DEPARTMENT OF ECOLOGY
State of Washington

Standard Operating Procedure EAP095, Version 1.2

Collecting Water Samples for Watershed Health Monitoring

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Purpose of this Document

The Washington State Department of Ecology develops Standard Operating Procedures (SOPs) to document agency practices related to sampling, field and laboratory analysis, and other aspects of the agency's technical operations.

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Washington State Department of Ecology

Environmental Assessment Program

Standard Operating Procedure EAP095, Version 1.2: Collecting Water Samples for Watershed Health Monitoring

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EAP095

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Please note that the Washington State Department of Ecology's Standard Operating Procedures (SOPs) are adapted from published methods, or developed by in-house technical and administrative experts. Their primary purpose is for internal Ecology use, although sampling and administrative SOPs may have a wider utility. Our SOPs do not supplant official published methods. Distribution of these SOPs does not constitute an endorsement of a particular procedure or method.

Any reference to specific equipment, manufacturer, or supplies is for descriptive purposes only and does not constitute an endorsement of a particular product or service by the author or by the Department of Ecology.

Although Ecology follows the SOP in most instances, there may be instances in which the Ecology uses an alternative methodology, procedure, or process.

SOP Revision History

Revision Date	Rev number	Summary of changes	Sections	Reviser(s)
2/13/2015	1.0	Draft release	All	Chris Hartman
2/18/2015	1.1	Numerous small changes	All	Chris Hartman
12/15/2016	1.2	Added Footers	All	Meghan Rosewood-Thurman
12/21/16	1.2	General edits, updated references	All	Meghan Rosewood-Thurman
12/27/16	1.2	Added glossary definitions	3.0	Meghan Rosewood-Thurman
1/9/17	1.2	Added Glossary Definitions	3.0	Meghan Rosewood-Thurman
1/17/17	1.2	Refined definitions 3.11, 3.23, 3.24	3.0	Glenn Merritt
1/20/2017	1.2	Edited definitions 3.12, 3.15 Added definition 3.14 Added a cite (MEL, 2016) in 6.1.1 and 6.6.2.1 Reference replaced 10.4 Reference updated 10.5	3.0, 6.0 10.0	Glenn Merritt
2/7/17	1.2	Edited Table 1	5.0	Meghan Rosewood-Thurman
2/13/17	1.2	Added Reviewers	Signature Page	Meghan Rosewood-Thurman
5/10/19	1.2	added cover page, formatting	all	Olegre, Ponzetti

1.0 Purpose and Scope

1.1 This document is the Environmental Assessment Program (EAP) Standard Operating Procedure (SOP) for manually obtaining surface water samples from rivers and streams for the Watershed Health Monitoring (WHM) program. It includes procedures for both of the WHM protocols: 1) The Narrow Protocol, which is typically accomplished by wading upstream; and 2) The Wide Protocol which is typically accomplished by floating on rafts. This SOP is also used in the Ambient Biological Monitoring program.

2.0 Applicability

2.1 This SOP should be followed when manually collecting samples from surface waters for the WHM program, as described in section 1.1.

2.2 This SOP is used in conjunction with many other SOPs to complete a data collection event (DCE) for the WHM program. The standard water samples that are part of a DCE include Total phosphorus (TP), Total persulfate nitrogen (TPN), Chloride (CL), and Total suspended solids (TSS). In rare situations samples might be required for pH or specific conductivity.

3.0 Definitions

3.1 CL: Chloride

3.2 DCE: The *Data Collection Event* is the sampling event for the given protocol. Data for a DCE are indexed using a code which includes the site ID followed by the year, month, day, and the time (military) for the start time of the sampling event. For example: WAM06600-000222-DCE-YYYY-MMDD-HH:MM. One DCE should be completed within one working day, lasting 4 - 6 hours, on average.

3.3 EAP: Environmental Assessment Program

3.4 Ecology: The Washington State Department of Ecology

3.5 Grab sample: A sample collected during a very short time period at a single location.

3.6 Index station: The distinct point location mapped by the site coordinates obtained from the Washington Master Sample List. The index station is called “X” and is generally located at major transect F; however, the point may occur at any elevation in the stream between transects A and K.

3.7 Intermediate container: A temporary sampling container used to directly sample water and transfer it to the primary container.

3.8 LAR: Laboratory Analysis Required form. This is a chain-of-custody form that is delivered to the Manchester Environmental Laboratory along with samples from a Data Collection Event (DCE).

3.9 Lotic: Flowing water systems such as streams and rivers.

3.10 MEL: Manchester Environmental Laboratory

3.11 Narrow Protocol: The set of Watershed Health Monitoring SOPs that describe data collection at wadeable sites with an average bankfull width of less than 25 m at the index station.

3.12 Protocol: A collection of SOPs used to accomplish a DCE. Watershed Health Monitoring uses two protocols: The Narrow Protocol is used for sampling wadeable streams that are less than 25m average bankfull width. The Wide Protocol is used for rivers or streams that are wider than 25m average bankfull width or too deep to wade.

3.13 pH: a measure of hydrogen ion concentration; a measure of the acidity or alkalinity of a solution. Aqueous solutions at 25°C with a pH less than seven are acidic, while those with a pH greater than seven are basic or alkaline

3.14 QAMP: Quality Assurance Monitoring Plan. The QAMP for WHM is Cusimano *et al.* (2006). An updated version is in the early stages of development.

3.15 Site: A site is defined by the coordinates provided to a sampling crew and the boundaries established by the protocol's site layout method (Hartman, 2017) (SOP EAP105) for the Wide Protocol; Merritt, 2017 (SOP EAP106) for the Narrow Protocol. Typically, a site is centered on the index station and equal in length to 20 times the average of 5 bankfull-width measurements. Sites cannot be longer than 2 km nor shorter than 150 m. Narrow protocol sites range from 150 m to 500 m long. Wide Protocol sites are up to 2 km long. The most downstream end of a site coincides with major transect A; the most upstream end coincides with major transect K.

