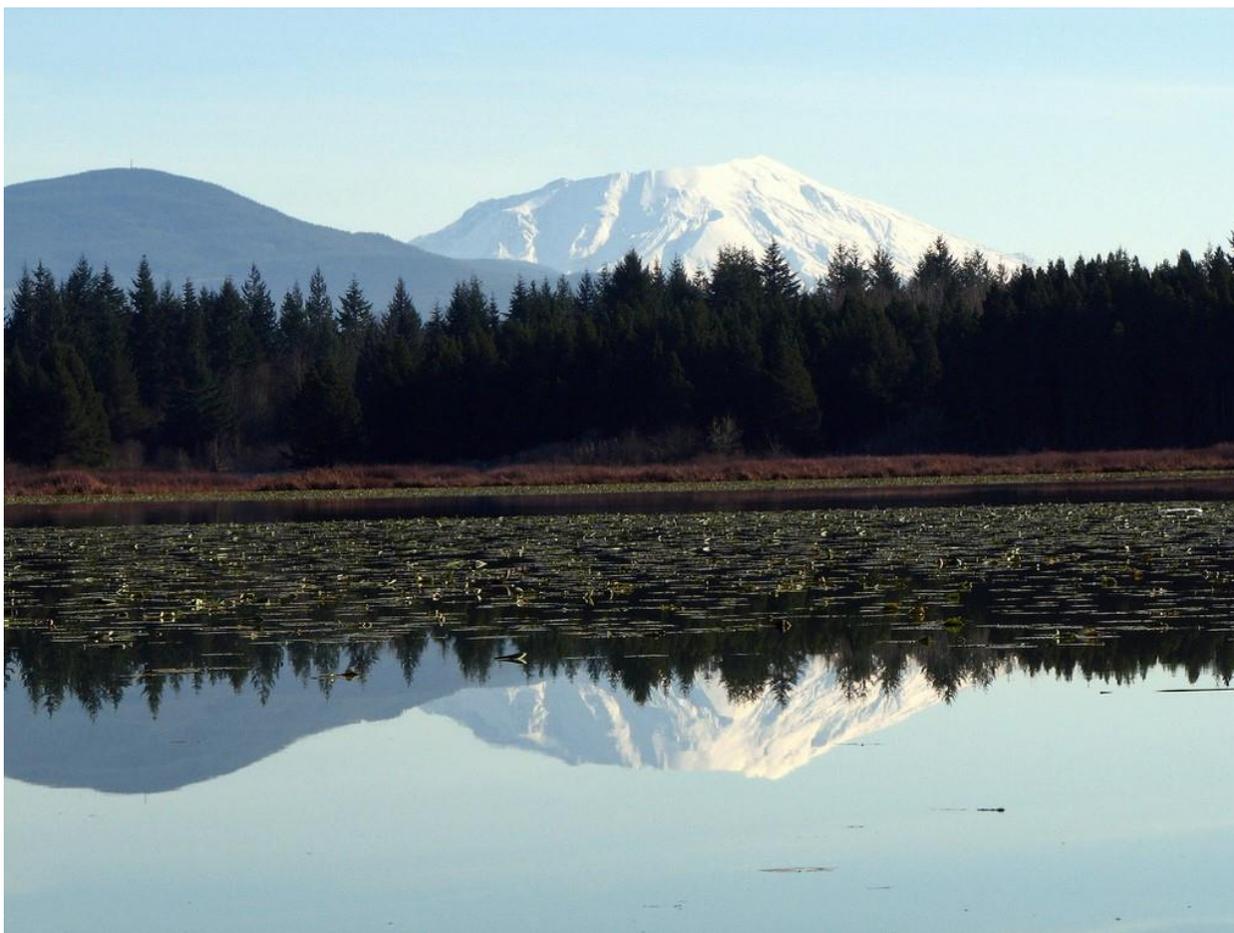


SOPs

SILVER LAKE WATER QUALITY SAMPLING



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1. General Information

This Standard Operating Procedure (SOP) is applicable to the collection of liquid samples and probe readings from Silver Lake and its major inlet streams. The intent of SOPs is to ensure safety of personnel and validity of results.

