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Agenda Item #9
REPORT #RWSC 2008-18

REPORT TO REGIONAL WATER SUPPLY COMMISSION
MEETING OF WEDNESDAY, 17 SEPTEMBER 2008

SUBJECT WATER QUALITY TRENDS IN SOOKE RESERVOIR IN JUNE, JULY AND AUGUST 2008

SUMMARY

The water quality tests conducted for Sooke Reservoir during the period of June to August 2008 continued to show good quality source water.

PURPOSE

This report provides information on the water quality conditions observed in Sooke Reservoir during the months of June through August 2008 and compares these data with those from previous years and long-term averages.

Physical Parameters

*Water Levels***.** During the months of June through August the water level in Sooke Reservoir declined gradually, following a similar pattern to that in 2007 (**Figure 1)**. By the end of August, the water level was about 3.5 m below full pool level of 186.75 m (183.19 metres) (**Figure 1**).

Water Temperature. During June and July, the weekly average temperature of the water entering the Japan Gulch Treatment Plant fell below the post-inundation average and was about 1°C lower than the water temperature during the same period in 2007. This drop in water temperature was due to colder than average temperatures in June and July. (**Figure 2**). Similar to past years following inundation, the water temperature increased over the 15°C limit in early August. Generally, the water temperature in August was similar to recent years (2005-2007) following inundation of the Reservoir.

Water Clarity

Turbidity. During the months of June and July 2008, the turbidity of the water in Sooke Reservoir averaged 0.44 and 0.41 NTU respectively which is consistent with the post-inundation average during that same time period and about 0.15 to 0.18 NTU above the pre-inundation average (**Figure 3).** In August 2008, the turbidity averaged only 0.34 NTU, lower than the post-inundation average and similar to the pre-inundation average for that same period. This trend in lower turbidity was consistent throughout the Reservoir.

Water Transparency. In June and July 2008, the transparency of the water throughout the reservoir was better than the post-inundation average and only slightly worse than the pre-inundation average (**Figure 4)**. In August 2008 the water transparency improved in the forebay and the south basin while becoming slightly poorer, albeit lower than the post-inundation average, in the north basin.

Bacteria

Total Coliform Bacteria. The total coliform bacteria concentration in the water entering the Japan Gulch Treatment Plant from Sooke Reservoir was similar to levels observed in past years. As typical and as expected, coliform numbers rose during mid-July through the end of August. By the end of August, the total coliform level was about 250 colony forming units per 100 mL. This is similar to past years and is a relatively low number indicating good bacterial quality in Sooke Reservoir.

Nutrients

Phosphorus. During June through August, the total phosphorus concentrations continued to gradually decline in both basins.(**Figure 5 and 6)**. In both the south and north basins the June total phosphorus level averaged slightly above the long term pre-inundation average, while in July and August the average total phosphorus concentration fell slightly below the long term pre-inundation average. (**Note**: In the charts, the bars on each data point indicate the range of data observed from triplicate samples).

Nitrogen. In both south and north basins, the total nitrogen levels fluctuated around the pre-inundation average during the months of June and July (**Figure 7 and 8**). In August 2008, the total nitrogen levels rose slightly above the long term pre-inundation levels but remained 20% lower than the post-inundation average (2003-2007).

Chlorophyll-a

Throughout Sooke Reservoir in June through August, chlorophyll-a concentrations declined and then remained fairly steady with levels averaging between the low pre-inundation average and the higher post-inundation average (**Figures 9 and 10**). Towards the end of August chlorophyll levels rose slightly, approaching levels similar to the post-inundation average.

Algae

The beginning of June saw the die-off of the spring bloom of the Diatom *Asterionella formosa* (a potential filter clogging species) and there were no algal blooms in June in Sooke Reservoir. In addition, concentrations of all three major groups of zooplankton remained low. In July, the colonial Cyanophyte *Anabaena flos-aquae* developed throughout the Reservoir but did not cause any taste and odour problems. Similarly, concentrations of the three groups of zooplankton began to increase. In August the colonial Cyanophyte *Gleotrichia echinulata* appeared throughout the reservoir, albeit in very low concentrations that did not present any taste and odour or filter clogging problems. Populations of all zooplankton and all other algae maintained numbers at July levels.

