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Agenda Item #12
REPORT #RWSC 2007 - 31

REPORT TO REGIONAL WATER SUPPLY COMMISSION
MEETING OF WEDNESDAY, 19 SEPTEMBER 2007

SUBJECT WATER QUALITY TRENDS IN SOOKE RESERVOIR IN JULY & AUGUST 2007

SUMMARY

The water quality tests conducted for Sooke Reservoir during July and August 2007 continued to show good quality water. While there were no algal blooms during the summer months, increased concentrations of zooplankton (the small animals which graze on the algae) were observed. These higher concentrations resulted in a number of filter clogging complaints.

PURPOSE

This report provides information on the water quality conditions observed in Sooke Reservoir during the months of July and August 2007 and compares these data with those from previous years and long-term averages.

REPORT

Physical Parameters

*Water Levels***.** During the months of July and August, the water level in Sooke Reservoir continued to decline (**Figure 1**). At the end of August, the water level was 183.12 metres, a drop of 2.08 metres over the period.

Water Temperature. During July and August, the weekly average temperature of the water entering the Japan Gulch Treatment Plant was cooler than the long term average (**Figure 2**). The cooler temperatures observed in 2007 were similar to those observed for the past several years and are a result of the deeper water available at the intake tower following the expansion of Sooke Reservoir. By the end of August, the weekly average temperature of the water entering the Japan Gulch Plant was 17.3ºC, an increase of 3.2ºC over the period.

Water Clarity

Turbidity. During July and August, the turbidity (cloudiness) of the surface water in Sooke Reservoir continued to remain above the long term average in both the south and north basin (**Figure 3)** of the reservoir. Nevertheless, the turbidity of the water entering the Japan Gulch Treatment Plant continued to be below the turbidity limit listed for drinking water in the *Guidelines for Canadian Drinking Water Quality* with the exception of a few (3 days only) early morning turbidity spikes that rose just over 1 NTU limit. These spikes resulted from the unusually high demands which caused the sediments within the large pipes supplying the Japan Gulch Plant to be stirred into the faster flowing water. At the end of August, the turbidity levels were similar to those observed in 2006.

Water Transparency. In July and August, the transparency of the water at the Intake Tower (as measured by observing a black and white disk under the water) continued to be poorer than the long term average (**Figure 4**). However, by the end of August, the water transparency had improved and returned to levels close to the long term average.

Bacteria

The total coliform bacteria concentration in the water entering the Japan Gulch Treatment Plant from Sooke Reservoir were similar to levels observed in 2005 and 2006. By the end of August, the total coliform level was about 310 colony forming units per 100 mL. These concentrations are not problematic.

Nutrients

Phosphorus. During July and August, the total phosphorus concentrations averaged 50% higher than the long-term, pre-inundation average in the south basin (**Figure 5**) and 50% to 75% higher in the north basin (**Figure 6**) of Sooke Reservoir. (**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 July and August were also about 50% higher than the long-term pre-inundation average in both the south (**Figure 7**) and north basins (**Figure 8**) of Sooke Reservoir for the majority of the period.

Chlorophyll-a

In July and August, chlorophyll-a concentrations (a general measure of algal populations) continued to remain relatively low at the Intake Tower (**Figure 9**) and in the north basin (**Figure 10**) in Sooke Reservoir. By the end of August, chlorophyll-a concentrations were similar to those of recent years and above the long-term pre-inundation levels.

Algae

During July and August, while algal concentrations continued to remain relatively low, the concentrations of zooplankton, particularly in the south basin near the intake tower, were higher than in other years. These increased concentrations were somewhat mystifying since increased zooplankton concentrations typically follow increased algal concentrations (i.e. more food is available). However, in the summer of 2007, the algal populations did not appear to be particularly high as evidenced by the relatively low algal counts and chlorophyll-a numbers.

The increased zooplankton concentrations resulted in a number of filter clogging complaints – particularly for low flow irrigation systems protected by filters or screens. Several complaints were received from homeowners who noticed that the screens on their kitchen faucets were clogging.

Inundation Scientific Advisory Working Group

The Sooke Reservoir Inundation Scientific Advisory Working Group met on August 2, 2007. No specific concerns or recommendations were noted by the Working Group.