Activities for each sample event are divided into four segments: preparation, sampling and measuring, and delivery. The performance of stringent sample collection will assist in obtaining the highest quality of data possible.

In general, sampling should occur between 10 am and 3 pm. However, there is flexibility in both the time and the day of the sampling event, especially in consideration of weather conditions. Common sense and good judgment dictate timing. Under no circumstances should volunteers be on the water during rain or electrical storms, high winds, or other unsafe conditions.

2. Preparation

TASK 1 – Consult *Silver Lake Sample Schedule with QC*, and order applicable bottles from lab 1 – 2 weeks prior to desired sampling date.

- Check *Silver Lake Sample Schedule with QC* to determine which samples are called for.
- Write an email to the lab project manager requesting the applicable bottles.

TASK 2 – Consult *Silver Lake Sample Schedule with QC*, and confirm acceptable weather conditions and resources approximately 1 week prior to desired sampling date.

- Check the current and forecasted weather and decide if the conditions allow for safe sampling. This decision should be confirmed upon observing lake conditions prior to launching the boat and beginning the sampling trip.
- Communicate schedule with volunteers.

TASK 3 – Calibrate the Probe.

- Consult the YSI ProDSS User Manual, with Quick Start Guide and Probe Tutorial Notes 8/27/15, to calibrate the probe. Instead of one rinse as described, use three rinses.
- Record results in *ProDSS Calibration for 00092* filed under water>Probe – ProDss.
- Verify that current calibration was successful by checking “last calibrated date” on the handheld for each analyte.
- Ensure that the probe is properly storing information by taking an “in office” sample, and pressing the File menu, View Data.

TASK 4 – Obtain coolers from lab, and prep labels and reports.

- Fill out general information sections on bottle labels and label cap with site letter using upper case letter and a period after it.
- Complete the general info sections on the Chain of Custody Report

- Complete the general info sections on the Lake Field Form and Stream Field Form.
- On the day of sample event, check National Weather Service website (www.weather.gov) to obtain the daily high and lows for Toutle Washington, and the 24 hr precipitation info preceding the event by clicking on “3 Day History” for Toutle / Castle Rock.

TASK 5 – On sampling day, load sampling equipment and supplies including:

- The probe, box of gloves, personal floatation device, extra sample jar, and goggles in carrying case.
- Secchi disk with a measured line
- Water sampler instrument / pole
- Water sample collection containers in cooler with ice packs
- Clipboard, waterproof pens, and sampling forms including: Lake Field Form, Stream Field Form and Chain of Custody Form
- SOP manual with map of lake sample sites
- 3’ grabbers (for E. coli direct sample)

TASK 6 – Check for boating safety equipment.

- Ensure that a personal flotation device is available for each person. Devices must be Coast Guard-approved, readily available, and the proper size.
- Ensure that a first aid kit is onboard.
- Check for other equipment that may be required by State and local boating laws.

3. Sampling

TASK 1 - Position boat at the designated sample site.

Locate the sample site on the water. The position should be verified using the shoreline landmark method (align two permanent landmarks from the boat, and then at an approximately 90° angle, align two additional ones). You may also use the GPS function on the probe or the boat.

TASK 2 - Complete the observations portion of the sampling form.

Record your observations about the lake and weather conditions on the sampling form. In addition, write down any unusual conditions that may affect the sampling results.

- Record water condition observations at the site including water color, suspended sediment and algae, aquatic plants, waterfowl activity, and odor.
- Record weather conditions on the form including the amount of cloud cover (when taking the Secchi disk reading), and water surface conditions. Indicate any unusual weather conditions that may have occurred in the previous week including storms, high winds, and temperature extremes.
- Record any other factors or conditions that make the sampling trip unusual or that may potentially influence sample results. For example, report any chemical, mechanical, or

biological control of algae or aquatic weeds that may have been done recently on the lake.

