



**REPORT TO REGIONAL WATER SUPPLY COMMISSION
MEETING OF WEDNESDAY, 16 SEPTEMBER 2009**

SUBJECT WATER QUALITY TRENDS IN SOOKE RESERVOIR IN JUNE - AUGUST 2009

SUMMARY

The water quality tests conducted for Sooke Reservoir in June through August 2009 continued to show good quality source water with no significant algal blooms.

PURPOSE

This report provides information on the water quality conditions observed in Sooke Reservoir during the period from June through August 2009 and compares these data with those from previous years and long-term averages.

REPORT

Physical Parameters

Water Levels. In June 2009, the water level in Sooke Reservoir fell by just over one metre, in July, it fell an additional 1.25 m and in August, a further 1.16 m. At the end of August, Sooke Reservoir was 5.45 m below the full pool level and 1.9 m below the level in 2008. This level is almost exactly the same level of the Full Pool Level of the reservoir prior to the expansion of the reservoir capacity. (**Figure 1**).

Water Temperature. Unlike 2008, the weekly average temperature of the water entering the Japan Gulch Treatment Plant during June through August was about two degrees warmer. During this time the water temperature averaged 17.5 °C and was consistently over the 15°C temperature limit from July 15th onwards (**Figure 2**). Nevertheless, the water temperature was still lower than the pre-inundation levels.

Water Clarity

Turbidity. During the period from June through August 2009, the turbidity of the water in Sooke Reservoir averaged 0.35 NTU in front of the intake, 0.36 NTU in the south basin (**Figure 3**) and 0.38 NTU in the north basin. All of these readings were lower (better) than the long term post-inundation average but slightly higher (poorer) than the pre-inundation (1995-2002) average.

Water Transparency. During the period from June through August 2009, the transparency of the water in front of the intake was, on average, slightly better than both the long-term, pre-inundation average and the post-inundation average (2003-2007) (**Figure 4**). In the south basin, the water transparency was similar to the long-term average and better than the post-inundation (2003-2007) average. In the north basin, the water transparency was similar to the same period in 2008 and better than the post-inundation (2003-2007) average albeit slightly poorer than the pre-inundation average.

Bacteria

Total Coliform Bacteria. Following the unusual increase in total coliform concentrations during the month of May in the raw source water entering the Japan Gulch Treatment Plant from Sooke Reservoir, a second bump occurred in mid August and then declined somewhat (**Figure 5**). Nevertheless, all of the *E. coli* concentrations were very low and indicative of good bacterial quality for a source water reservoir (**insert in Figure 5**).

Nutrients

Phosphorus. During the period from June through August, the total phosphorus concentrations was lower than the post-inundation average and near the long term pre-inundation in both basins (**Figure 6 and 7**). (**Note:** In the charts, the bars on each data point indicate the range of data observed from triplicate samples).

Nitrogen. The total nitrogen levels in both the south and north basins were slightly higher than the long-term, pre-inundation average (**Figures 8 and 9**).

Chlorophyll-a

Chlorophyll-a concentrations were generally slightly above the lower pre-inundation average throughout Sooke Reservoir in June through August, hovering slightly below the higher post-inundation average (**Figures 10-12**). Nevertheless, the chlorophyll levels were relatively low throughout the reservoir during this period indicating that there was no particular problem with algal concentrations.

Algae

There were no significant algal blooms during the period from June through August 2009. In early June, the diatoms *Asterionella formosa* and *Tabellaria fenestrata* dominated the Sooke algal flora. As June progressed, there was a minor *Uroglena spp* bloom with no associated water quality complaints. In July, Sooke Reservoir was dominated by several Dinoflagellates and in August, there was an increase in the blue-green algae *Anabaena flos-aquae*, but this did not present any taste and odour or filter clogging problems.

Inundation Scientific Advisory Working Group

The Sooke Reservoir Inundation Scientific Advisory Working Group met on May 6th, 2009. There were no concerns expressed regarding the water quality in Sooke Reservoir. There were no meetings during the summer months as the reservoir ecology was relatively quiet.

RECOMMENDATION

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

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Figure 1. Water Level Elevation in Sooke Reservoir, 2006-2009

