

Water Quality Testing & Improvement at Two Cowlitz County Lakes

Cowlitz County Health & Human Services

WQC-2015-CwCoHH-00129

1/1/2015 to 6/30/2018

Final Total Project Cost: \$143,028

Project Description

Cowlitz County has two lakes that struggle to safely provide desired beneficial uses. Public health cautionary postings occurred six times at Silver Lake between 2009 and 2013. Horseshoe Lake also has a history of algae blooms, but more recently suffered from impairment by dense milfoil. Both lakes are in need of remediation action. Unfortunately, they both lack comprehensive water quality monitoring programs.

This project provided water quality monitoring of key constituents with quality control measures over a two year period. A digital multi-parameter probe was purchased and used for temperature, pH, dissolved oxygen and turbidity measurements. A Secchi disk was used to measure clarity. Concentrations of total phosphorus, chlorophyll a, and nitrate-nitrite were determined by a lab. Results were compared to goal levels, and Carlson's trophic state indexes were calculated for both lakes.

Two-Year Water Quality Monitoring Project



Silver Lake algae bloom, Aug 2015



Horseshoe Lake milfoil, Oct 2006

Project Accomplishments

In collaboration with Silver Lake Watershed Advisory Council and Horseshoe Lake Management Committee, sample and quality assurance plans were developed for Silver Lake & Horseshoe Lake.

Water quality testing was conducted over the course of 24 months, utilizing lab samples and a digital probe. Results were placed into the Environmental Information Management system. Statistical analysis was conducted, and the results were graphed and presented to the committees and the public, and made available to the public on the county's website.

Results were used to characterize the lakes in accordance with Carlson's trophic index. Horseshoe Lake's constituents were determined to be mostly within previously established water quality goals, and the lake was classified as mesotrophic. Silver Lake was determined to be eutrophic, and not meeting water quality goals.

Hilarie Larson, REHS

Cowlitz County Health Department - Environmental Health Unit

207 4th Ave North, Kelso WA 98626

Water Quality Improvements

While water quality improvements are not directly generated by water quality monitoring, this project provided important baseline information that will be used to assess the outcome of remediation actions that took place during the course of the project, as well as future actions.

Horseshoe Lake Management Committee utilized herbicide, funded by the City of Woodland, in order to reduce or eliminate the milfoil problem midway into the project. An increase of phosphorus and a decrease of chlorophyll a concentrations were observed post treatment.

Silver Lake Watershed Advisory Council enhanced seasonal lake lowering by letting additional water out a few months after the project's sampling was completed. They did this after correlating lower subsequent phosphorus concentrations with the particularly low lake level in the summer of 2015.

The Next Step for Continued Success

Horseshoe Lake: Washington Department of Transportation is scheduled to replace the water pump that controls the inflow from the Lewis River into Horseshoe Lake. This planned improvement will result in higher water inflow velocity, and will also be able to operate more consistently. The reduction or elimination of milfoil in Horseshoe Lake after the herbicide application may result in an increase of turbidity. The re-emergence of natural vegetation needs to be monitored and possibly facilitated.

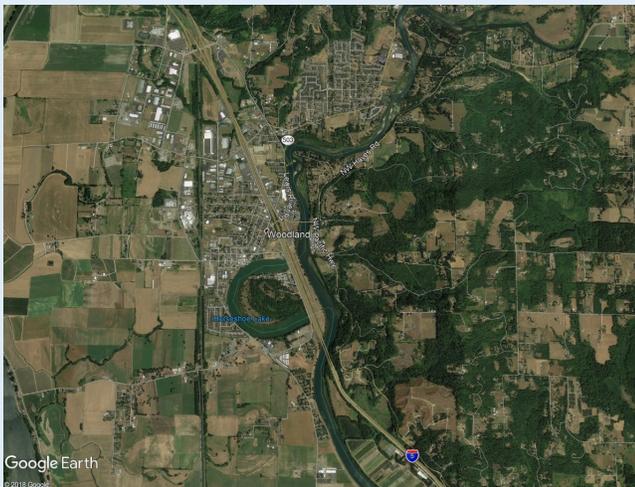
Silver Lake: Water quality monitoring will continue on Silver Lake, and will be utilized to see if any apparent positive consequences were achieved by lowering the lake to 36" below the weir. The activities of a new grant awarded by Department of Ecology will commence in October of 2018, and include: water quality monitoring in the lake and in the main inlet streams, testing of lake sediment to help assess dredging feasibility, public workshops and lakeside owner newsletters. The watershed management plan written in 1994 will be made available electronically and updated to include recent activities.

Lessons Learned

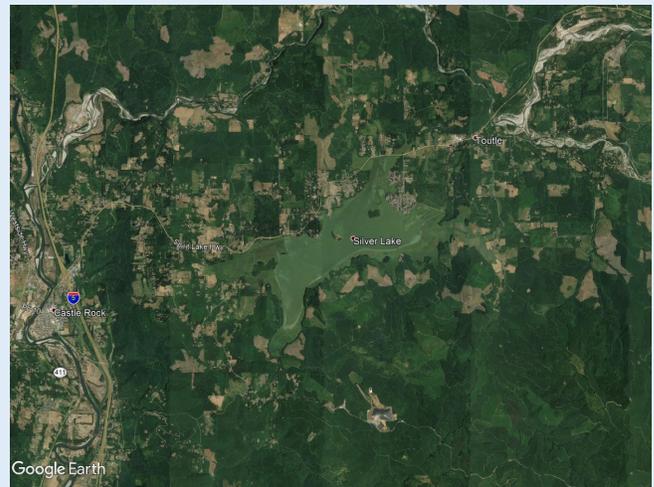
Lab accrediting of chlorophyll a was an unexpected challenge, due to a presumption by the lab that it wasn't applicable because there is no approved proficiency testing provider. Instead, accreditation is achieved with in-house proficiency testing.

A sample plan utilizing chlorophyll a in the winter may be of limited value.

Installing a Secchi disk onto a telescoping probe is very helpful in eliminating the influence of horizontal wave action.



Horseshoe Lake



Silver Lake