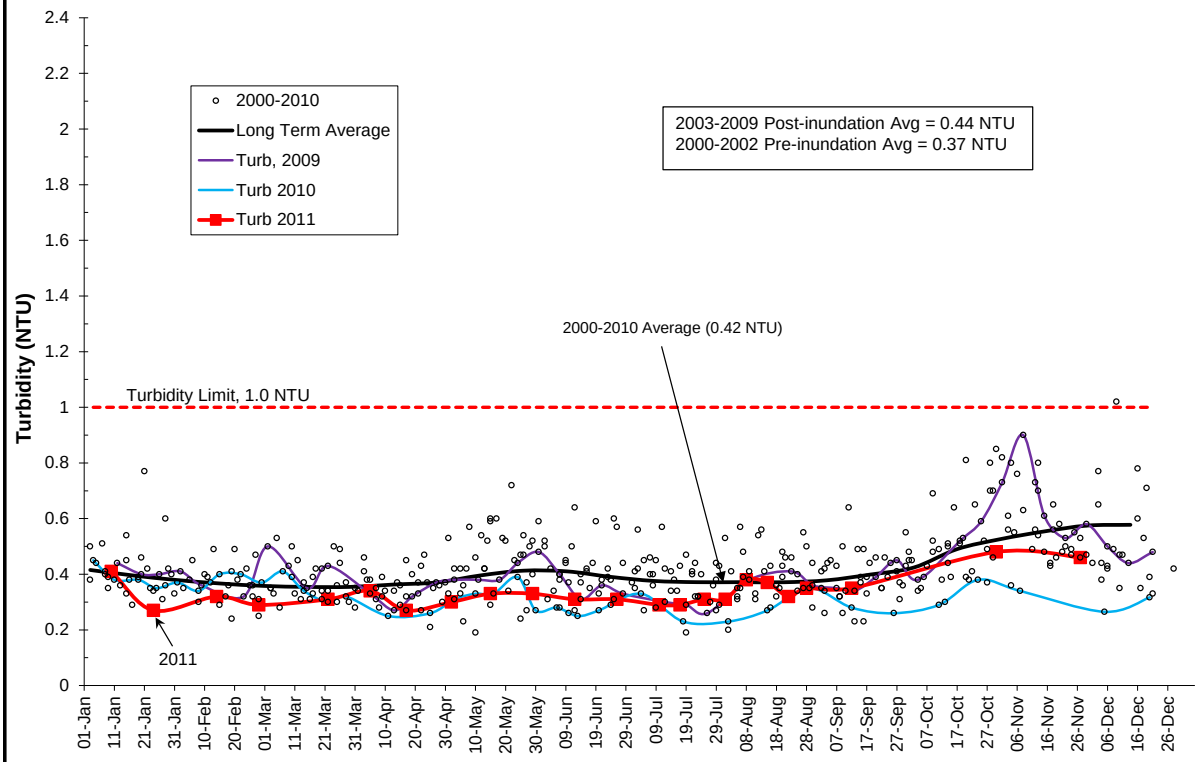


**Figure 4. 2011 Water Transparency in Sooke Reservoir Intake tower, (SOL-00-01)**

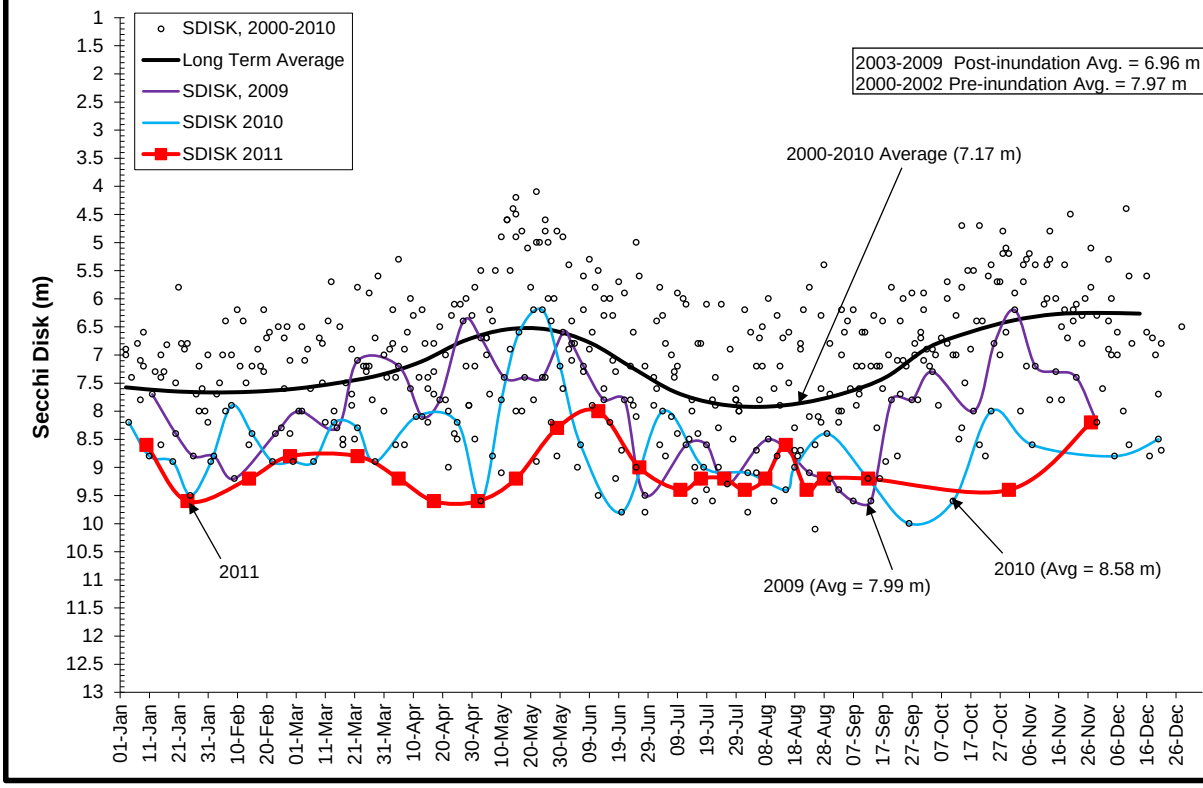