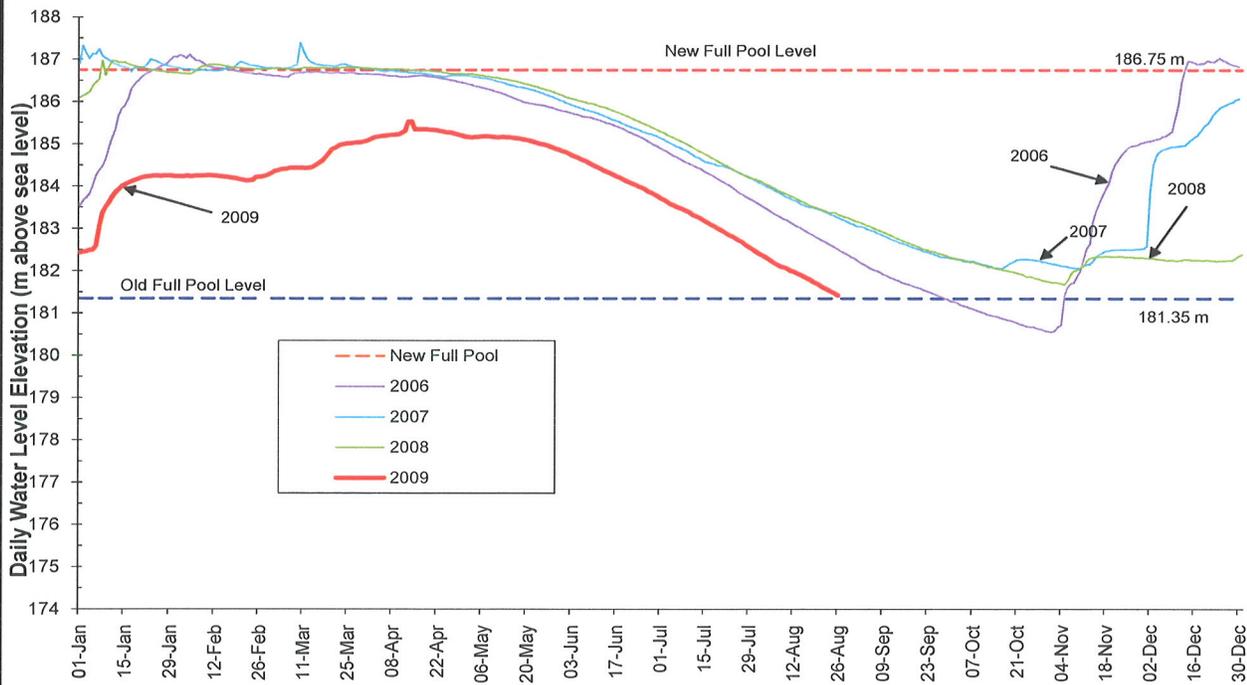
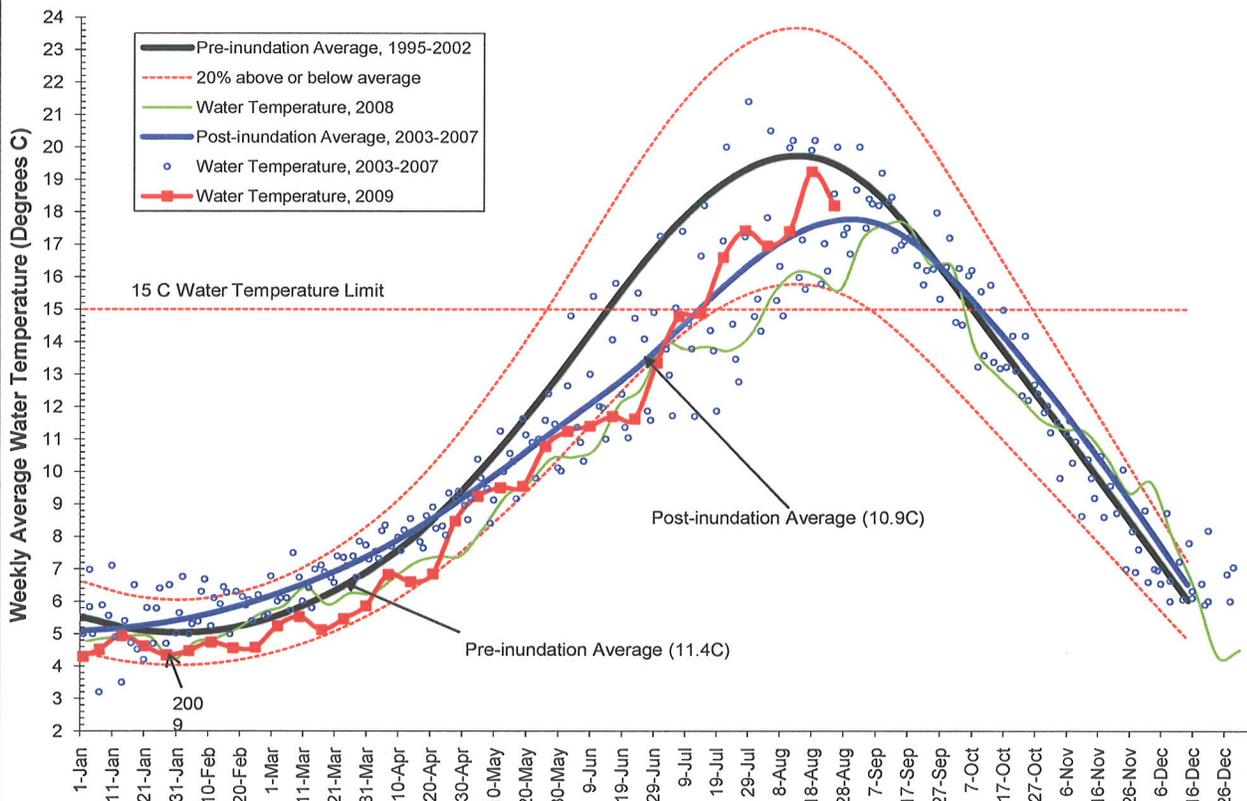