3.16 SOP: Standard Operating Procedure

3.17 Specific Conductivity: Electrical conductivity is a measure of water's ability to conduct electricity, and therefore a measure of ionic activity and content. It is the reciprocal of specific resistivity. Specific conductivity is conductivity adjusted to 25˚ C (reported in µS/cm at 25˚ C). This is what most field conductivity meters report.

3.18 STR: Status and Trends Regions (STRs) are based on Salmon Recovery Regions (SRRs) that were described by the Governor's Salmon Recovery Office (JNRC, 1999). Membership is as follows:

- Puget STR Puget Sound, & Hood Canal/Puget Sound SRRs
- Coastal STR Coastal SRR
- Lower Columbia STR Lower Columbia SRR
- Mid-Columbia STR Mid-Columbia SRR

- Upper Columbia STR___Upper Columbia SRR
- Snake STR_____Snake SRR
- Northeast Wash. STR___Northeast Washington SRR
- Unlisted STR_____No SRR identified

3.19 Thalweg: Path of a stream that follows the deepest part of the channel (Armantrout, 1998). For WHM, we emphasize Armantrout's use of the word "path" because the thalweg longitudinal profile excludes (sometimes deeper) side pools that are not part of the dominant flow path.

3.20 Thalweg transect: One of one hundred (100) equidistant measurement locations in the thalweg, across the length of a site. For example the thalweg stations at/above each major transect are named as follows:

- A0, A1, A2, A3, A4, A5, A6, A7, A8, A9,
- B0. B1, B2, B3, B4, B5, B6, B7, B8, B9,
- C0, C1, C2, C3, C4, C5, C6, C7, C8, C9,
- …
- J0, J1, J2, J3, J4, J5, J6, J7, J8, J9, and
- K0.

3.21 TP: Total phosphorus

3.22 TPN: Total persulfate nitrogen

3.23 TSS: Total suspended solids

3.24 WHM: Watershed Health Monitoring, a status and trends monitoring program within the Environmental Assessment Program at the Washington State Department of Ecology.

3.25 Wide Protocol: The set of WHM SOPs that describes the sample and data collection at non-wadeable sites or sites wider than 25 m bankfull width. It is an abbreviated version of the Narrow Protocol and is typically accomplished by use of rafts.

4.0 Personnel Qualifications/Responsibilities

4.1 This SOP pertains to all Natural Resource Scientists, Environmental Specialists, Administrative Interns and Environmental Technicians in Ecology's EA Program and any other technicians collecting and entering data for the WHM program.

4.2 All field staff must comply with the requirements of the EA Safety Manual (Ecology, 2019). A full working knowledge of the procedures in Chapter 1 "General Field Work," especially the sections "Working in Rivers and Streams," and "Fall Protection," is expected. Sampling from a boat requires one person onboard to be a qualified boat operator and all persons onboard must be familiar with Chapter 3 of the EA Safety Manual, "Boating."

4.3 All field staff must have completed the annual WHM program field training and be familiar with the WHM protocol to be used for the given DCE. All field staff must be familiar with the electronic data recording tablet and web-based field forms that one uses to record and submit data for the WHM program. Refer to the appropriate SOP.

4.4 The field crew leaders must be knowledgeable of all aspects of the project's Quality Assurance Monitoring Plan (QAMP) to ensure that credible and useable data are collected. All field staff should be briefed by the field crew leader or project manager on the sampling goals and objectives prior to arriving to the site.

4.5 Field staff must be annually trained to minimize the spread of invasive species. See SOP EAP070: https://www.ecology.wa.gov/quality.

5.0 Equipment, Reagents, and Supplies

5.1 General Equipment and Supplies

5.1.1 Field tablet, electronic field forms

5.1.2 LAR form

5.1.3 Non-powdered nitrile gloves (for hygienic protection)

5.1.4 Black garbage bag

5.1.5 Cooler

5.1.6 Ice

5.1.7 Sample tags

5.1.8 Sample bottles

5.1.9 Disinfection solutions, brushes, or other equipment necessary to minimize the spread of invasive species from site to site. See EAP Policy 1-15 for more information.

5.2 Sample Bottles

5.2.1 Table 1 describes the type of bottle and volume of sample necessary to complete the laboratory analysis. New or clean containers come from MEL. Containers for TP and for TPN have pre-loaded acid. The holding time for a standard set of WHM samples ranges from 7 to 28 days. Table 1 describes the bottles needed for a DCE. These bottles are pictured in Figure 1. All containers are wide mouth polyethylene, except the one for TP, which is narrow mouth.

Table 1. Requirements for water samples.

Parameter	Bottle Type	Sample Holding Time
TP[a]	60 ml (MEL # 26)	28 days
TPN[b]	125 ml (MEL # 19)	28 days
CL	500 ml (MEL # 22)	28 days
pH[c]	500 ml (MEL #22)	24 hours
Conductivity[c]	500 ml (MEL #22)	28 days
TSS	1000 ml (MEL # 23)	7 days

a TP containers are preserved with H_2SO_4, so that final pH will be < 2
b TPN containers are preserved with HCl, so that final pH will be < 2
c Typically measured *in situ* for WHM, unless field meters malfunction.
Leave no headspace in laboratory samples.