Inundation Scientific Advisory Working Group

The Sooke Reservoir Inundation Scientific Advisory Working Group met on June 5, 2008. No concerns were voiced. Due to the lack of significant biological activity in Sooke Reservoir, no further meetings were scheduled over the summer.

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, 2003-2008

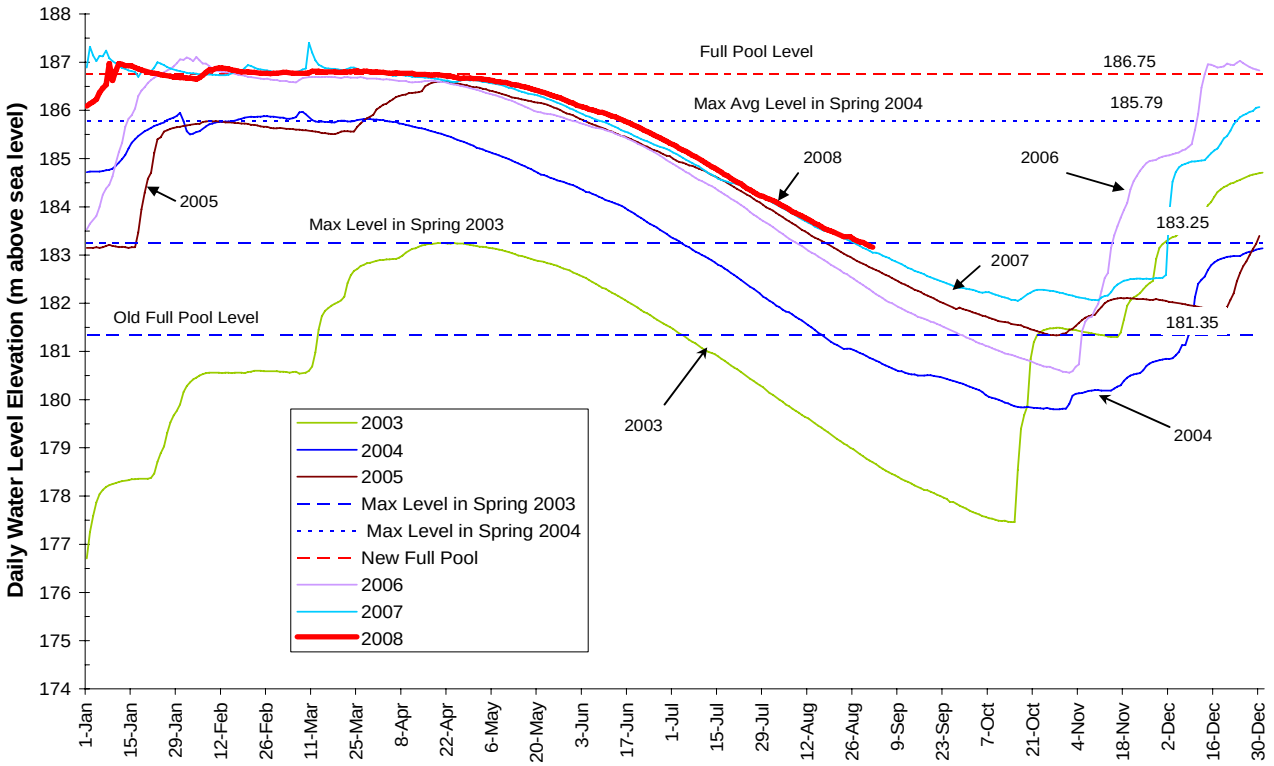

Figure 2. 2008 Temperature of Raw Water entering Japan Gulch Plant (Weekly Average)