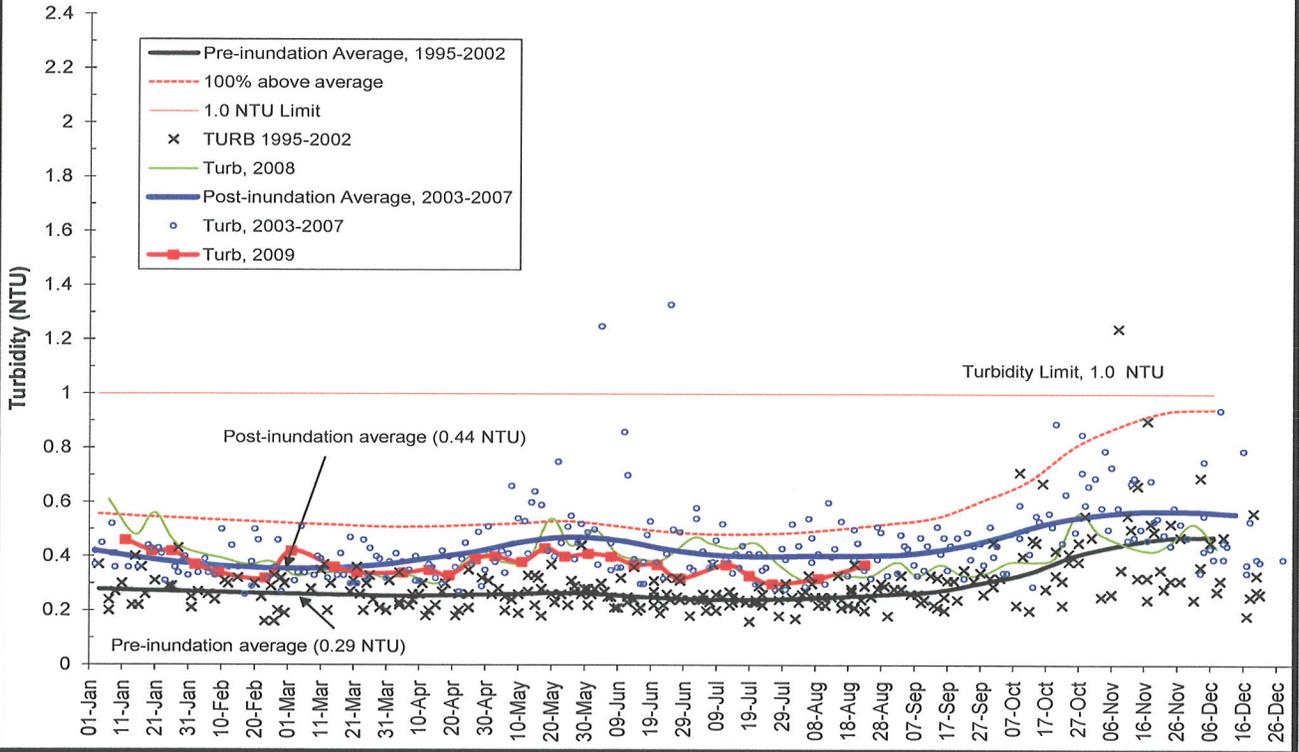


