Snohomish County Surface Water Management
Resource Monitoring Group

Standard Operating Procedures for the Collection of Benthic Macroinvertebrates Using a Surber Sampling Device in Rivers and Streams

Samples Version 1.0

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Please note that Snohomish County Surface Water Management's (SWM) Standard Operating Procedures (SOPs) are adapted from Washington State Department of Ecology Standard Operating Procedure EAP073 version 2.1, other published methods, or developed by in-house technical and administrative experts. Their primary purpose is for internal Snohomish County 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 Snohomish County.

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

SOP Revision History

Revision Date	Rev number	Summary of changes	Sections	Reviser(s)

STANDARD OPERATING PROCEDURE FOR COLLECTION OF BENTHIC MACROINVERTEBRATES FROM RIFFLES IN RIVERS AND STREAMS USING A SURBER SAMPLER.

Introduction

Aquatic macroinvertebrates are aquatic animals that do not have a backbone and can be seen with the naked eye. Benthic macroinvertebrates live in or near the streambed, and include, insects, worms, snails, crustaceans, and clams. Benthic macroinvertebrates are monitored because they are good indicators of the biological health of stream systems and play a crucial role in the stream ecosystem. Since they are relatively sedentary and spend most or all of the life cycle in the aquatic environment, benthic species are reflective of local water quality, sediment, habitat and hydrologic conditions. The Benthic Index for Biotic Integrity used by Snohomish County was developed for Puget Sound Lowland Streams (Karr, 1998, 1999; Fore et. al., 2001; Morley and Karr, 2002). It is comprised of ten metrics measuring taxonomic richness, composition, tolerance and intolerance, habit, reproductive strategy, feeding ecology and population structure.
Monitoring benthic macroinvertebrate populations is a relatively inexpensive and effective way to assess the impacts of a wide range of environmental disturbances (King County, 2002).

Snohomish County has identified three goals for using Benthic Invertebrate monitoring to support its water quality monitoring program: 1) evaluate whether stream management programs are effective, 2) assess the current status of stream sites in the region, and 3) identify trends in stream condition.

Benthic Invertebrate sampling collection methods employed by SWM for its' status and trends monitoring program are similar to those employed by King County, the City of Seattle, Pierce County and other municipalities across Washington State. Use of the Surber sampler (Surber 1936) has a long history in Puget Sound benthic macroinvertebrate monitoring programs. It is a versatile sampling device for collection of benthic macroinvertebrates and is used in running water. The sampling device is one-foot high and so is limited for use in rivers and streams to this depth. Since riffle sampling in small streams (sometimes broader rivers) is the target habitat, riffles are rarely deeper than one-foot.

Sample training is held each year to refresh staff and inform new team members of equipment and procedures. The lead benthologist provides orientation and training through actual sample collection at one of the SOW sites to begin the new monitoring year.

Figure 1. Surber sampler set in Wallace River.

Figure 2. Surber sampler and grid set in a small stream.

1.0 Purpose and Scope

1.1 This Standard Operating Procedure (SOP) details methods used by Snohomish County Resource Monitoring Group to collect benthic macroinvertebrate samples, estimate percent fines, and measure substrate size. This collection technique uses the Surber Sampler, a 25-point grid, and Vernier calipers for measuring substrate dimensions. It may also contain methods that other users would find helpful for their monitoring work.

1.2 The scope of the SOP applies to sampling equipment preparation, supplies that store and preserve benthic macroinvertebrate samples, and substrate measurements collected on wadable streams in depths ranging from 1.25 inches to 1ft. Each new field staff member must be trained by a custodian or other designated proficient user. Operating instructions should be consulted for detailed information. Failure to do so, could result in collection of unusable samples and/or substrate characterizations. If written instruction does not provide adequate information, consult a custodian.

2.0 Applicability

This SOP is intended for any SWM program involving the collection and analysis of benthic macroinvertebrates and substrate characterization of streams.

3.0 Definitions

3.1 Vernier Calipers – measuring device used to determine the b-axis dimension (see Section 7.6) of 25 individual substrate particles (stones) taken from within the area sampled for benthic macroinvertebrates.

3.2 Discharge – the volumetric flow rate of water transported through a cross-sectional area.

3.3 GRTS – Generalized random tesselation stratified design

3.4 RM Group – Resource Monitoring Group.

3.5 QAMP – Quality Assurance Monitoring Plan.

3.6 SOP – Standard Operating Procedure.

3.7 SWM – Snohomish County Surface Water Management.

4.0 Personnel Qualifications/Responsibilities

4.1 Field operations require training specified by job title in SWM's Safety Training database.

4.2 This SOP pertains to all Natural Resource Scientists, Environmental Specialists, Interns and Environmental Technicians in the RM group or other staff using this SOP.

4.3 All field staff must review the QAMP, this SOP, have completed field training, and be familiar with procedures for data collection.

4.4 All field staff must be familiar with the electronic data recording tablet (iPad® application).

4.5 The field lead directing sample collection 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 lead or project manager about the sampling goals and objectives prior to arriving at the site.