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, 2003-2007

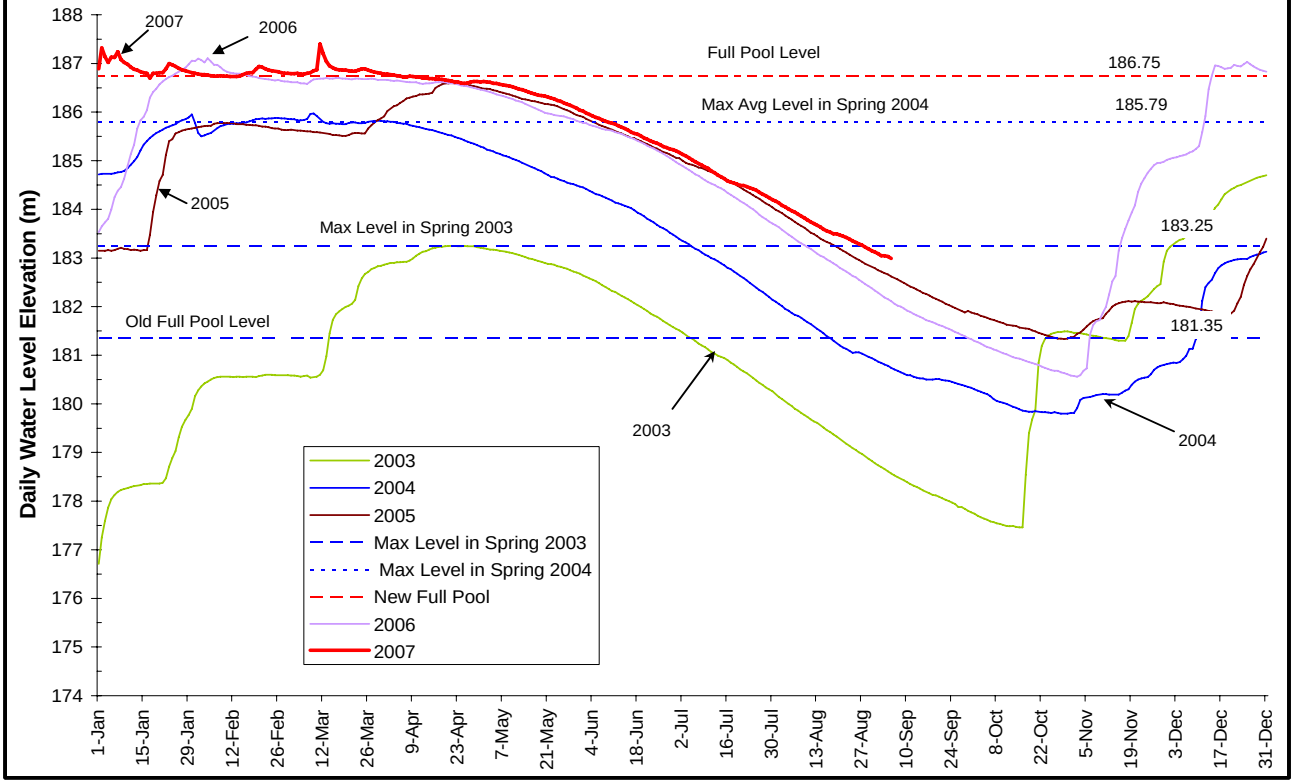

Figure 2. 2007 Temperature of Raw Water entering Japan Gulch Plant (Weekly Average)