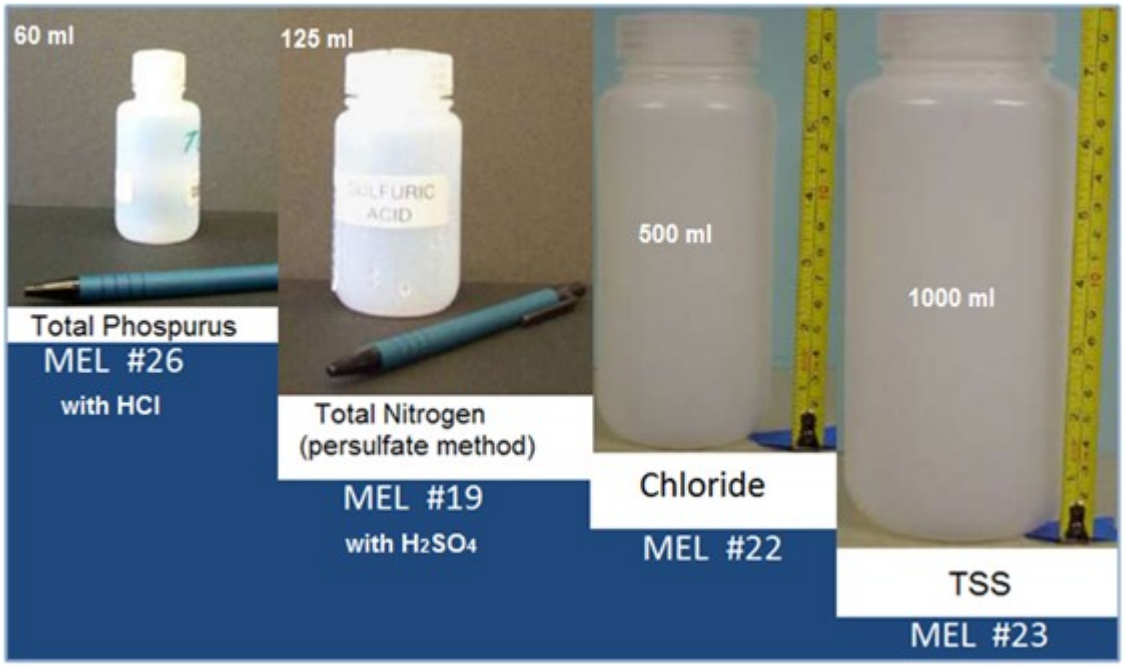

Figure 1. Water sample bottles required per DCE.

5.2.2 Check bottles for loose lids. Damaged or leaking containers should be recycled or discarded.

5.2.3 Containers left over from previous projects should be closely inspected before using. Bottles with old or discolored preservative should be sent back to MEL for proper disposal. Check with MEL if there is a question on whether a bottle can be reused.

6.0 Summary of Procedure

6.1 Pre-sampling Preparation

6.1.1 Obtain proper sample bottles from MEL laboratory and arrange for sample analyses. Use MEL's sample container request and pre-sampling notification forms (Appendices A and B and MEL, 2016). MEL's sample manager will provide lab sample numbers after these forms are submitted.

6.1.2 Notify the laboratory at least two weeks prior to first sampling,

6.1.3 Invite MEL staff to the annual end-of-June training event.

6.1.4 Weekly, email or call the MEL sample manager to indicate which samples to expect during the following week.

6.1.5 Ensure that there is an adequate supply of blank sample tags prior to sampling. Each bottle needs a label with the following information: project name, site ID, date, time, sampler name, parameter name, and MEL sample number (Figure 2).

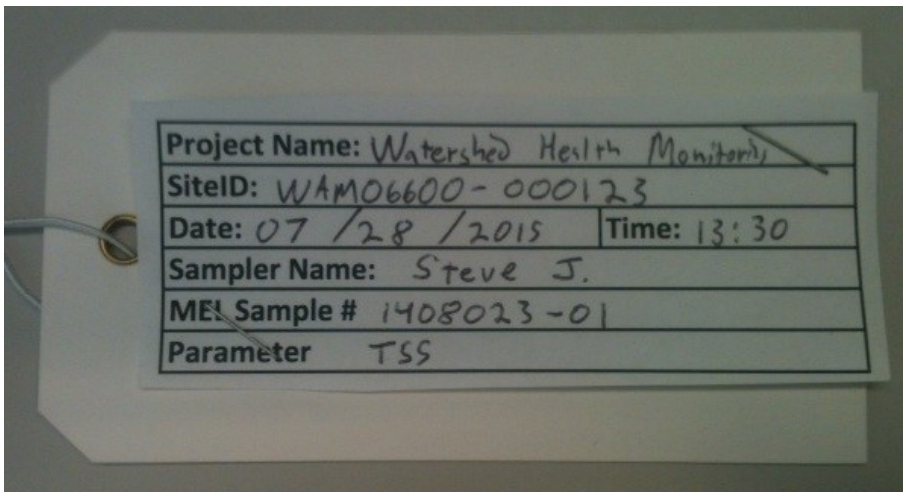

Figure 2. Example sample label stapled to sample tag.

6.2 General Considerations and Cautions

6.2.1 Each week, plan to deliver samples to the laboratory by Friday, before noon.

6.2.2 When wading, sample water as the first task of a DCE, so that samples are collected from undisturbed water. When rafting long floats, crews may delay water sampling until reaching the last transect, to minimize duration between sampling and delivery to the laboratory.

6.2.3 Choose a water-sampling location located within the site (between transects A and K). This location should be relatively deep and nonturbulent. If possible, sample near the thalweg or predominant downstream current. Avoid back eddies and side channels.

6.2.4 To avoid sample contamination be careful that you or your work partners do not disturb sediment from the streambed. Move upstream if necessary to sample in an undisturbed area.

6.2.5 If sampling on foot, face upstream while obtaining the grab sample.

6.2.6 If sampling from a raft, retrieve grab samples from the upstream end of the raft.

6.2.7 Refrain from using sunscreen, insect repellent, or other contaminants prior to sampling.

6.3 Grab Sampling

6.3.1 Prepare. Put on nitrile gloves and remove the cap while being careful not to contaminate the cap, neck, or the inside of the bottle with your fingers, wind-blown particles, or dripping water from your clothes, body, or overhanging structures.