Figure 2. 2009 Temperature of Raw Water entering Japan Gulch Plant (Weekly Average)



**Figure 3. 2009 Turbidity in Sooke Reservoir
 South basin, 1m depth (SOL-01-01)**



**Figure 4. 2009 Water Transparency in Sooke Reservoir
 Intake tower, (SOL-00-01)**

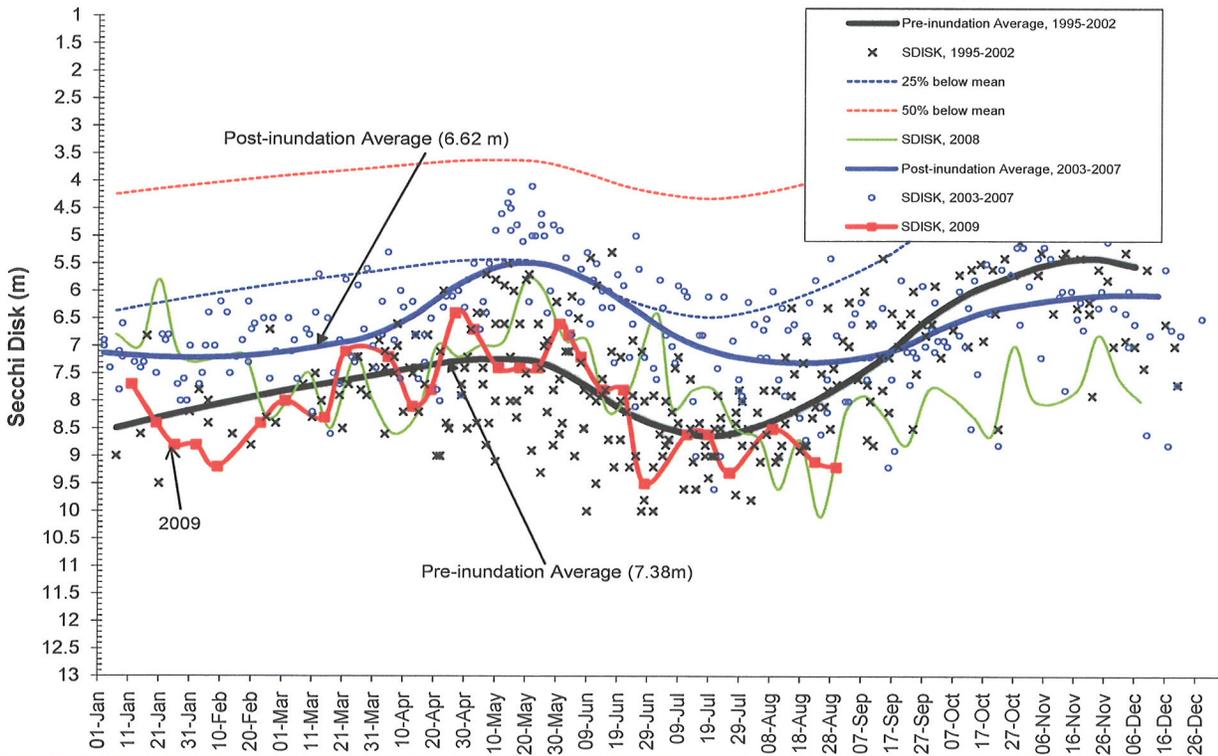


Figure 5. Total Coliforms in Raw Water Entering Japan Gulch Plant, 2004-2009

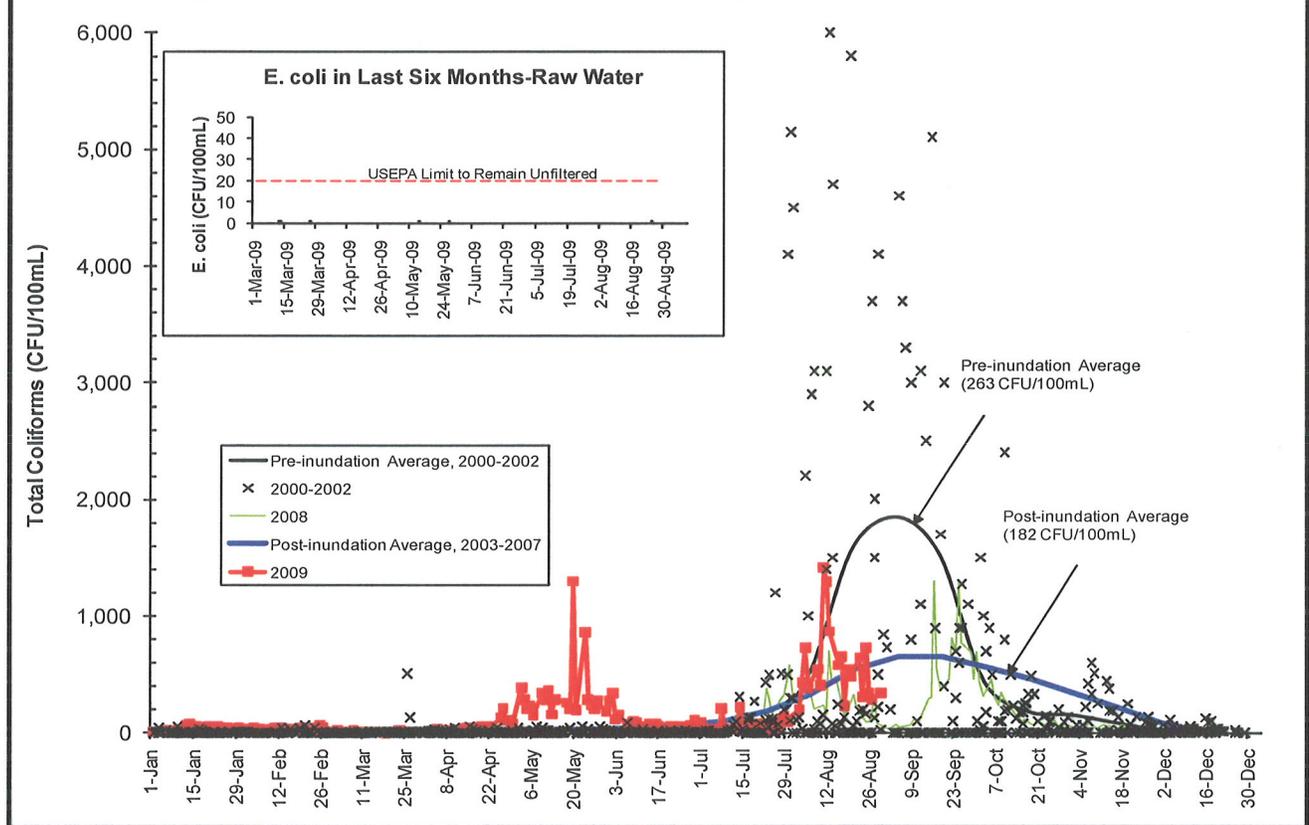


Figure 6. 2009 Total Phosphorus for Sooke Reservoir South basin, 1 m depth (SOL-01-01)