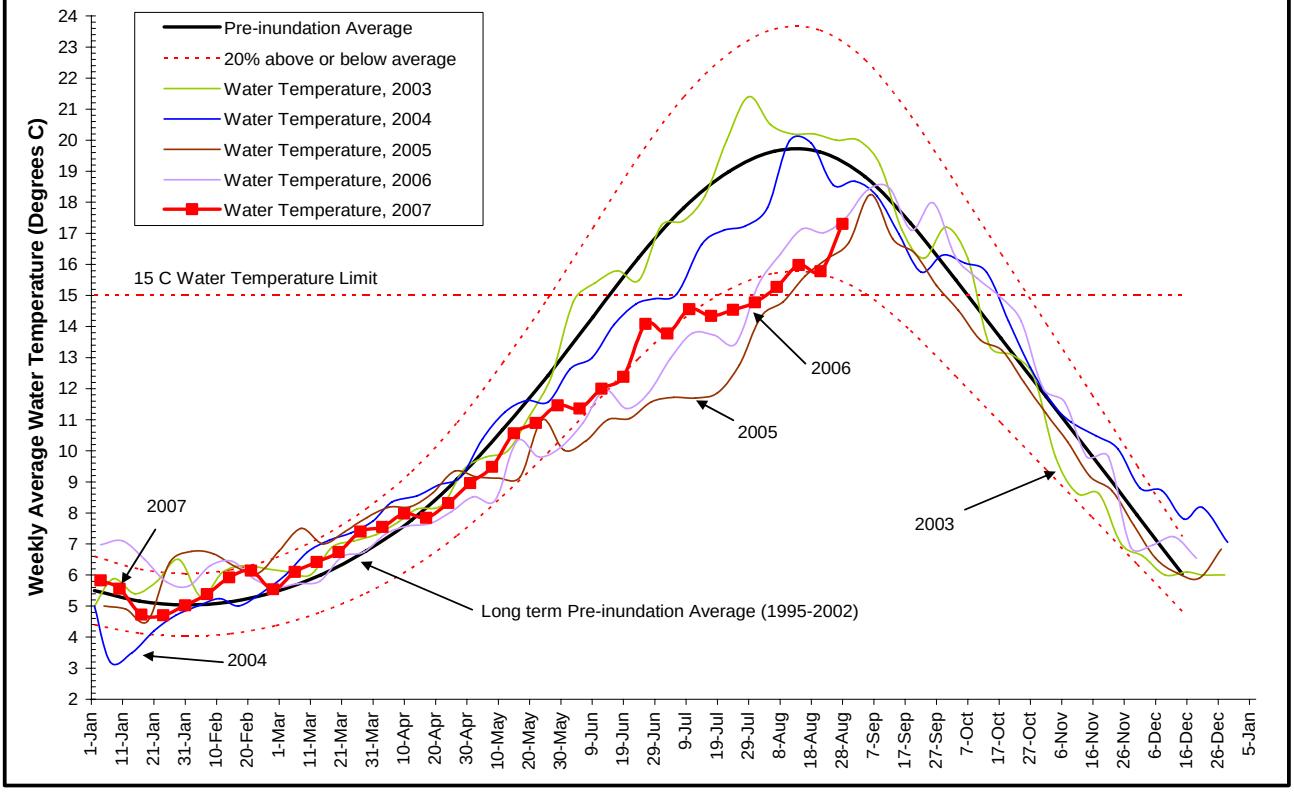

Figure 3. 2007 Turbidity in Sooke Reservoir
North Basin, 1m depth (SOL-04-01)