TASK 3 - Probe Measurements

- Perform depth calibration, as described in the ProDSS User Manual, at water surface before every sample event.
- If the handheld part can be secured, turn it on and place the probe in water while other tasks are performed, in order to allow time for the pH reading to stabilize.
- Take at least two probe measurements at 3' when that depth is available. Read depth on the monitor via "vertical position" rather than "depth."
- If reading in creek, note if probe is laying horizontally in water due to shallow depth.

TASK 4 - Secchi disk depth

It is preferable to have the same individual take the reading at a site throughout the entire sampling season. Sunglasses should not be worn. The line attached to the Secchi disk must be marked according to ¼ feet increments, rounding up as necessary.

- Check to make sure that the Secchi disk is securely attached to the measured line.
- Lean over the non-sunny side of the boat and lower the Secchi disk into the water.
- Continue to lower the disk until it just disappears from view. Lower the disk another one foot, and then slowly raise the disc until it just reappears. Continue to move the disk up and down until the exact vanishing/reappearing point is found, and round to the nearest ¼ ft. Once obtained, repeat until consistent measurement is obtained.
- Record the observed measurement on the field form.

TASK 5 – Take E. coli sample directly into lab bottle – *Do not use intermediate jar*

- Take this sample first, donning new gloves.
- Remove the cap from a sterile collection bottle without touching the inside of the cap or the inside of the bottle. Gently place the cap, facing up, onto a stable flat surface.
- Secure the lab bottle with the tongs of the gripper pole to, and plunge it in a downward and motion into the water to a depth of 12-18".
- Using a forward sweeping motion, invert the bottle and bring it to the surface.
- If necessary, empty it slightly to leave a bit of air at the top, but make sure it is at or above the fill line.
- Carefully re-cap the container and place it in the cooler.
- Note: E. coli sterile sample bottles contain sodium thiosulfate, a chlorine neutralizing agent. This is the way that the lab purchases the bottles. The sodium thiosulfate is not necessary for this study

TASK 6 – Take the phosphorus and chlorophyll *a* samples using water sampler instrument and collection jar:

- When you arrive at each sampling location, rinse sample collection jar with surface water and shake dry.
- Attach sample collection jar to the Subsurface Jar Sampler.
- Lower the sampler gently into the water to the desired depth as marked on the pole.
- Pull the pull-ring extending from the handle to open the plunger on the telescoping pole. When bubbles stop rising from the sampler, release the pull ring to close the plunger and gently bring the sampler to the surface.
- Remove the sampling bottle from the pole and fill the lab bottles:

chlorophyll *a* sample bottle

- Move the chlorophyll *a* sample bottle into position and remove cap.
- Gently shake the container with the sample water to re-suspend any settled material.
- Gently pour the sample water into the lab bottle to a level just at the neck, taking care not to allow bottles to touch.
- Cap the sample bottle and place it into the shipment container with the frozen ice packs and close the lid so sunlight cannot reach it.

total phosphorus sample bottle

- Glasses or goggles required due to the powder acid in these bottles. Even the vapors should be avoided.
- Move the total phosphorus sample bottle into position and remove cap only when ready to pour, it's extremely susceptible to contamination.
- Gently shake the container with the sample water to re-suspend any settled material.
- Gently pour the sample water into the lab bottle to a level just at the neck, taking care not to allow bottles to touch each other.
- Cap the sample bottle and place it into the shipment container with the frozen ice packs and close the lid so sunlight cannot reach it.

quality control bottles

- Utilize the same capture jar for total phosphorus regular sample and duplicate sample.
- For chlorophyll *a*, pour half of the capture jar into the regular sample lab bottle and the other half into the QC sample bottle, and then repeat.
- Use distilled water for field blanks.

TASK 7 – Place bottles in cooler and check off applicable boxes on Field Forms.