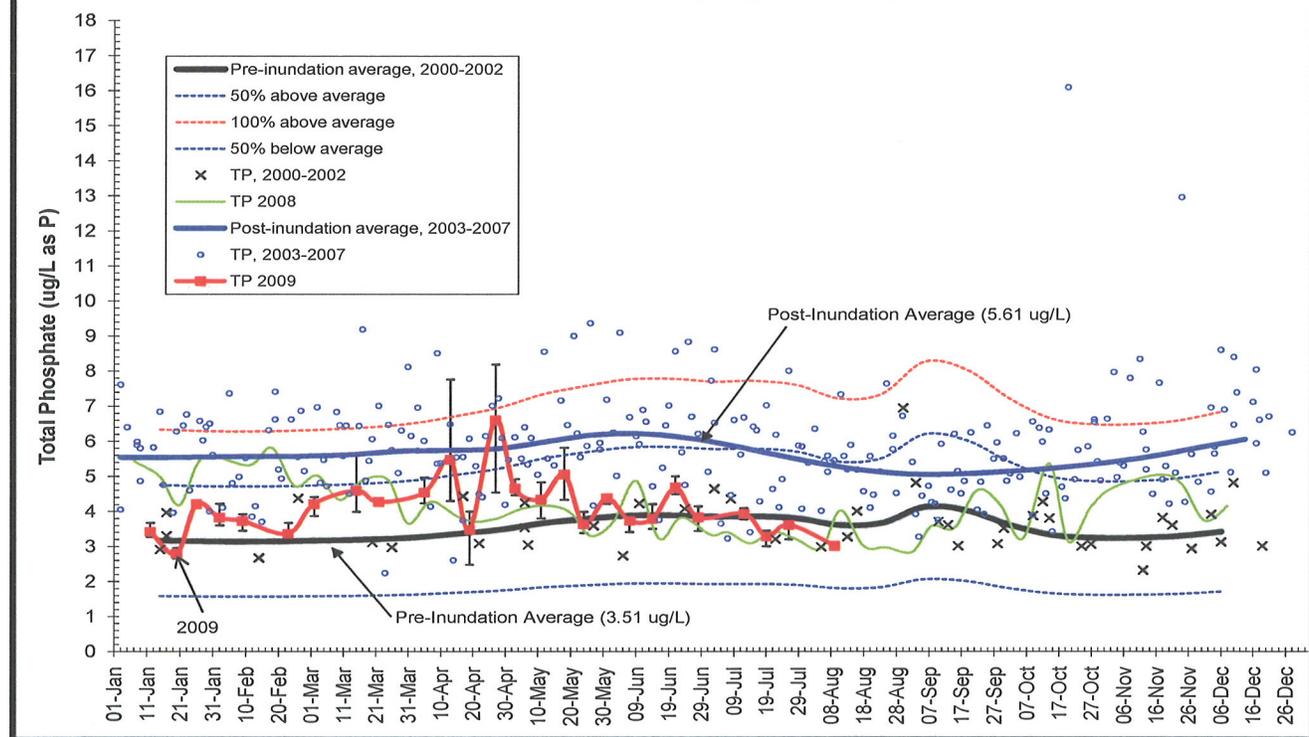


Figure 7. 2009 Total Phosphorus for Sooke Reservoir North basin, 1m depth (SOL-04-01)