**Figure 1. Total Coliforms in Raw Water Entering Japan Gulch Plant, 2009-2011**

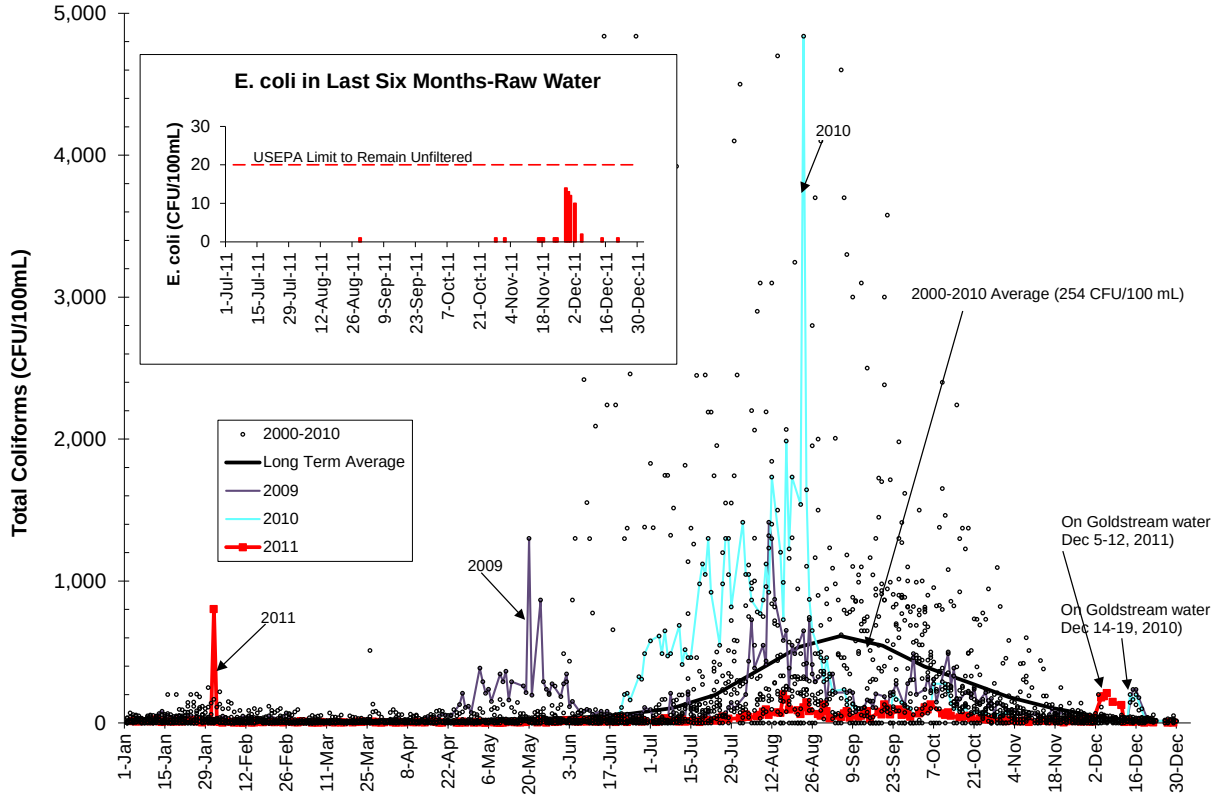


**Figure 6. 2011 Total Phosphorus for Sooke