5.0 Equipment, Reagents, and Supplies

Surber Sampler
Nalgene® collection jar
99% Denatured Ethanol (1-L per benthic sample)
Screw driver – sediment agitation tool
25-point grid
Vernier Calipers
Quality Assurance Management Plan
Any rights of entry
First aid kit
Personal gear (boots, gloves, hat, water, clothing, food, waders, survey vest)
Traffic control equipment

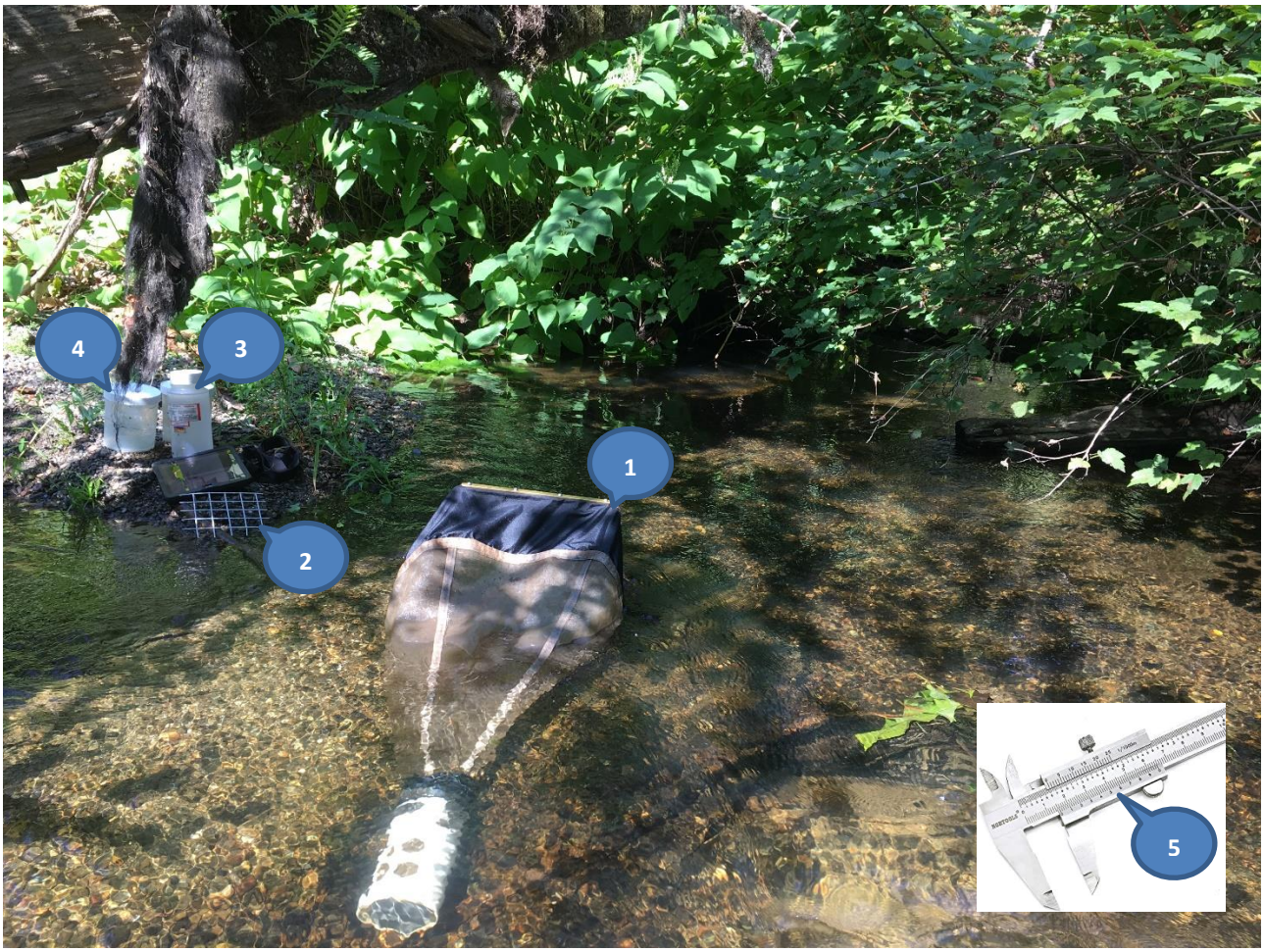


Figure 3. Equipment, reagents and supplies used to collect benthic macroinvertebrates.

1.	Surber Sampler
2.	25-point grid
3.	1-L 99% Denatured Ethanol
4.	Nalgene® Sample Collection Jar
5.	Vernier Calipers

6.0 Study Sites

Detailed description of the goals for this monitoring program are in the QAMP (Section A.5.1). Site selection is made using the GRTS (generalized random tessellation stratified) design in which randomly selected reaches are identified using a Master Sample Draw (see QAMP 2019, Section B.1.2). Property access permission must be obtained before accessing stream reaches that are selected using the GRTS design. This is completed by the Public Works Department Engineering Services Right of Way Group. Once access is granted, site visits are completed to determine site suitability

6.1 Site Reconnaissance

Each potential sampling site identified through the GIS site selection process is evaluated prior to sampling for verification that target conditions for sampling are present. The following field criteria must be met for site riffles that can be sampled:

- Access, preferably right of way make sure you have notified landowners in vicinity of sampling and gained permission if necessary to cross over private property to gain access.
- Riffles present – in absence of well-defined riffle, choose the fastest flowing, most turbulent, non-depositional location possible).
- Pebbly, gravely, or rocky substrate within riffles
- Minimum channel width of one foot
- Water depth ranging from one inch to one foot in riffles.