6.3.2 Collect samples for TSS, and chloride and rarely, sample pH, and conductivity (where the sample bottle does not contain acid preservative). Use the following procedure:

6.3.2.1 Hold the container near its base, reach out in front of your body, and plunge it (mouth down) below the surface to about mid-water column. If the water is so shallow that this technique will disturb sediment and contaminate the sample, it may be necessary to collect a surface water sample. Note your change of methods, if any.

6.3.2.2 Leave some headspace (5 - 10%) in jars, so laboratory staff can mix the samples.

6.3.2.3 For rarely-sampled pH, completely fill the sample container, eliminating all headspace.

6.3.2.4 The pH and conductivity data are typically measured *in situ*. Therefore, water samples for these parameters are not normally required. Sample for these parameters and send them for laboratory analysis *only* if an equipment malfunction precludes field measurement. If you do sample for these parameters, be aware of the overnight holding time for pH. However, do not let an expected long holding time prevent you from sampling pH. We want at least one pH data point for every DCE.

6.3.3 Collect samples for TP and TPN (where the sample bottle contains acid preservative). Use the following procedure:

6.3.3.1 Hold the container upright, and place the lid over the mouth so that only a small area forms an opening (Figure 3).

6.3.3.2 Immerse the bottle about 15 cm (6 inches) under the water surface while holding the cap in position with your fingers as far away from the opening as possible.

6.3.3.3 Carefully observe the rate the container is filling and remove it from the water before the headspace area is reached. If overfilling occurs, get a new sample container and repeat.

6.3.3.4 This procedure does not work well in fast-moving, shallow water. Use procedures in section 6.4 if this is the case.

6.3.3.5 Securely place the cap back on the container, and screw it tight. Invert it several times to evenly mix any preservative with the sample.

6.3.3.6 Rinse any dirt or debris from the outside of the container.

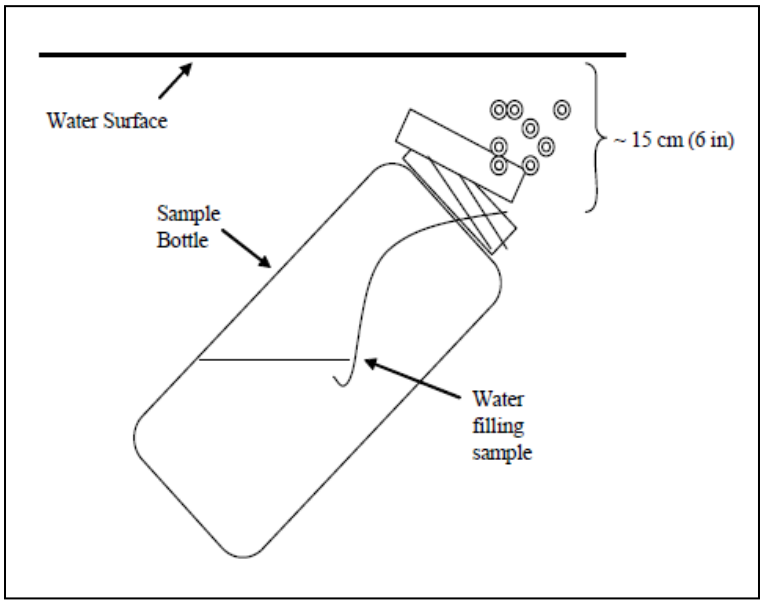

Figure 3. Illustration of the cap position on a sample container being filled that already contains a preservative.

6.4 Sampling with an intermediate container

6.4.1 Any unacidified sample bottles in Figure 1 can be used as an intermediate container.

6.4.2 Rinse the intermediate container with site water, and pour the rinsate downstream of the sampling location.

6.4.3 Fill the intermediate container with water following the technique described in 6.3.2 as closely as possible. Submerge the container to a depth that does not disturb bottom sediments, but also avoids sampling the surface layer.

6.4.4 Pour the sample from the intermediate container to the primary container. Take care not to overfill the primary container if it contains preservative. Leave adequate headspace (5 - 10% volume), except if pH is sampled; leave no headspace for the pH jar.

6.5 Sample Labeling and Storage

6.5.1 Upon collection, cover and chill the samples. Wrap all the chemistry samples (including sediment; see the relevant SOP) in a black garbage bag and chill (close to 4 °C) in the dark.

6.5.1.1 Use a cooler of ice whenever possible.

6.5.1.2 Use the stream if you are distant from the work vehicle and a cooler is not available (USEPA, 2013). Transfer the samples to a cooler of ice as soon as possible.

6.5.2 Label the samples with the following information: project name (Watershed Health Monitoring), site ID (e.g. beginning with WAM06600-), date (e.g. Month: AUG Day: 15 2015), time (military), sampler name, parameter name, and MEL sample number (these are assigned by the laboratory). Ensure that the information on the sample labels is accurate for the DCE. Sample labels should be printed on waterproof paper and information written in waterproof ink or pencil. Write legibly.

6.5.3 Staple the label to a sample tag. Secure the tag around the neck of the sample bottle.

6.6 Sample Delivery and Transport

6.6.1 There are two options for sample delivery. Crews can drop off samples at the EAP Operations Center (OC), or they may ship samples by commercial courier.

6.6.2 Option 1: Deliver weekly samples to the OC by Thursdays for next-day transport to the laboratory by MEL courier.

6.6.2.1 Complete an LAR form (MEL, 2016) for each shipment, and create a copy for inclusion in the cooler(s). An example of a completed form can be found in Appendix C.