4. Delivery

TASK 1 – Clean Equipment

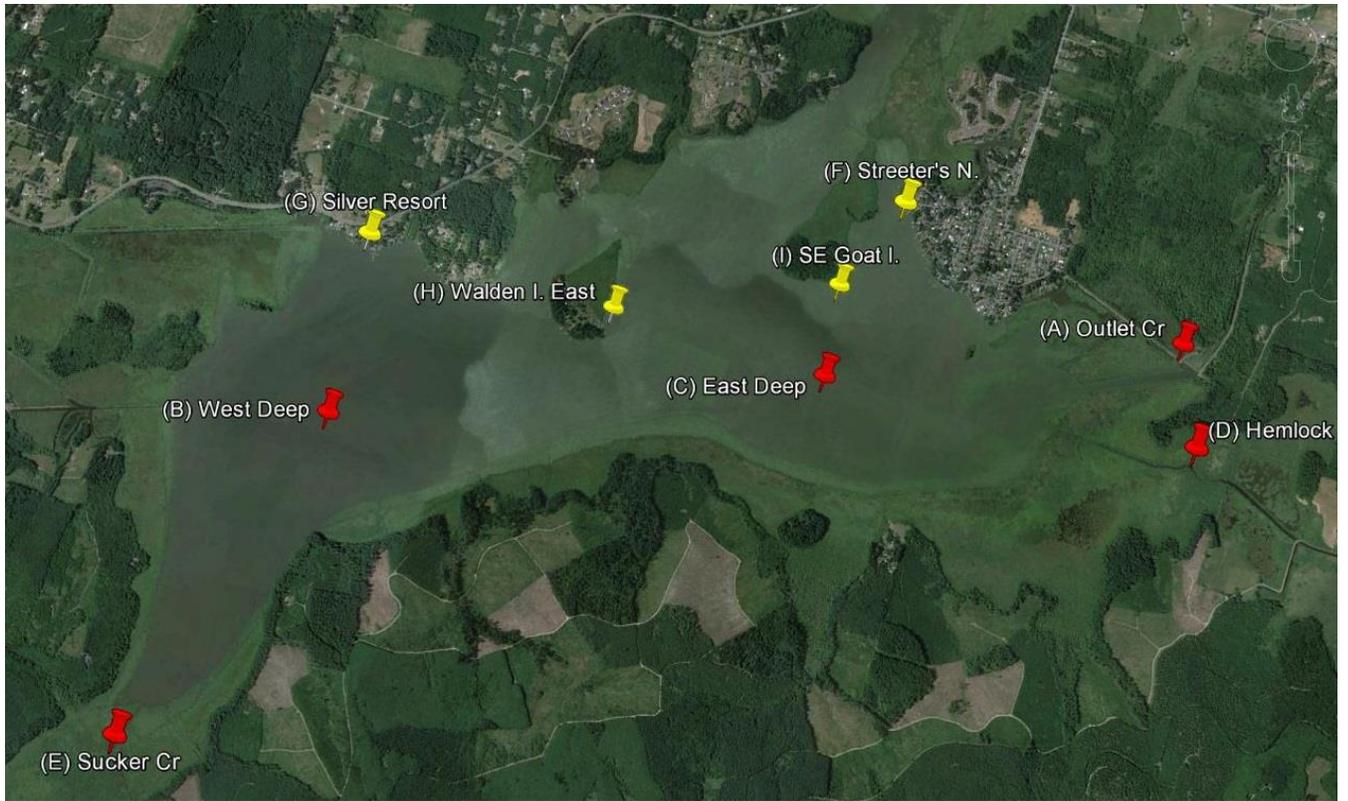
- Clean the sampling and laboratory equipment for the next sampling trip. The Secchi disk and water sampler should be rinsed off with fresh tap water, and the sampling containers rinsed with distilled water.