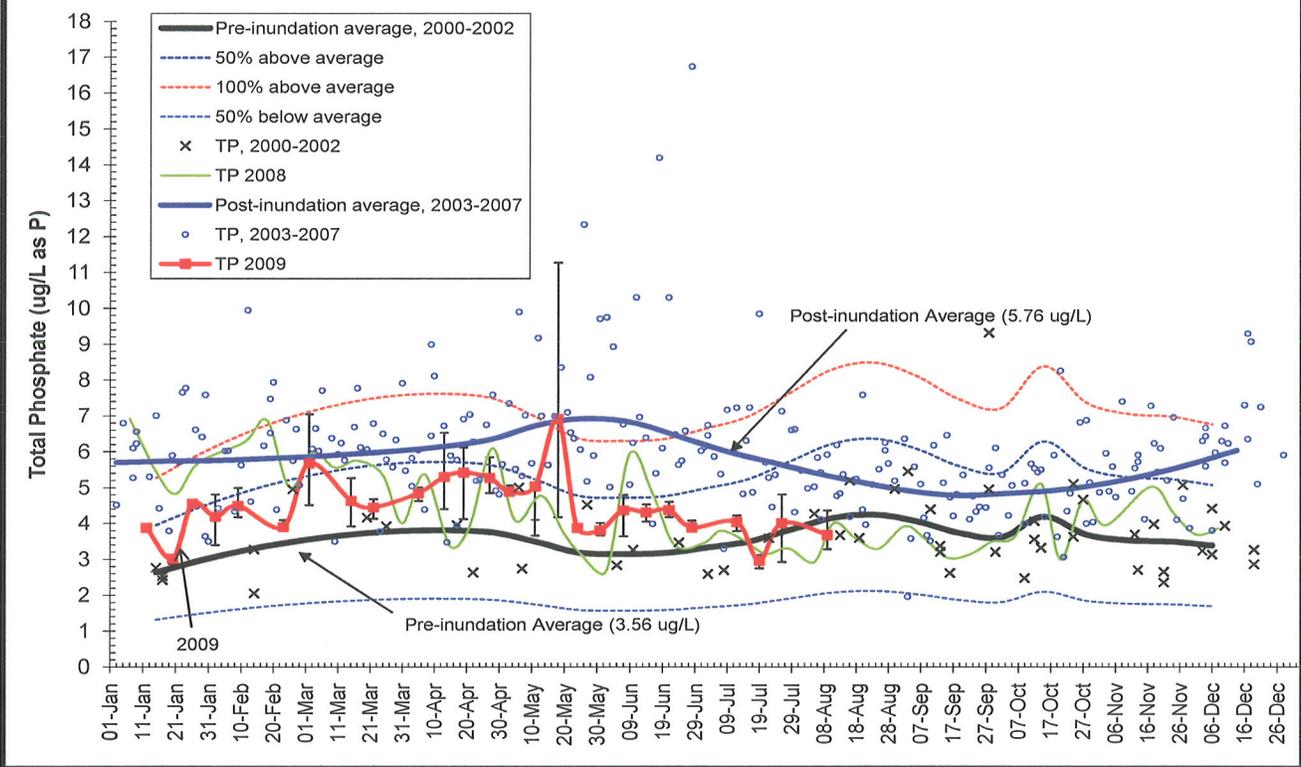


Figure 8. 2009 Total Nitrogen in Sooke Reservoir south basin, 1m depth (SOL-01-01)

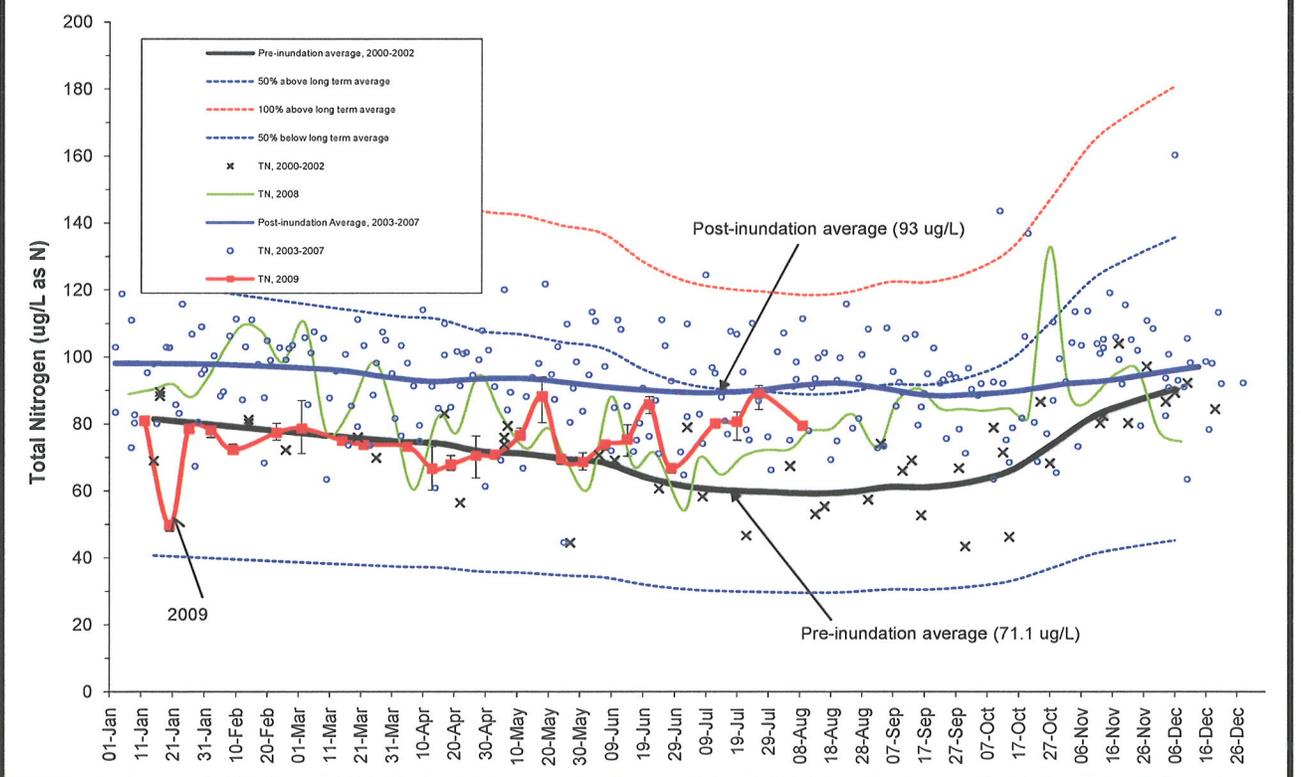


Figure 9. 2009 Total Nitrogen in Sooke Reservoir
 North basin, 1m depth (SOL-04-01)