Reservoir South basin, 1 m depth (SOL-01-01)**

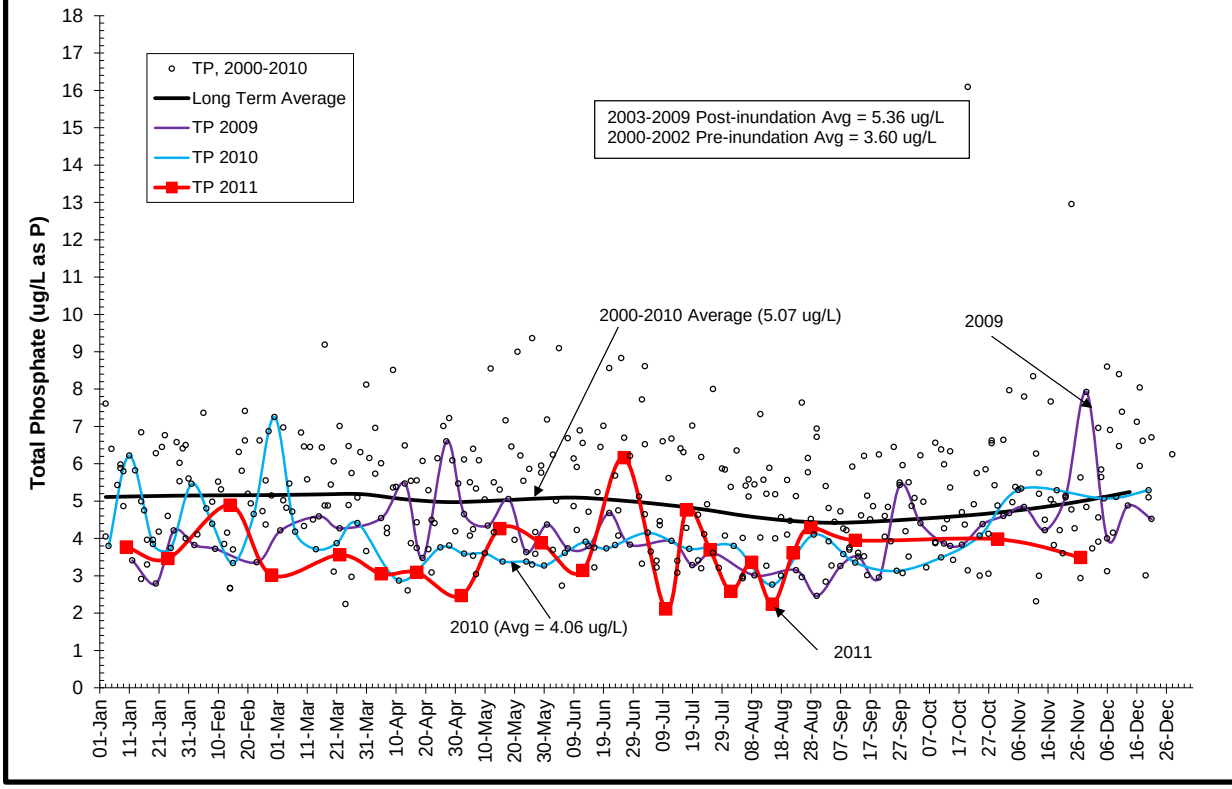

**Figure 7. 2011Total Phosphorus for Sooke Reservoir**
**North basin, 1m depth (SOL-04-01)**

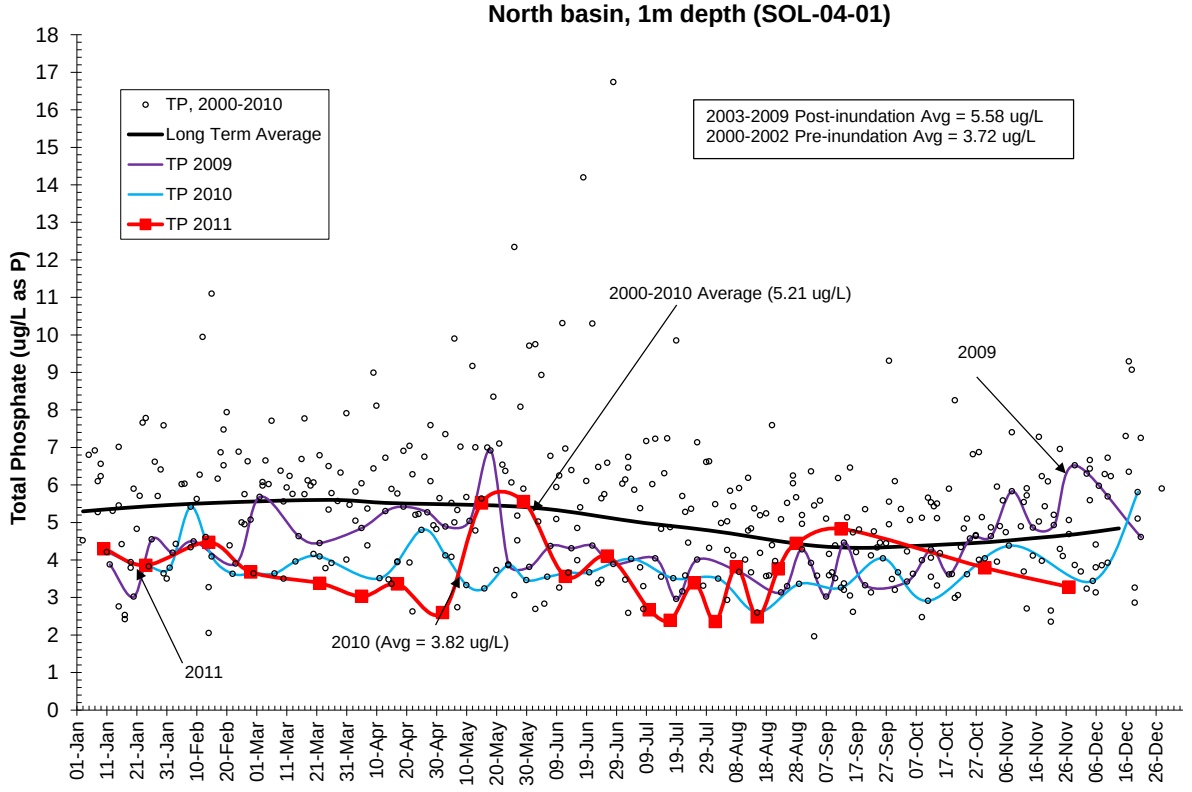


**Figure 8. 2011 Total Nitrogen in Sooke Reservoir**
**South basin, 1m depth (SOL-01-01)**

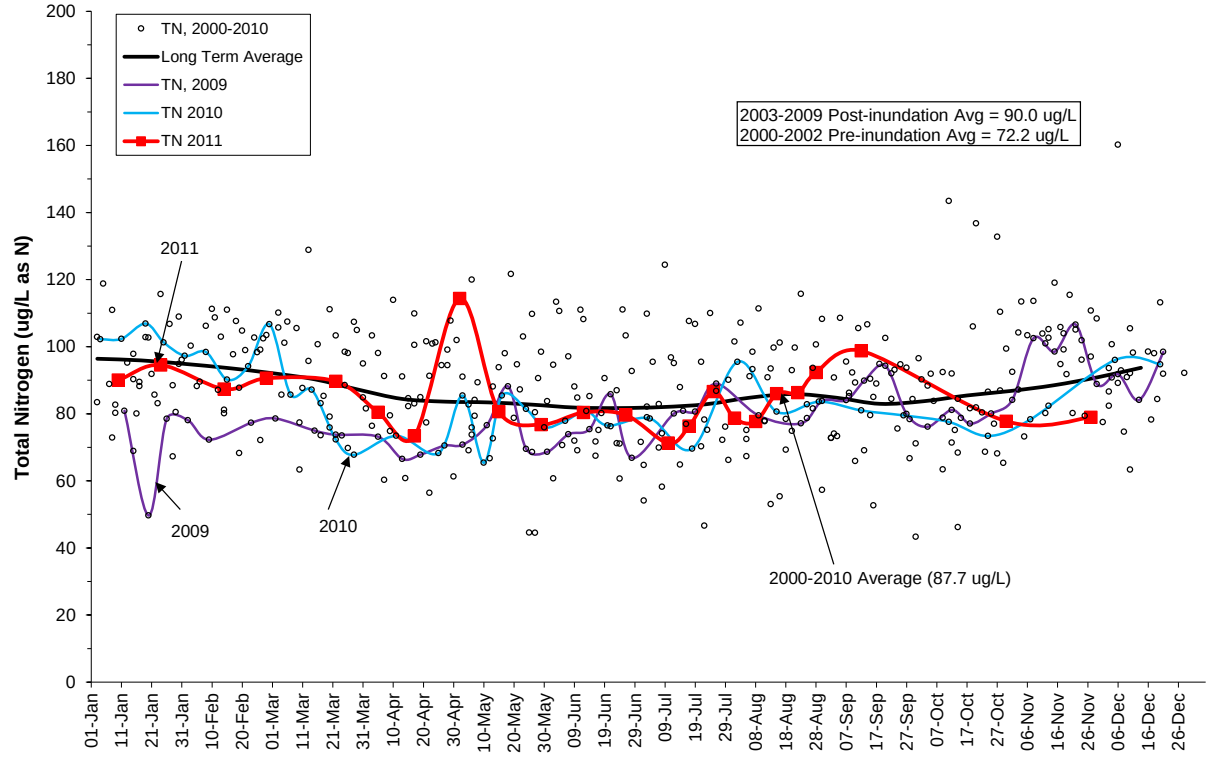