TASK 2 – Transport Samples with Forms

Deliver in person to: ALS Global Laboratory, 1317 S. 13th Ave, Kelso, WA 98626 between 8am and 5pm Monday-Friday and between 8am and 12pm on Saturday. They prefer to receive by 4pm on weekdays and by 11am on Saturdays.

5. Appendices

Silver Lake Sample Locations						
Site Type	Site Name	Site Letter	GPS Latitude	GPS Longitude	Comments	Access
Lake	Deep East	c	46.2944	-122.7718		boat
Lake	Deep West	b	46.2842	-122.8011		boat
Lake	Outlet Crk	a	46.3027	-122.7473		boat
Swim	Streeters	f	46.3061	-122.7694	summer e. coli only	boat or dock
Swim	Tree House	i	46.3005	-122.7727	summer e. coli only	boat
Swim	Walden	h	46.2960	-122.7871	summer e. coli only	boat
Swim	Silver Resort	g	46.2957	-122.8060	summer e. coli only	boat or dock
Lake-Alt	Dave’s Dock	c-alt	46.3046	-122.7674	Deep East alt. site	dock
Lake-Alt	Silver Resort Dock	b - alt	46.2954	-122.8052	Deep East alt. site	dock
Stream	Sucker Crk Upper 1	y 1	46.2566	-122.7949	below landfill	Car – key needed
Stream	Sucker Crk Upper 2	y 2	tbd	tbd	at landfill	Car
Stream	Sucker Crk Upper 3	y 3	tbd	tbd	above landfill	Car
Stream	Hemlock – Canal Rd	x 1	tbd	tbd	below agriculture	Car
Stream	Hemlock - Rd 1390	x 2	46.2724	-122.7241	above agriculture	Car – key needed



Silver Lake Sample Sites



CHAIN OF CUSTODY
95049

005

SR# _____
COC Set _____ of _____
COC# _____

1317 South 13th Ave. Kelso, WA 98626 Phone (360) 577-7222 / (800) 695-7222 / FAX (360) 636-1099
www.alsglobal.com

Site Name: Silver Lake WQ+		Project Number: 00092	
Project Manager: Hilarie Larson		Company: CCHD	
Address: 207 4th Ave North		City: Cowlitz Co. Cowlitz WA US	
Phone: 360-914-5599		Fax: x 6428	
Sampler Signature: <i>[Signature]</i>		Sampler Printed Name: Hilarie Larson	

CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix	REMARKS
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input type="checkbox"/> V. EDD	Invoice Information P.O.# _____ Bill To: Cowlitz County Hth Dpt	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
	Turnaround Requirements <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 5 Day <input type="checkbox"/> Standard	Special Instructions/Comments: Please call Hilarie at 360-414-5599 x 6428 if e.coli: ≥ 200 MPN/100mL

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: <i>[Signature]</i>	Signature: _____				
Printed Name: Hilarie Larson	Printed Name: _____				
Firm: CCHD	Firm: _____				
Date/Time: _____	Date/Time: _____	Date/Time: _____	Date/Time: _____	Date/Time: _____	Date/Time: _____

Lake Field Form - Event #: _____ Day High Temp: _____ Day Low Temp: _____

Date: _____

Names: _____

General Lake & Weather Conditions: _____

Sites – via route order	Time:	Adequate Depth for Probe?	T Phos	Chlor <i>a</i>	e. coli	QC	Comments
3 LAKE:							
c. Deep East							
a . Outlet							
b. Deep West							
4 SWIM:							
f. Streeters							
i . Tree House							
g. Silver Resort							
h. Walden							
OTHER:							

Stream Field Form - Event #:

Day High Temp: Day Low

Temp:

Date:

Names:

General Lake & Weather Conditions:

Sites – via route order	Time:	Adequate Depth for Probe?	T Phos	Chlor <i>a</i>	e. coli	QC	Comments
z – Outlet gate							
r - Sucker Creek Upper							
s – Sucker Creek Upper 2							
t – Sucker Creek Upper 3							
j - Hemlock Canal Rd							
k - Hemlock Rd 1390							