6.6.2.2 Pack samples in fresh ice within a shipping cooler. Add a copy of the LAR, sealed in a clear zip-closed bag.

6.6.2.3 Deliver the shipping cooler(s) to the walk-in cooler

6.6.2.4 Place the completed original LAR form in the "Out" box near the walk-in cooler.

6.6.3 Option 2: Deliver weekly samples using an overnight commercial freight service. Ensure delivery to the laboratory occurs no later than Friday morning.

6.6.3.1 Complete an LAR form as described in section 6.6.2. Place a copy in a zip-closed bag, and tape the bag to the inside lid of a shipping cooler.

6.6.3.2 Line each shipping cooler with a large garbage bag.

6.6.3.3 Pack samples in the lined shipping cooler(s) using fresh, contained ice. Ice can be contained with zip-closed bags or in pre-frozen 16-oz bottles of water. Add as much ice as possible.

6.6.3.4 Seal the cooler shut with strapping tape. Apply completed (courier-provided) shipping labels. Ship.

6.6.3.5 Notify the MEL sample manager of the sample shipment, including the number of coolers and the tracking number. If you have an electronic copy of the LAR, email it. If not, provide all the pertinent information.

7.0 Records Management

7.1 Find the *Samples* tab of the WHM electronic field forms *Navigation Pane* (Figure 4).

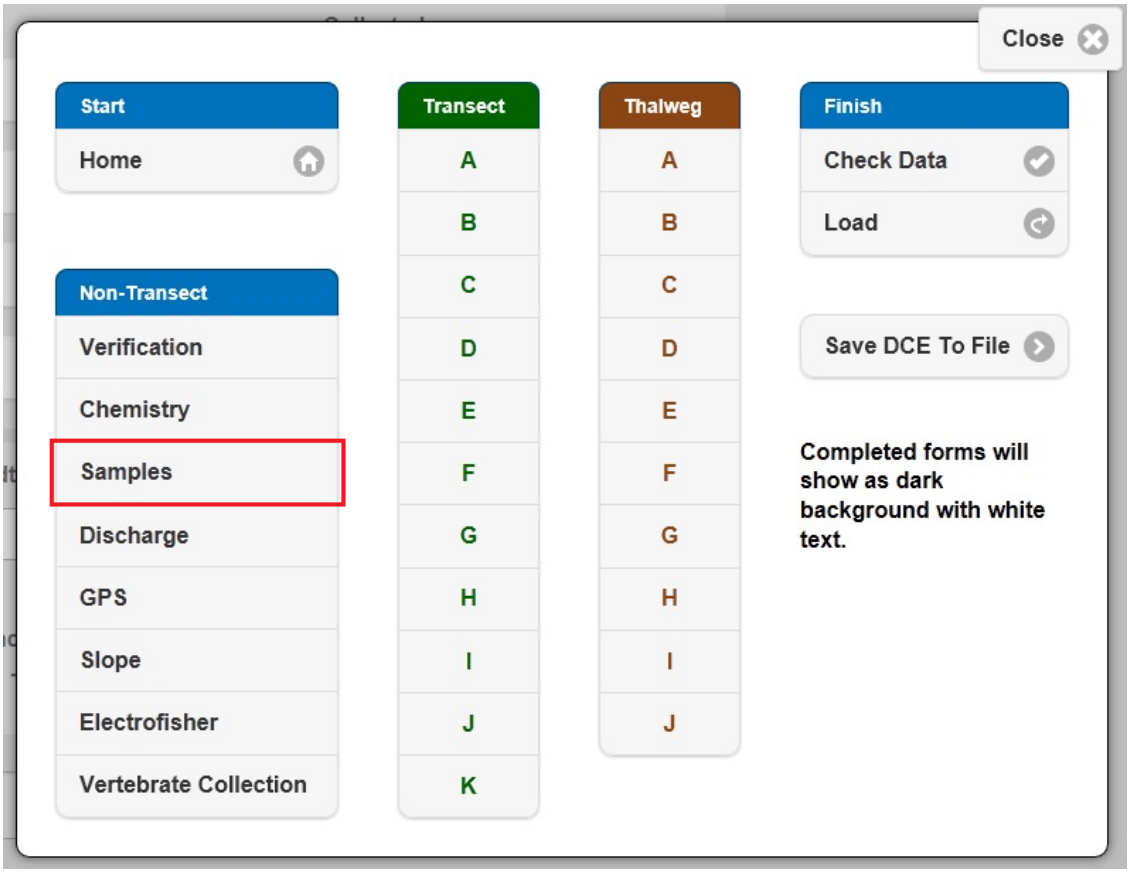

Figure 4. Location of the Samples tab within the *Navigate Pane* of the WHM electronic field forms.

7.2 Within the *Samples* tab (Figure 5) record the following information:

7.2.1 *Work Order #*: Issued by MEL

7.2.2 *Water Sample #*: Water, Sediment, and Chlorophyll samples should each have a unique 2-digit number. (Sediment and chlorophyll sampling are discussed in other SOPs).

7.2.3 Click *Jars Collected for Lab Shipment*: Select each parameter that you sampled. If you sampled pH or conductivity indicate so in the *Note* field.

7.2.4 *Sample Station*: The thalweg transect where the samples were collected, usually F0 for waded streams and A0 for rafted rivers.