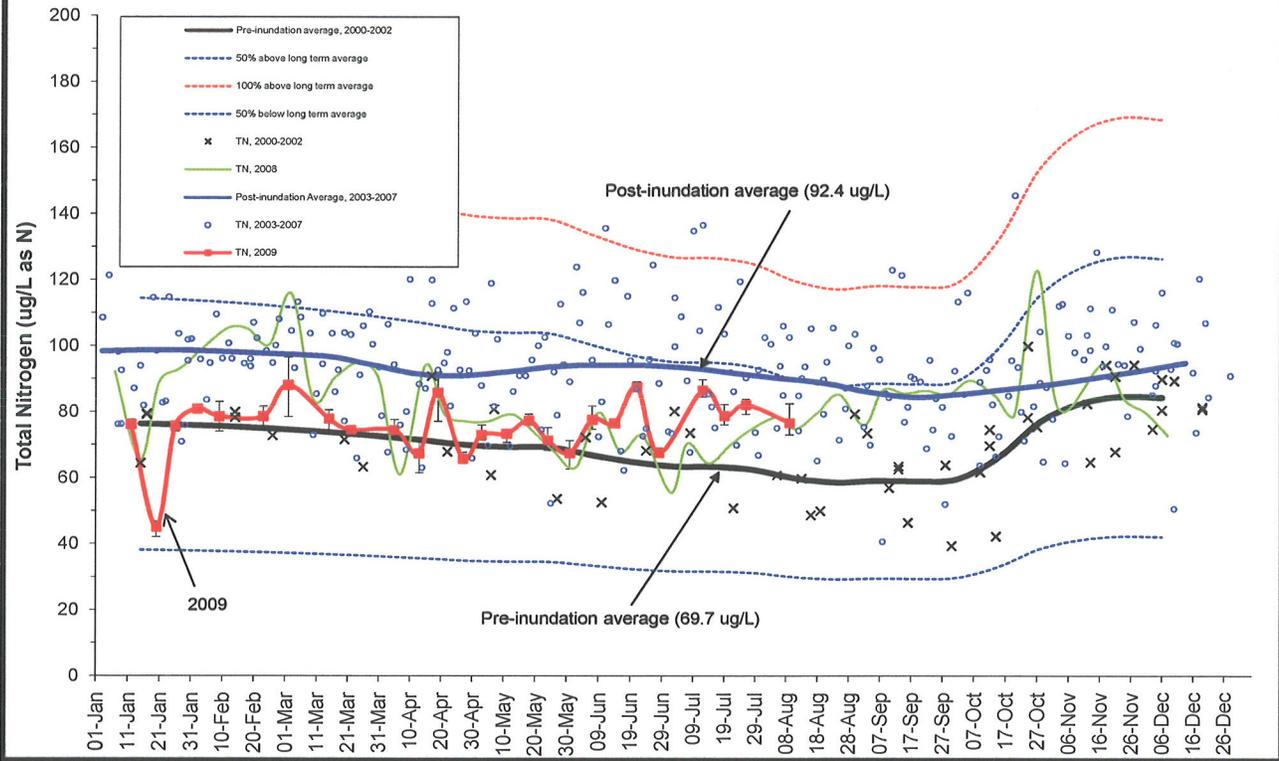


Figure 10. 2009 Chlorophyll-a in Sooke Reservoir
 Intake Tower, 1 m depth (SOL-00-01)