**Figure 9. 2011 Total Nitrogen in Sooke Reservoir**
**North basin, 1m depth (SOL-04-01)**

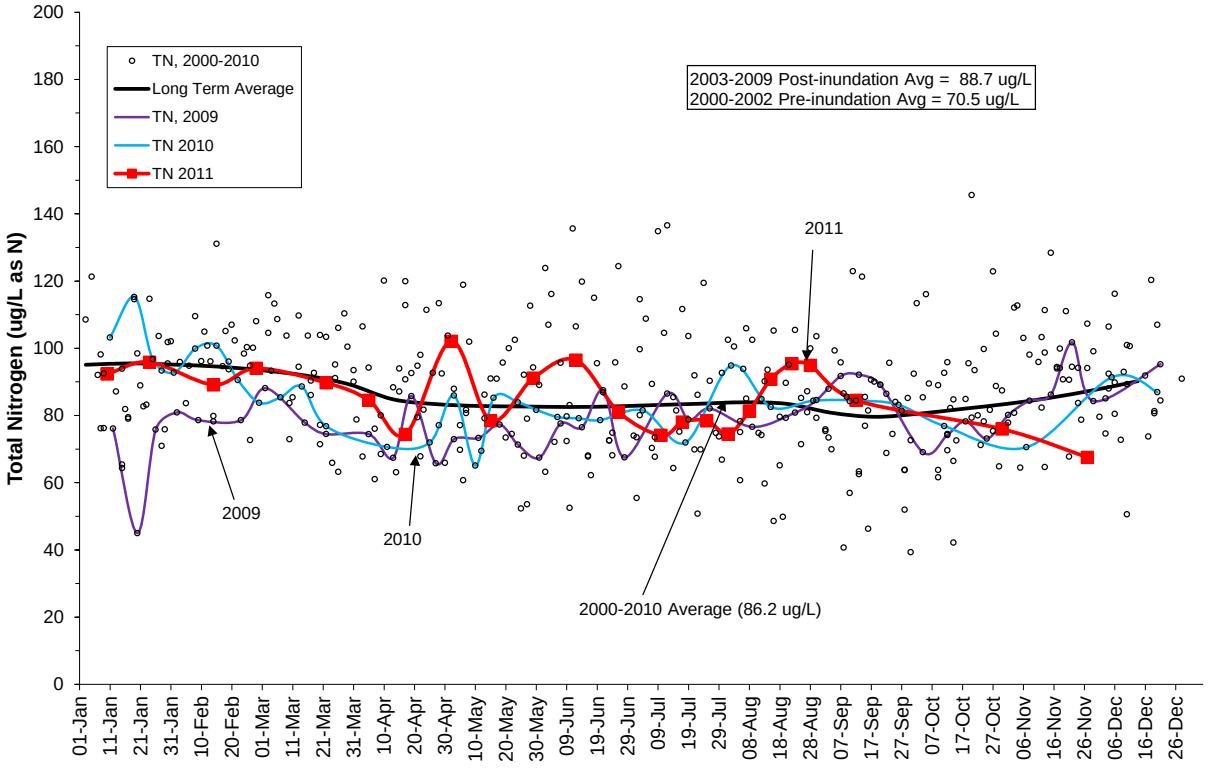