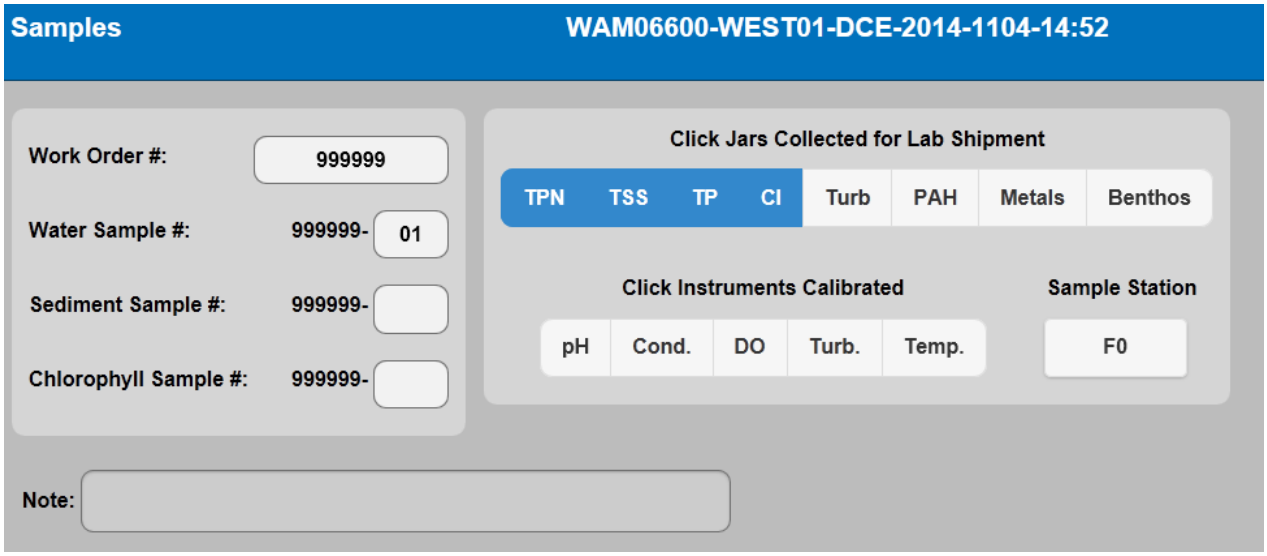

Figure 5. Data fields within the Samples tab of the WHM electronic field forms.

7.3 Refer to the SOP for validating, loading, and committing completed WHM field forms to the WHM database.

8.0 Quality Control and Quality Assurance

8.1 PROJECT QA/QC is discussed in the Quality Assurance Monitoring Plan (Cusimano et al., 2006), which is in the process of being updated.

8.1.1 PRECISION: Repeat the sampling for 10% of all sites per year per Status and Trends Region. Timing of replicates should be several weeks or more later than initial samples (as far apart in time as possible within the same index period).

8.1.2 BIAS: Persons using this SOP must either attend the annual training event (June) or be trained by someone who did.REPRESENTATIVENESS: Sample sites are randomly chosen using a Generalized Random Tessellation Stratified (GRTS) design. Samples must be collected from within the site boundaries (between transects A and K).

8.2 SAMPLING QA/QC

8.2.1 PRECISION: At every repeat DCE, collect field duplicates for each water sample.

8.2.2 BIAS: MEL analyzes quality-control samples with each batch to assess analytical bias.

8.2.3 REPRESENTATIVENESS: Water should be collected upstream of any nearby ground or surface water inputs, where possible. Water should be collected on the same day that all other data are collected for the DCE.

9.0 Safety

9.1 All field staff must comply with the requirements of the EA Safety Manual, especially Chapter 1 "General Field Work," which includes special circumstances like fall protection and working in rivers and streams.

9.2 Sampling from a boat requires one person onboard to be a qualified boat operator and all persons onboard must be familiar with Chapter 3 of the EA Safety Manual, "Boating."

9.3 For further field health and safety measures, refer to the Environmental Assessment Program (EAP) Safety Manual.

9.4 Wear nitrile gloves to avoid bacterial or chemical exposure. Use antibacterial soap or hand sanitizer before ingesting food or drink.

10.0 References

10.1 Armantrout, N.B., compiler. 1998. Glossary of aquatic habitat inventory terminology. American Fisheries Society, Bethesda, Maryland.

10.2 Cusimano, R., G. Merritt, R. Plotnikoff, C. Wiseman, C. Smith, and WDFW. 2006. Status and Trends Monitoring for Watershed Health and Salmon Recovery: Quality Assurance Monitoring Plan. https://fortress.wa.gov/ecy/publications/summarypages/0603203.html

10.3 Ecology, 2019. Environmental Assessment Program Safety Manual. Washington State Department of Ecology. Olympia, WA. http://teams/sites/EAP/Pages/safety.aspx

10.4 JNRC. 1999. Statewide Strategy to Recover Salmon – Extinction is Not an Option, Chapter III: A Road Map to Recovery. Governor's Salmon Recovery Office, Olympia, WA. http://digitalarchives.wa.gov/governorlocke/gsro/strategy/summary/roadmap.htm

10.5 MEL, 2016. Manchester Environmental Laboratory Lab User's Manual Tenth Edition. Environmental Assessment Program. Washington State Department of Ecology. Manchester, WA. http://teams/sites/EAP/manlab/LabUsers/SitePages/Home.aspx

10.6 USEPA. 2013. National Rivers and Streams Assessment 2013-2014: Field Operations Manual – Wadeable. EPA-841-B-12-007. U.S. Environmental Protection Agency, Office of Water Washington, DC.

11.0 Appendices

Appendix A Manchester Environmental Laboratory *Sample Container Request* form.