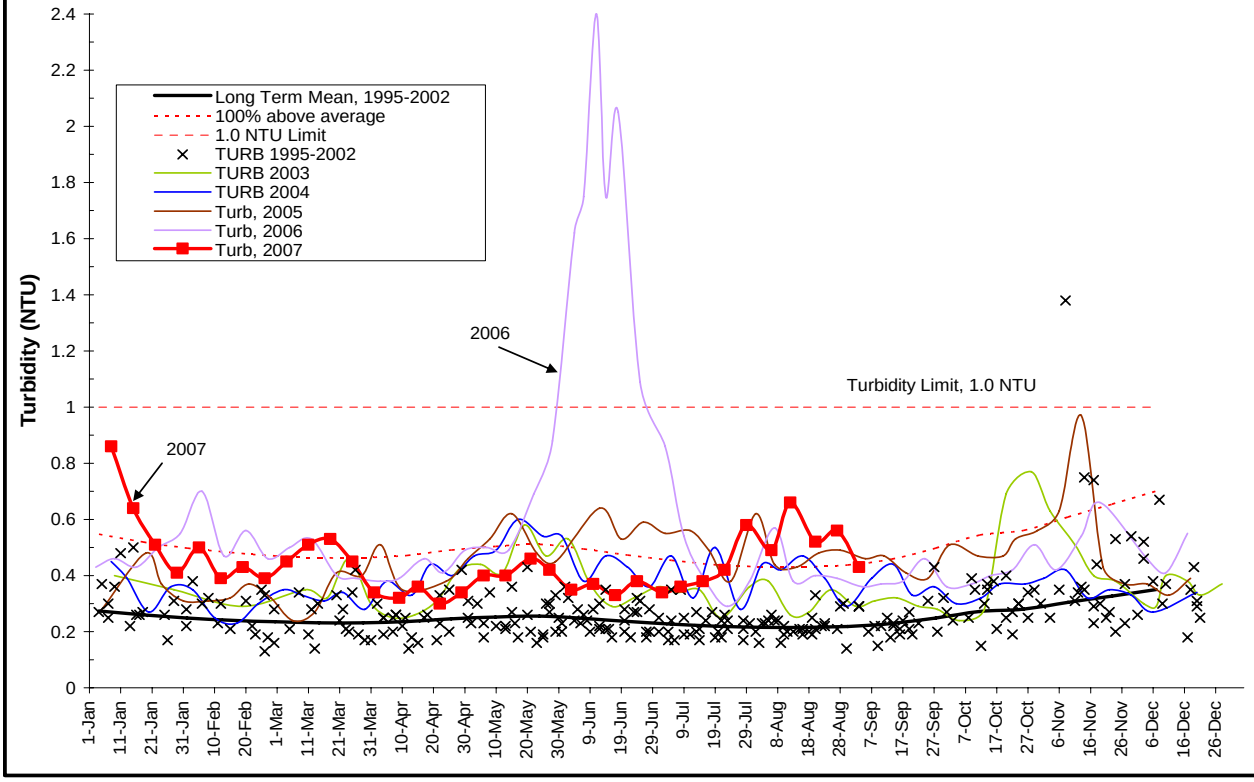

Figure 4. 2007 Water Transparency in Sooke Reservoir
Intake tower, (SOL-00-01)

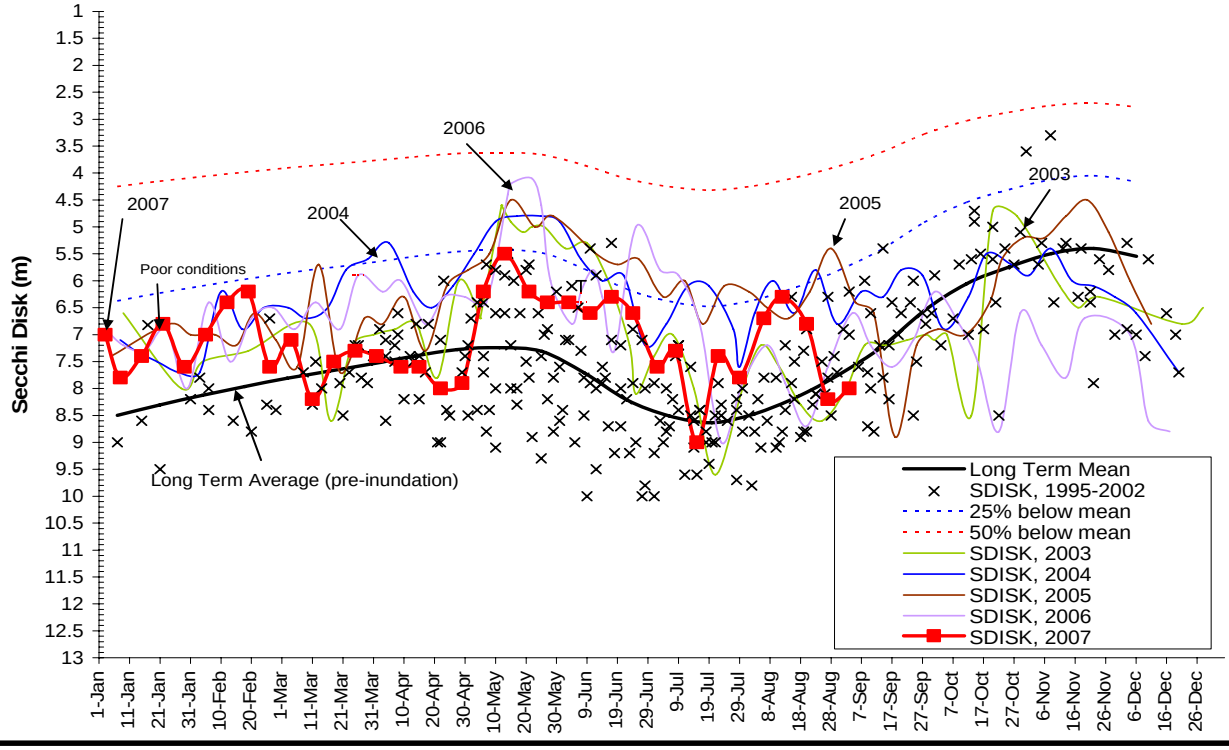

Figure 5. 2007 Total Phosphorus for Sooke Reservoir
South basin, 1 m depth (SOL-01-01)