**Figure 10. 2011 Chlorophyll-a in Sooke Reservoir**
**Intake tower, 1m depth (SOL-00-01)**

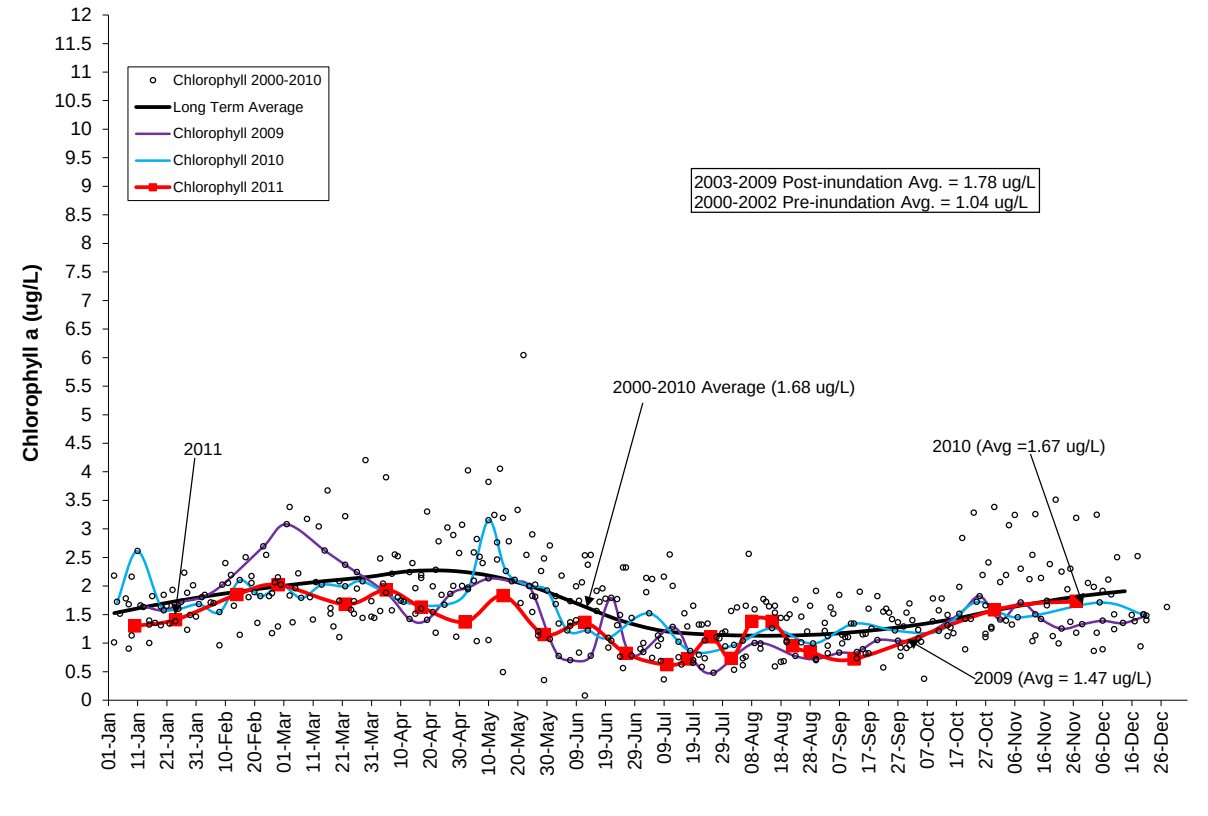

**Figure 11. 2011 Chlorophyll-a in Sooke Reservoir**