Sample Container Request Form

Please **FAX** to: (360) 871-8850
Contact: Leon Weiks, Lab Assistant and Courier
Phone: (360) 871-8825 Email: lwei461@ecy.wa.gov
Please allow about 2 weeks for typical requests; longer for special requests

Requestor: _____ Project Name: _____

Phone: _____ Today's Date: _____

Location for Delivery: _____ Date Needed by: _____

Index #	Description	Qty.
1	1 gallon jar WM, CLR (BNA)	
2	1/2 gallon jar WM, CLR	
3	1 liter jar WM, CLR (Organics) for HCID only, no preservative	
4	1 liter jar NM, CLR w/ 1:1 HCl 15mL dropper bottle included (Oil & Grease)	
7	16 oz short jar WM, CLR	
5	8 oz short jar WM, CLR	
8	4 oz short jar WM, CLR	
34	2 oz short jar WM, CLR	
13	2 oz short jar WM, CLR, w/septum	
11	40mL vial AMB w/septum □ pre-preserved with HCl □ dropper bottle of HCl □ ascorbic acid for chlorinated VOA samples	
14	20mL vial w/acetic acid (Carbamates)	
39	1 liter glass NM, AMB (TPH-D)	
15	1 liter glass NM, AMB (All other Organics)	
16	500mL HDPE bottle w/5mL 1:1 nitric acid (Metals including **standard** level mercury)	
17	1 gallon cubitainer (BOD)	
19	125mL Nalgene WM, CLR w/1:1 sulfuric acid (Nutrients or COD)	
20	125mL Nalgene WM, AMB (filters and syringe also required for orthophosphate)	
21	125mL poly NM, CLR (Hardness) w/ 1:1 sulfuric acid *Hexachrome request w/o acid*	

Index #	Description	Qty.
22	500mL poly WM, CLR (General Chem.)	
23	1000mL poly WM, CLR (TSS)	
24	1000mL poly WM, AMB (Chlorophyll)	
25	250mL poly NM, AMB (Cyanide)	
26	125mL poly WM, CLR w/ 1:1 hydrochloric acid (TOC/DOC or TP) □ Filters and syringe for DOC	
27	250mL poly WM, CLR (Fecal Coli)	
28	500mL poly WM, CLR (Multiple Micro Tests)	
29	250mL poly WM, CLR w/thiosulfate (Fecal Coliform - Chlorinated)	
30	500mL poly WM, CLR w/thiosulfate (Multiple Micro Tests - Chlorinated)	
31	8oz plastic jar (Grain size only)	
32	1 liter jar WM, CLR w/sulfuric acid (Phenolics)	
33	4oz sterile specimen cup (Micro - sediment)	
35	Soil VOA/BTEX Airtight Sampling Capsules (3 per sample)	
36	Soil VOA/BTEX Sampling Handle (1 per sampling event)	
37	500mL Teflon NM, CLR (low level mercury ONLY) □ **Total**, Recoverable - nitric acid and no filter □ **Dissolved** w/filter and nitric acid	
38	Nalgene Metals Filters 0.45um	
Other Supplies		

All containers for organics are organic free with Teflon lined lids
WM = Wide Mouth **NM** = Narrow Mouth **CLR** = Clear **AMB** = Amber

Appendix B. Manchester Environmental Laboratory *Pre-Sampling Notification* form

Pre-Sampling Notification Form

Fax to Manchester Laboratory: (360) 871-8850

Or email to Nancy Rosenbower: nros461@ecy.wa.gov and cc: Leon Weiks: lwei@ecy.wa.gov

☐ Enforcement
☐ Monitoring
☐ Emergency
☐ Class II
☐ Preliminary Invest
☐ Special turnaround

Project Name: _____ **SIC:** _____

Requested by: _____ Sampling Date(s): _____

Program: _____ Date to Lab: _____

Phone No.: _____ Sample Pickup Location: _____

Date results needed by: _____ QAPP: ☐Yes ☐ No EIM Study ID (if available) _____

General Chemistry	W	S	O	Microbiology	W	S	O	Organic Chemistry	W	S	O
Alkalinity				Fecal Coliforms ☐MF ☐MPN				Base/Neutral/Acids (BNA)			
Conductivity				E. Coli MF ☐ MPN ☐				Polynuclear Aromatics (PAH)			
Hardness				E. Coli MPN							
pH				% Klebsiella				Volatile Organic Analysis (VOA)			
Turbidity								BTEX			
☐ Fluoride ☐ Chloride ☐ Sulfate								Pest/PCBs (Organochlorine)			
Cyanide ☐ Total ☐ Dissociable				**Metals**	W_T	W_D	S O	Pesticides only (Organochlorine)			
Total Solids				Priority Pollutant Metals (13 elements)				PCBs only			
Total Nonvolatile Solids (TNVS)				TCLP metals				OP - Pests (Organophosphorous)			
Total Suspended Solids (TSS)				Hardness				Herbicides (Chlorophenoxy)			
Total Nonvolatile Suspended Solids (TNVSS)								Nitrogen Pesticides			
Total Dissolved Solids (TDS)				Mercury (Hg) Low Level ☐ 245.7 ☐ 1631E Regular ☐				Organochlorine Pesticides by GCMS 8270			
Chlorophyll ☐ Filtered in field ☐ Filtered at lab				Other: List individual elements below:				PBDEs			
% Solids								Hydrocarbon ID (match to source)			
% Volatile Solids (TVS)								TPH-ID (gas/diesel/oil)			
Total Organic Carbon								$TPH\text{-}D_X$			
Dissolved Organic Carbon								$TPH\text{-}G_X$			
Biochemical Oxygen Demand (BOD) 5 day											
BOD - Inhibited											
BOD - Ultimate											
Ammonia											
Nitrate-Nitrite											
Orthophosphate											
Total Phosphorous											
☐ TPN ☐ TKN				Asbestos							

Comments: Enter the number of samples in the appropriate box(es) above

W = water S = soil/sediment O = other (please specify)
W_T = water total W_D = water dissolved