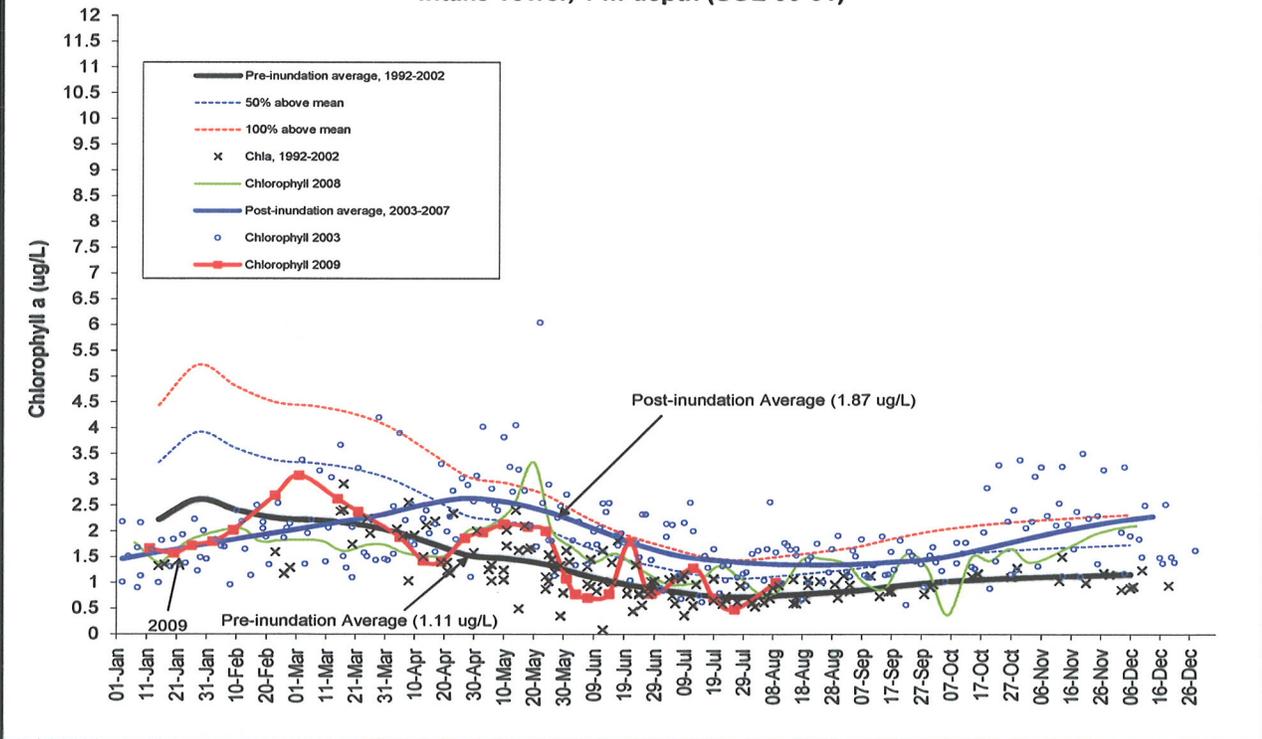


Figure 11. 2009 Chlorophyll-a in Sooke Reservoir South Basin, 1 m depth (SOL-01-01)

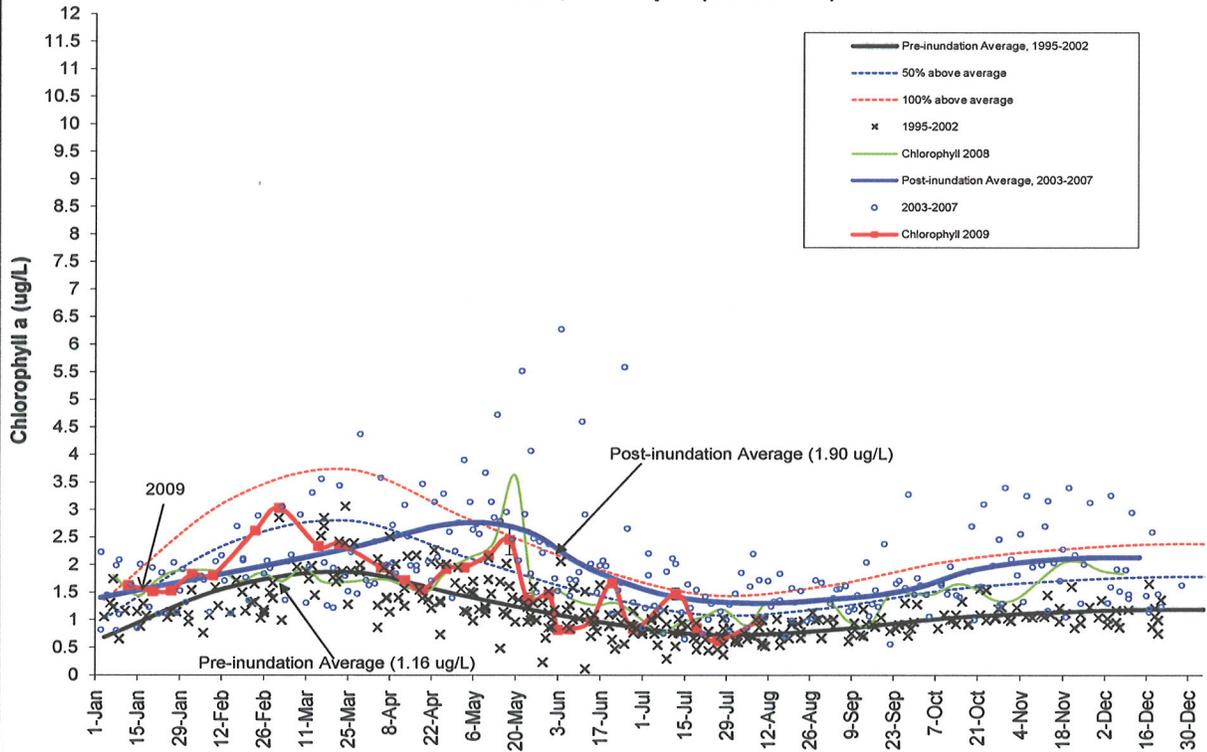


Figure 12. 2009 Chlorophyll-a in Sooke Reservoir North Basin, 1 m depth (SOL-04-01)