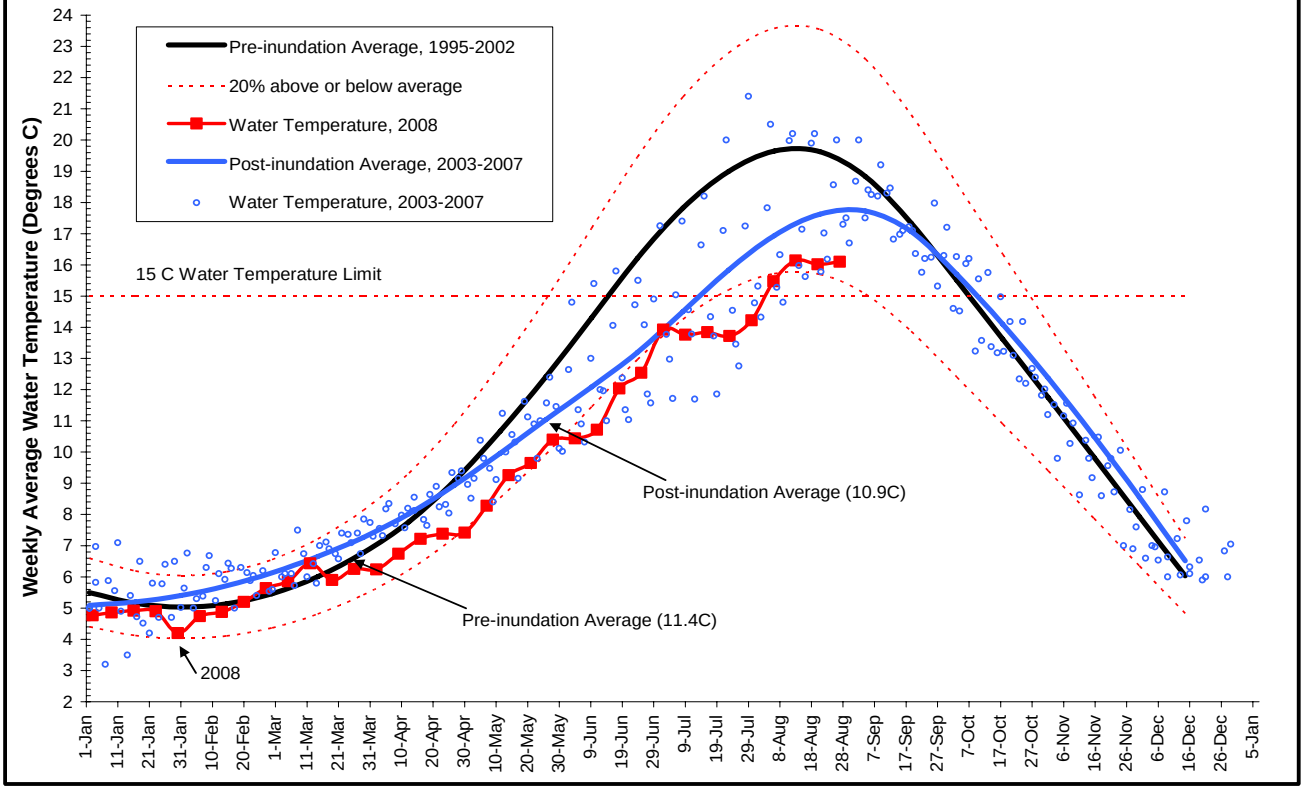

Figure 3. 2008 Turbidity in Sooke Reservoir
North Basin, 1m depth (SOL-04-01)