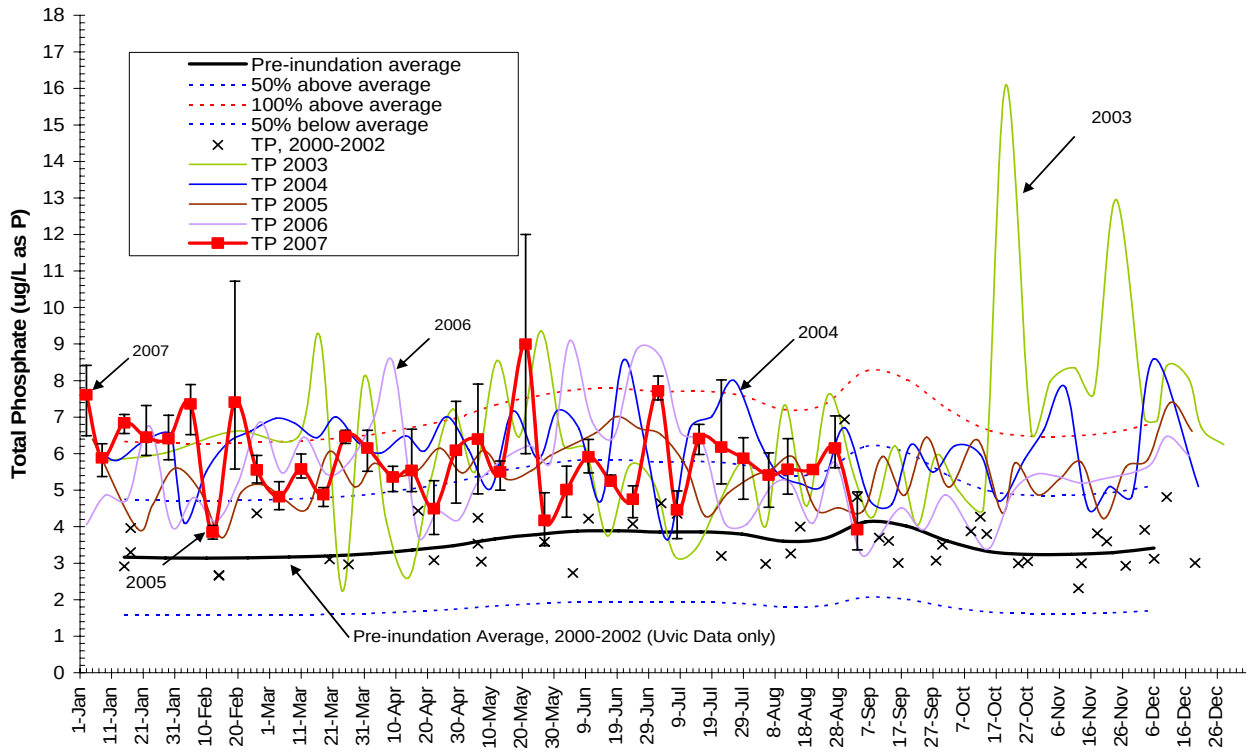

Figure 6. 2007 Total Phosphorus for Sooke Reservoir
North basin, 1m depth (SOL-04-01)