**South Basin, 1 m depth (SOL-01-01)**

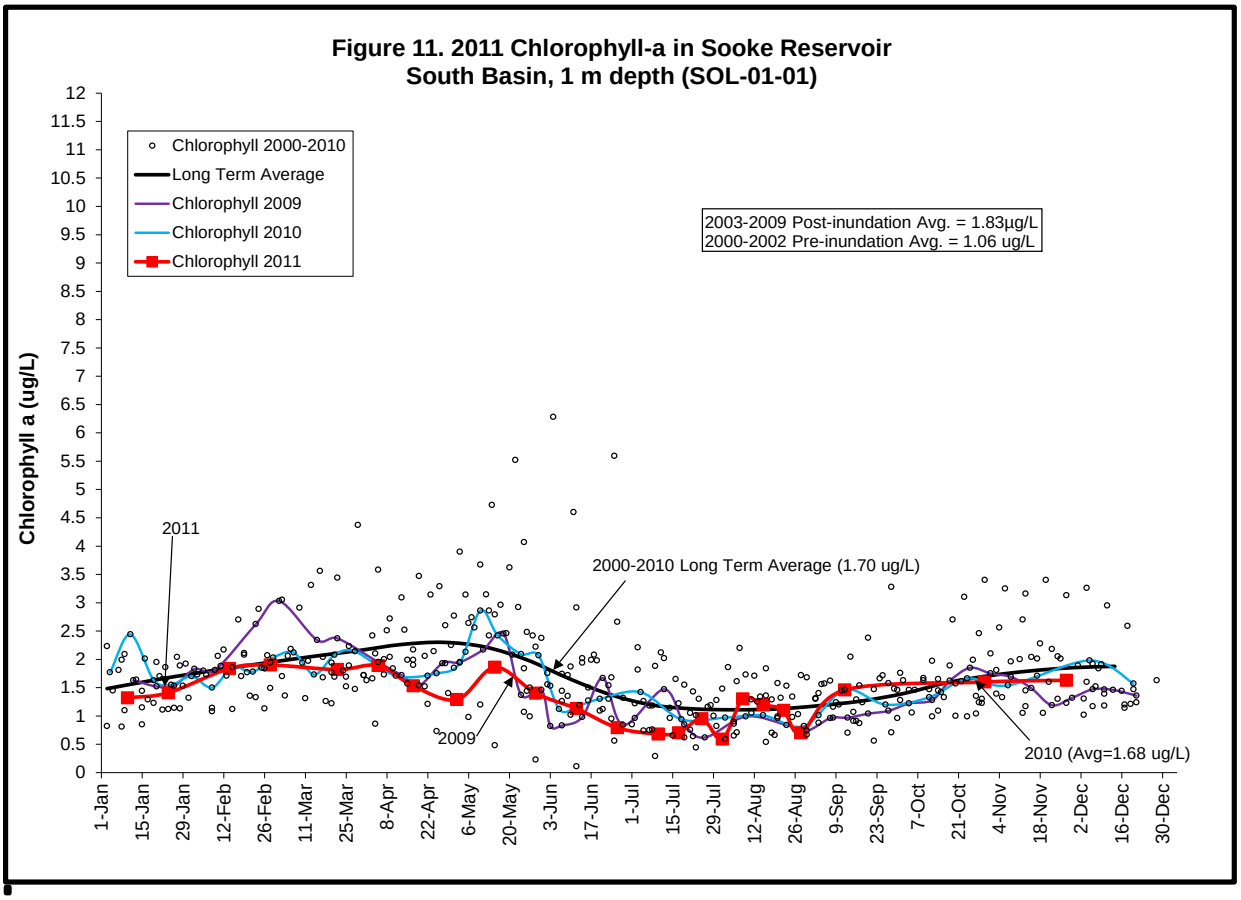


**Figure 12. 2011 Chlorophyll-a in Sooke Reservoir**
**North Basin, 1 m depth (SOL-04-01)**