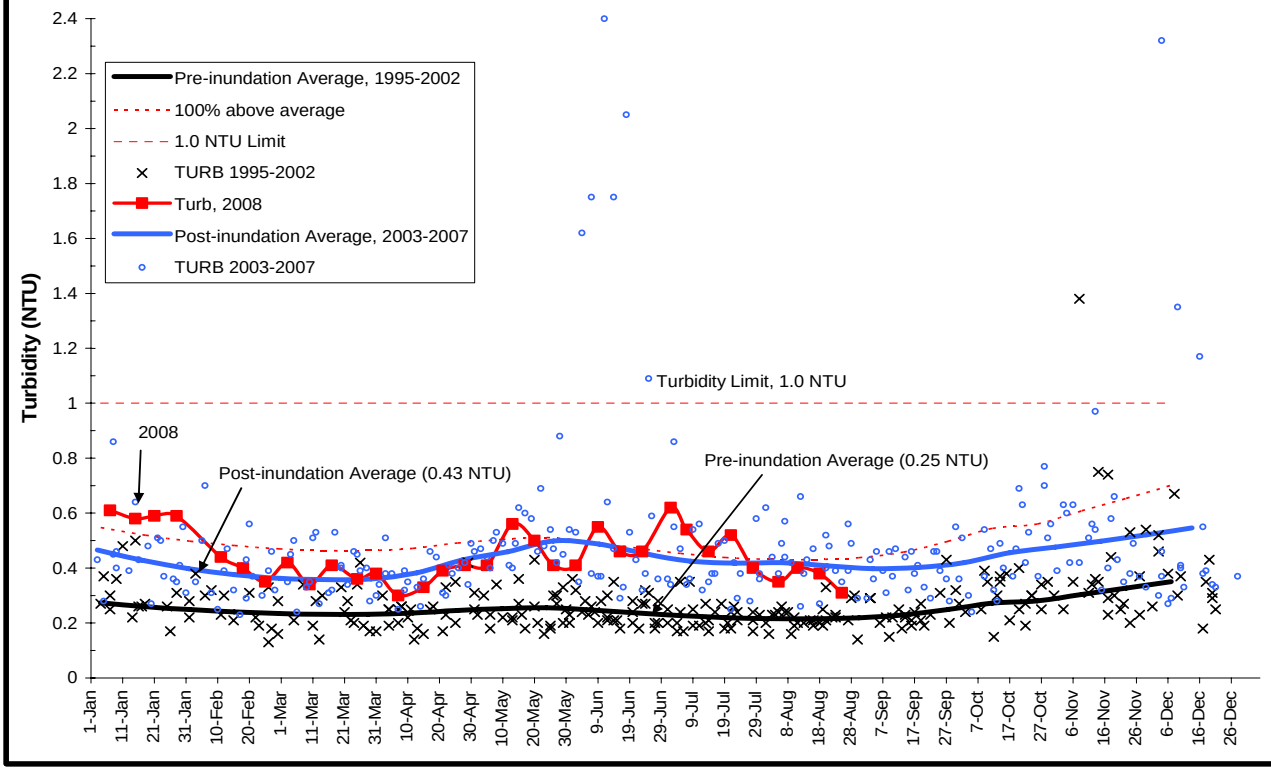

Figure 4. 2008 Water Transparency in Sooke Reservoir
Intake tower, (SOL-00-01)