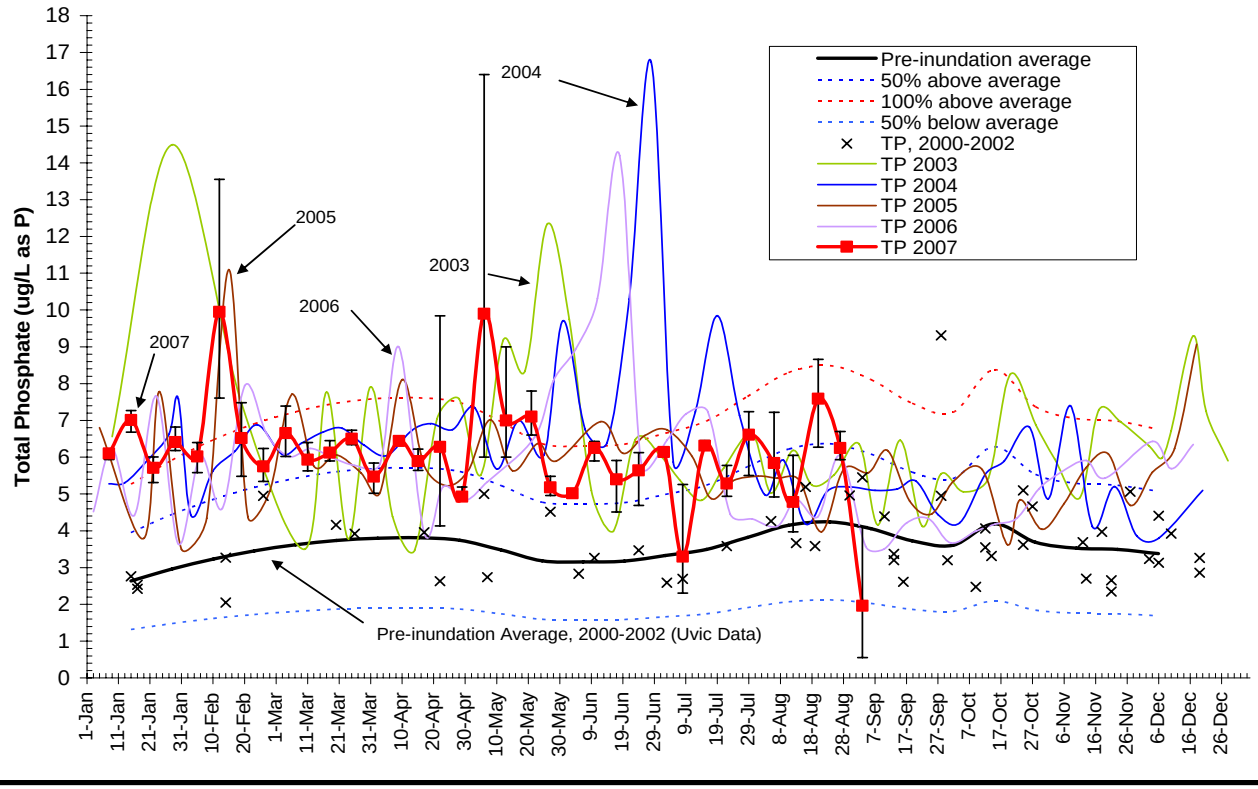

Figure 7. 2007 Total Nitrogen in Sooke Reservoir south basin, 1m depth (SOL-01-01)