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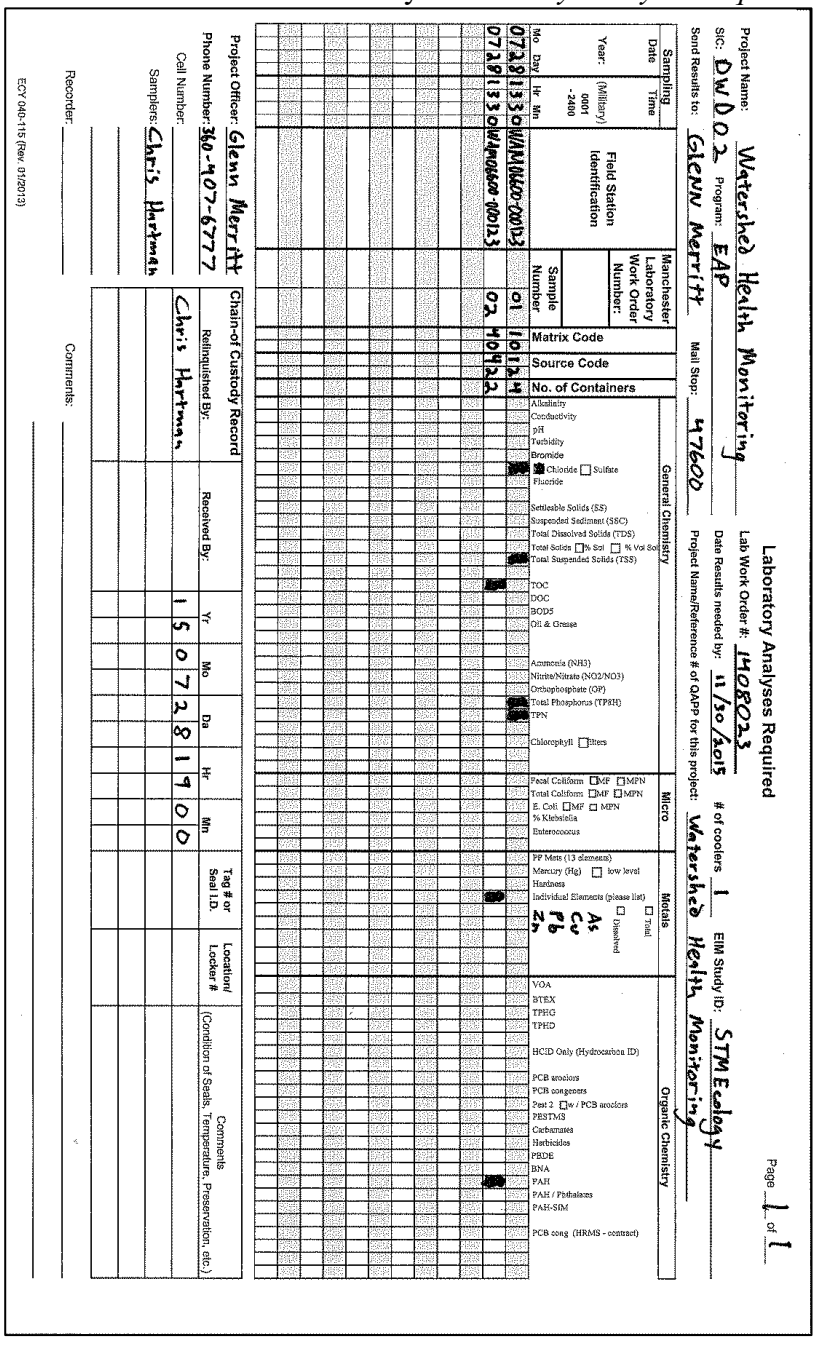
Appendix C

Manchester Environmental Laboratory *Laboratory Analysis Required* form.



Laboratory Analyses Required

Project Name: Watershed Health Monitoring — Lab Work Order #: 1408023 — # of coolers 1 — EIM Study ID: STMEcology — Page 1 of 1

SIC: DW002 — Program: EAP — Date Results needed by: 11/30/2015 — Project Name/Reference # of QAPP for this project: Watershed Health Monitoring

Send Results to: Glenn Merritt — Mail Stop: 47600

Sampling Date Mo	Day	Sampling Time Hr	Mn	Field Station Identification	Manchester Laboratory Work Order Number: Sample Number	Matrix Code	Source Code	No. of Containers	General Chemistry	Micro	Metals	Organic Chemistry
07	28	13	30	WANIKOO0012	01	10	12	4	Bromide; Chloride; TOC; Total Phosphorus (TPH); TPN		As Cu Pb Zn (Total)	
07	28	13	30	WANIKOO0023	02	10	12	2				

(Military Time: 0001 - 2400)

General Chemistry: Alkalinity; Conductivity; pH; Turbidity; Bromide; Chloride; Sulfate; Fluoride; Settleable Solids (SS); Suspended Sediment (SSC); Total Dissolved Solids (TDS); Total Solids % Soil % Vol Soil; Total Suspended Solids (TSS); TOC; DOC; BOD5; Oil & Grease; Ammonia (NH3); Nitrite/Nitrate (NO2/NO3); Orthophosphate (OP); Total Phosphorus (TPH); TPN; Chlorophyll Ethers

Micro: Fecal Coliform MF MPN; Total Coliform MF MPN; E. Coli MF MPN; % Klebsiella; Enterococcus

Metals: PP Metls (13 elements); Mercury (Hg) low level; Hardness; Individual Elements (please list) — Total Dissolved

Organic Chemistry: VOA; BTEX; TPHG; TPHD; HCID Only (Hydrocarbon ID); PCB aroclors; PCB congeners; Pest 2 w / PCB aroclors; PESTMS; Carbamates; Herbicides; PBDE; BNA; PAH; PAH / Phthalates; PAH-SIM; PCB cong (HRMS - contract)

Chain-of Custody Record

Relinquished By:	Received By:	Yr	Mo	Da	Hr	Mn	Tag # or Seal I.D.	Location/ Locker #	Comments (Condition of Seals, Temperature, Preservation, etc.)
Chris Hartman		15	07	28	19	00			

Project Officer: Glenn Merritt

Phone Number: 360-407-6777

Cell Number:

Samplers: Chris Hartman

Recorder:

Comments:

ECY 040-115 (Rev. 01/2013)