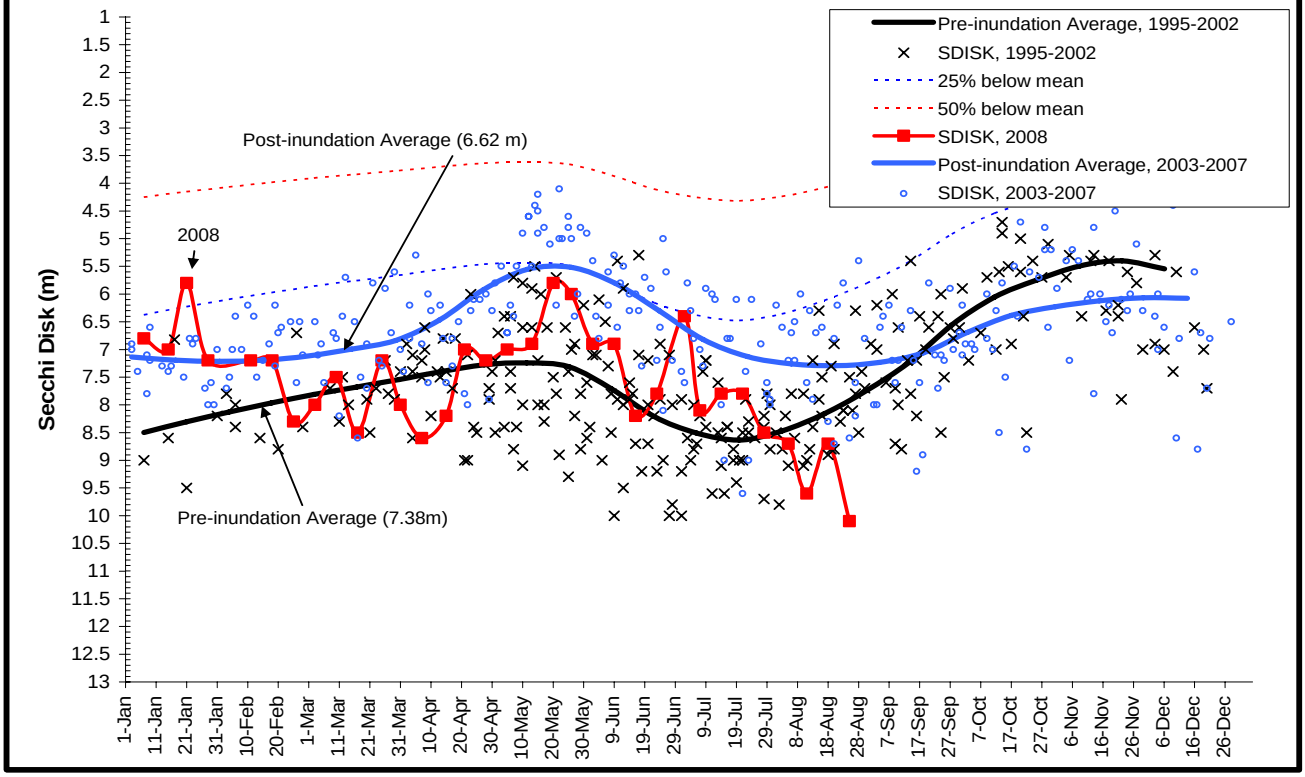

Figure 5. 2008 Total Phosphorus for Sooke Reservoir South basin, 1 m depth (SOL-01-01)

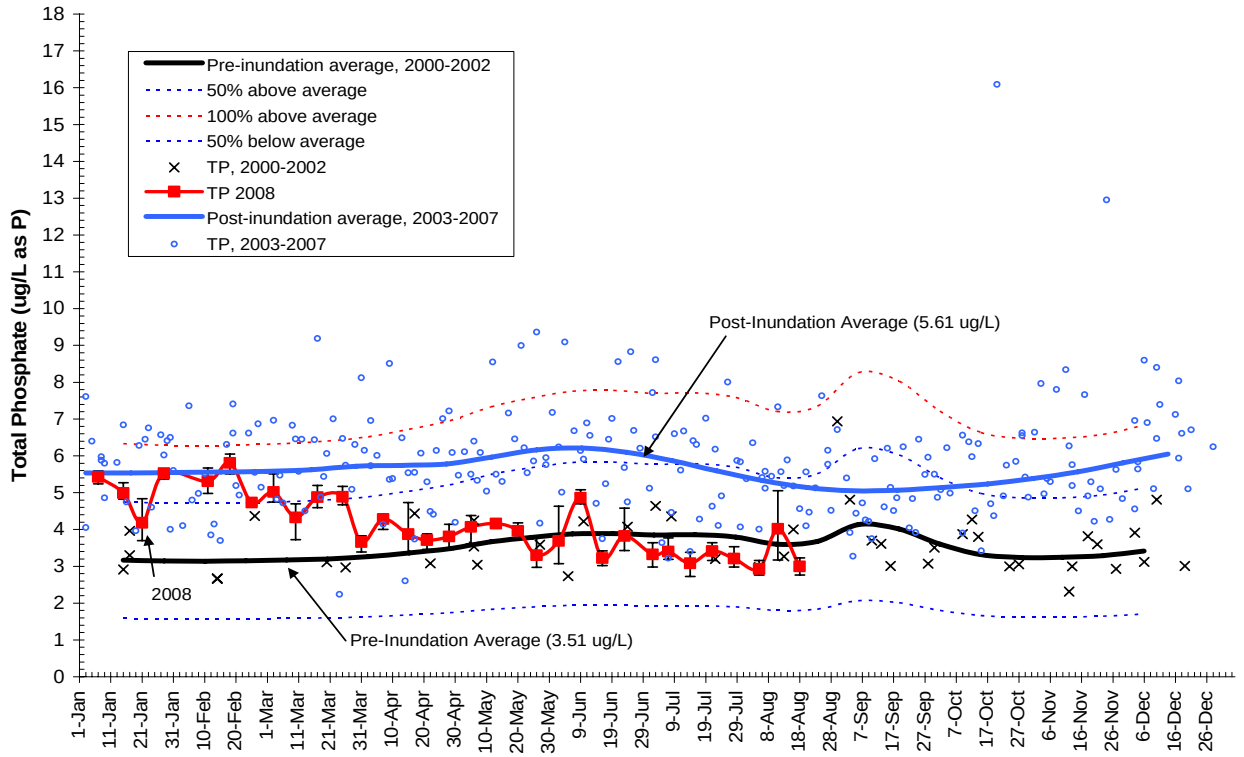

Figure 6. 2008 Total Phosphorus for Sooke Reservoir North basin, 1m depth (SOL-04-01)