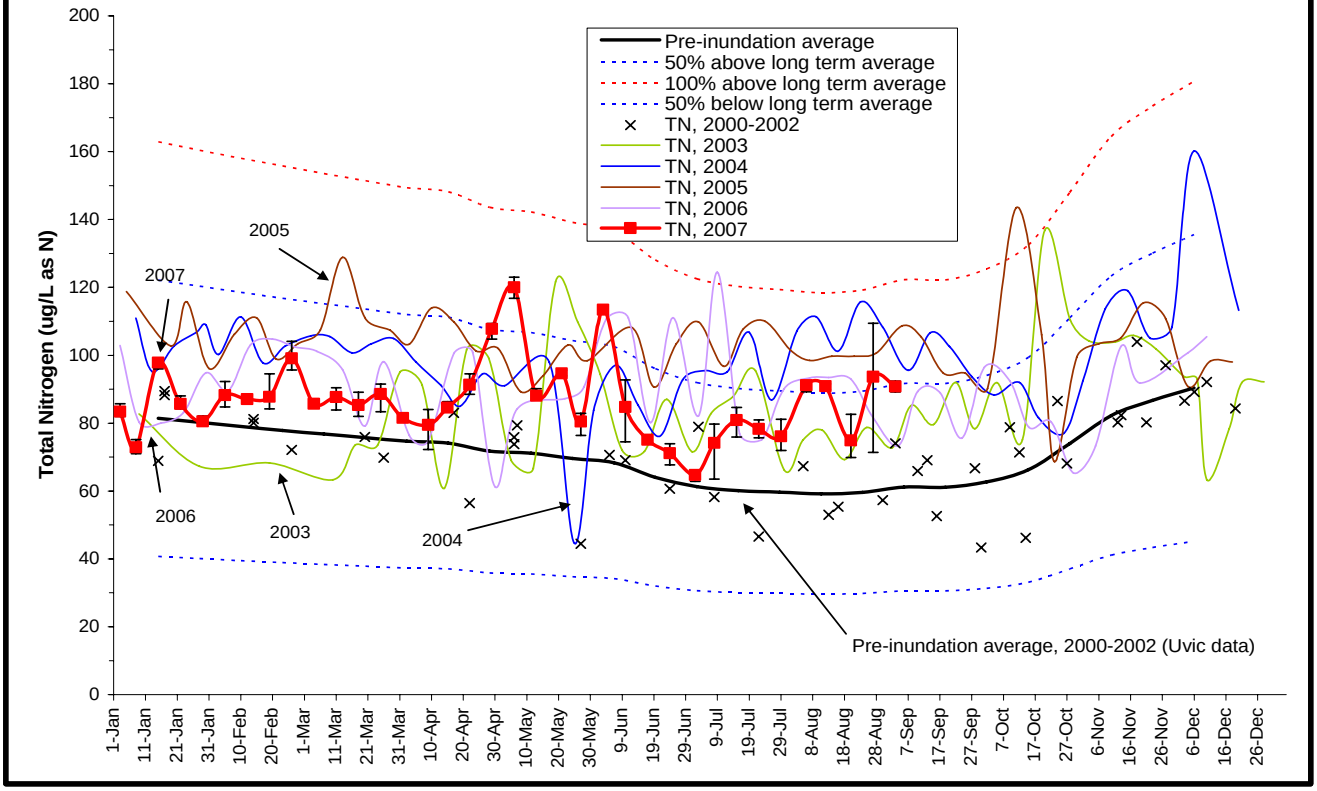

Figure 8. 2007 Total Nitrogen in Sooke Reservoir North basin, 1m depth (SOL-04-01)