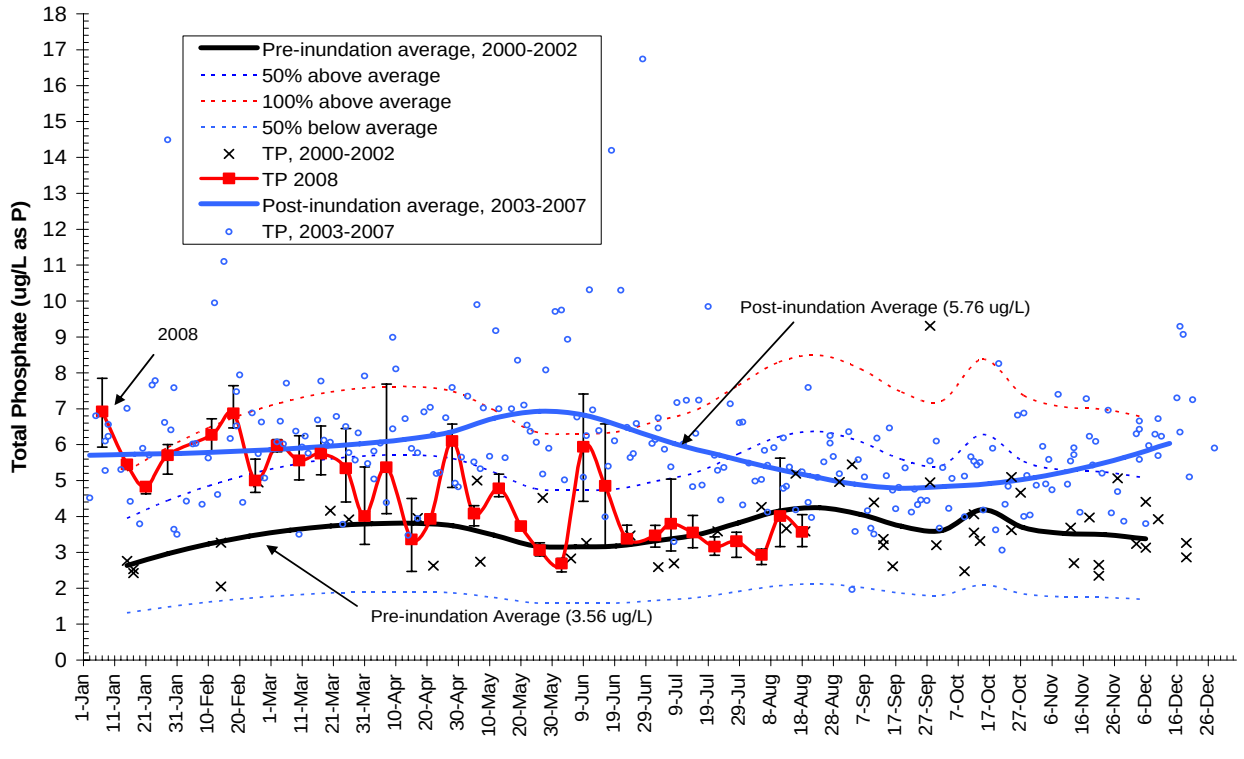

Figure 7. 2008 Total Nitrogen in Sooke Reservoir south basin, 1m depth (SOL-01-01)