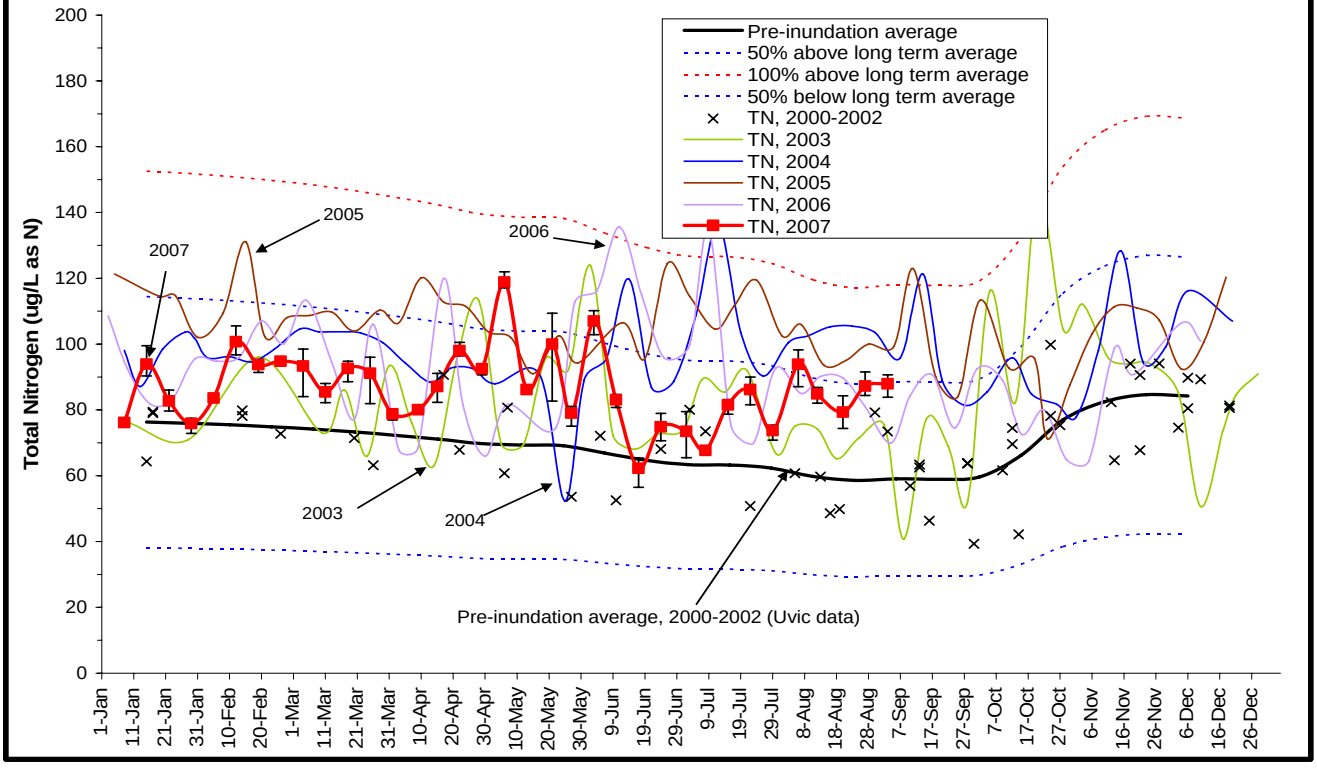

Figure 9. 2007 Chlorophyll-a in Sooke Reservoir
Intake Tower, 1 m depth (SOL-00-01)

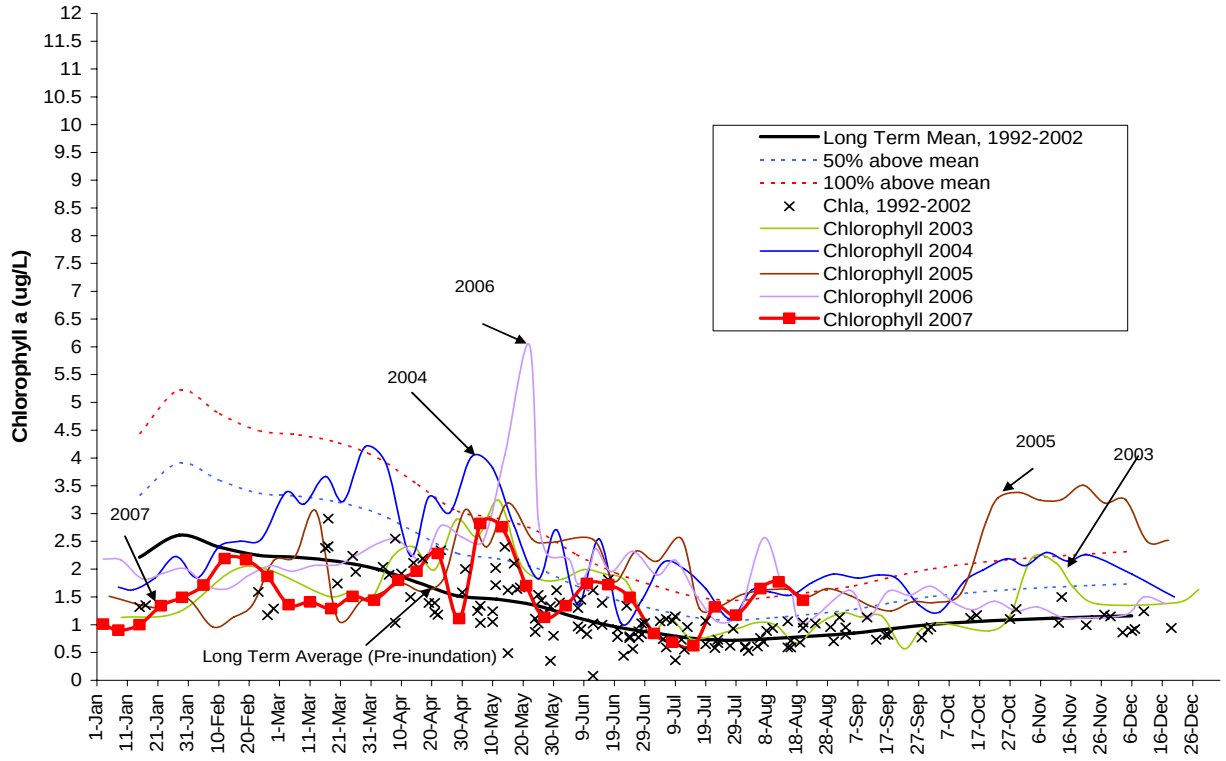

Figure 10. 2007 Chlorophyll-a in Sooke Reservoir
North Basin, 1 m depth (SOL-04-01)