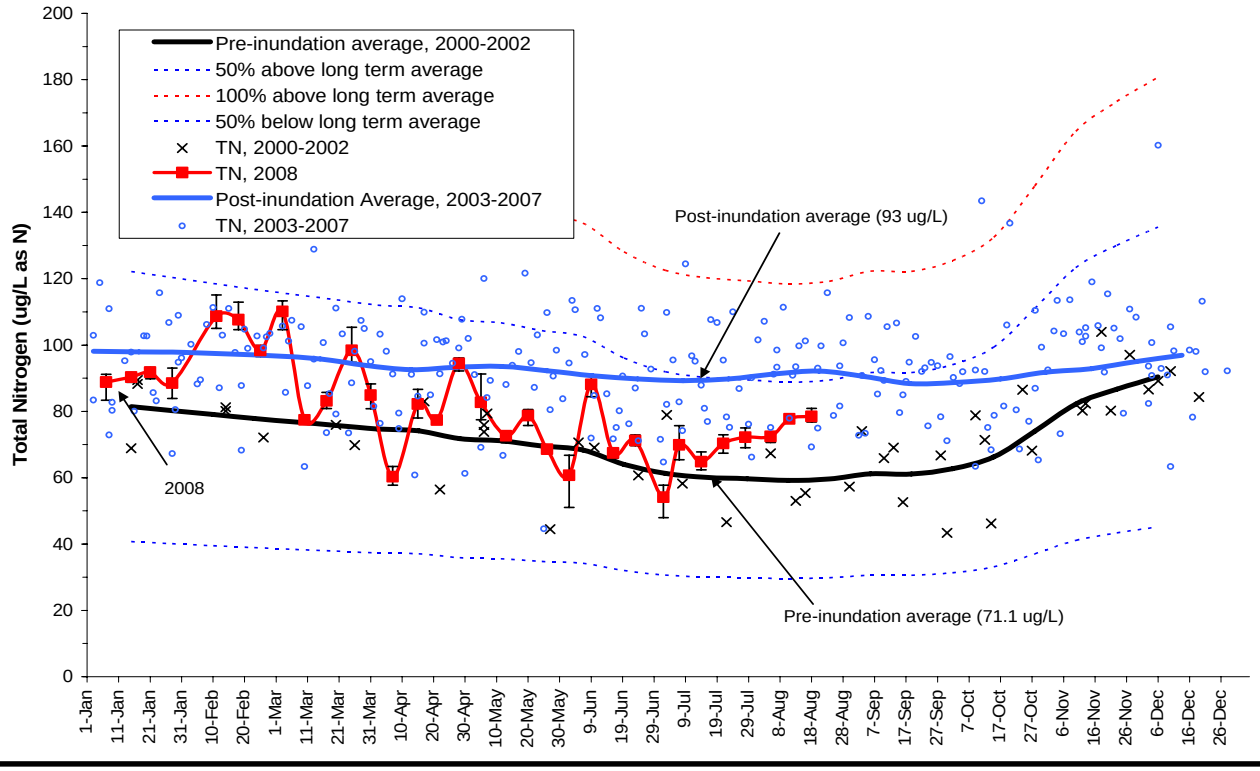

Figure 8. 2008 Total Nitrogen in Sooke Reservoir North basin, 1m depth (SOL-04-01)

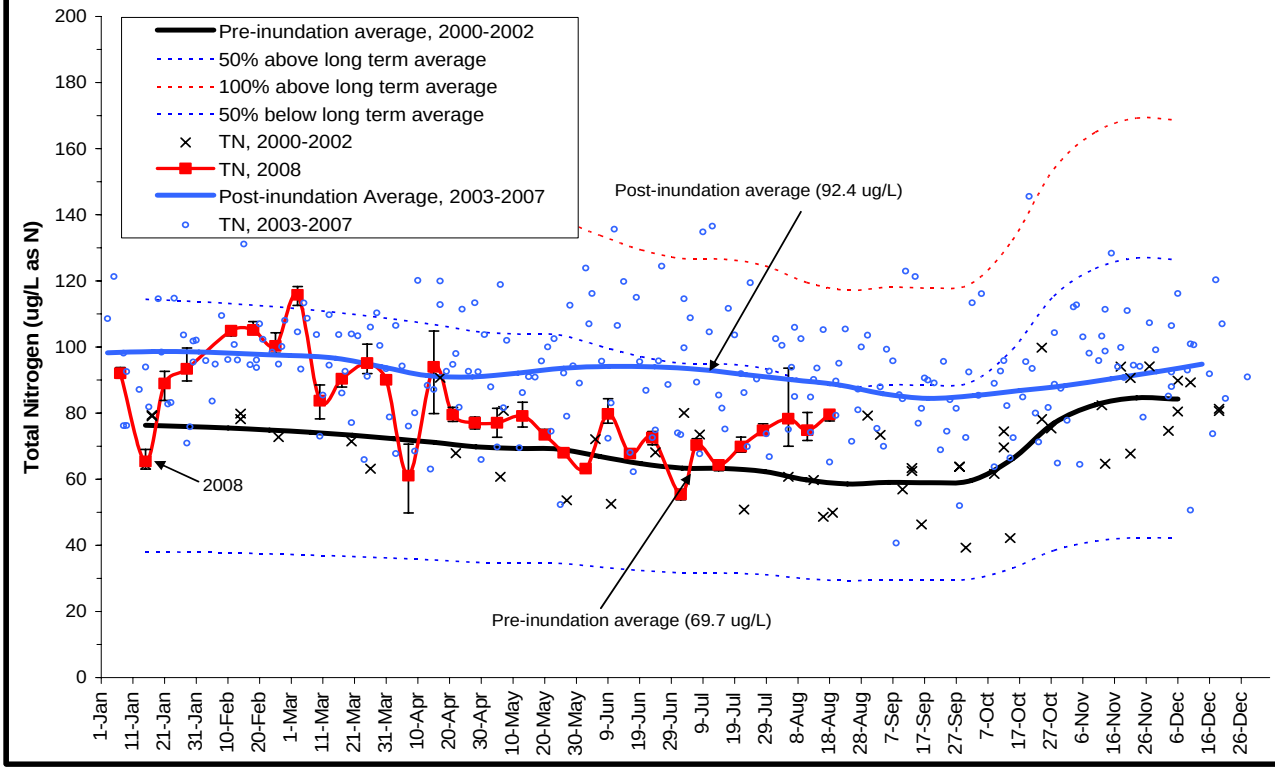

Figure 9. 2008 Chlorophyll-a in Sooke Reservoir Intake Tower, 1 m depth (SOL-00-01)

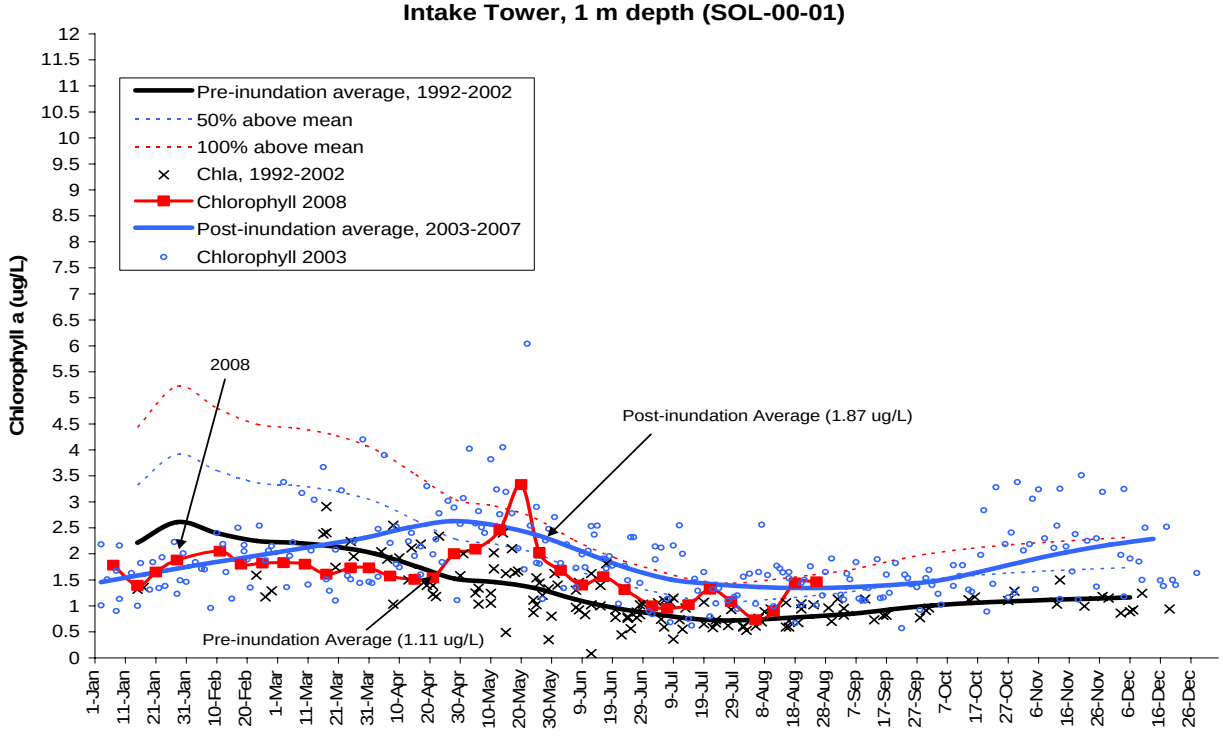

Figure 10. 2008 Chlorophyll-a in Sooke Reservoir North Basin, 1 m depth (SOL-04-01)