Sites without suitable flow, depth, width or substrate are eliminated. A photograph is taken to document viability or non-viability. Photos are stored in the appropriate years' folder at:

X:\ResMonitoring\State of Waters

Photos are used as reference for viable and non-viable sample locations and will be referred to in future years should the site be randomly selected once again.

7.0 Sample Collection Procedures

7.1 Sample Collection

Benthic Invertebrate sampling collection methods used by SWM for the State of Our Waters (status and trends) monitoring program are similar to those employed by King County, the City of Seattle, Pierce County and other municipalities across Washington State. The convergence of sample collection methods in our program with those of other agencies

(Federal, State, and Local) was important for the purpose of data sharing and for contributing to reporting on a larger scale like the Puget Sound region.

Sample training is held each year to ensure collection methods are consistent among sampling teams. New team members, science interns or temporary employees, are updated or introduced to our standard collection procedures and sample handling.

One caution regarding a decision to sample for benthic macroinvertebrates - a sampling event is not carried out during or shortly after a rain event sufficient enough to cause channel scour and/or erosion. A site should be re-visited approximately four weeks following an event that causes major scour to allow the macroinvertebrate community to recolonize the habitat.

7.2 Riffle Selection

The location of riffles for sampling is determined in two steps:

1. Staff Use the iPad® map with transects laid out on the sampling reach to define the down-stream to up-stream sampling limits in order to distribute riffle sampling locations throughout the entire area habitat will be sampled (11 transects); and
2. Select sampling locations at mid-point in riffles (broken surface water).

If riffle habitat is limited, a quick visual survey of the reach should be made to determine if eight riffles samples can be collected; determine if more than one Surber sample can be collected from the same riffle. If eight Surber samples cannot be collected within a reach, then other habitat characterized by moving water and non-depositional locations should be identified.

If the reach is a long glide or dominated by unbroken surface water, representative turbulent, eight non-depositional locations should sampled (habitat condition equivalent is "Other"). Walking in the stream or causing any disturbance upstream of any sampling location should be avoided so that organisms from other, upstream locations are not washed into downstream habitat.

7.3 Surber Sampler Placement

Enter the stream below that sampling location that is farthest downstream (above transect one). Approaching the riffle from downstream, set the net down firmly on the substrate at the approximate mid-point of a wetted riffle, so that the net and the frame are sealed against the substrate. In areas with high stream velocity, it may be necessary for one team member to hold the net down while another collects the sample.

7.4 Fine Substrate Grid

The 25-point grid (Section 5.0) is placed in the middle of the Surber sampler collection prior to sample collection and disturbance of the substrate. Each of the cross-hair points on the grid is viewed for sand or finer substrate directly below. The total number of cross-hairs where sand (or finer substrate) occurs is tallied (See Section 10.1 for record management) for a maximum of up to 25 points per 1ft square Surber, and up to 200 possible points for the 8 Surber placement locations. The number of points with sand or finer substrate divided by 200 (x100) represents the percent surface sand and fines for the composited surber samples.

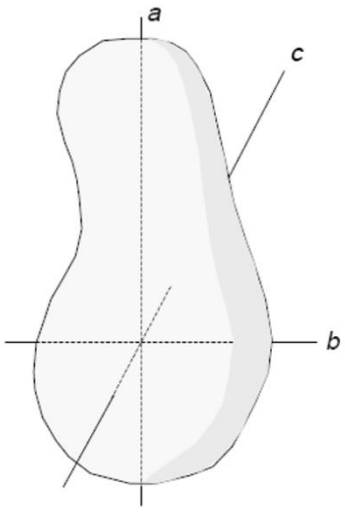
7.5 Sediment Agitation and Sample Collection

All large gravel and larger size particles, such as woody debris, will be carefully cleaned, preferably by hand (a scrub brush can be used, but organisms tend to get damaged with this removal process making identification difficult or impossible). Larger particles are held inside the net so that all organisms wash into the net. Each rock is handled and rubbed until all organisms, including pupae, that are attached or clinging to rocks are removed. Cobbles are placed outside the Surber sampler area following cleaning. Sample collection is performed for a minimum of two minutes. Upon completion of organism removal, substrate is disturbed using hands or agitation tool to a maximum depth of 10 cm. The inside perimeter of the frame is checked and the net is then inverted to collect remaining organisms that were not caught in the collection cup at the end of the Surber sampler. All rocks/cobbles will be replaced in the original location once sample collection is completed.

7.6 Substrate Size Characterization

From a minimum one square foot, up to one square meter, upstream or on either (undisturbed) side of the Surber sampler, twenty-five (25) diameters (b-axis) are measured from substrate particles as in the manner of a Wolman pebble count. This adjacent area sampled for substrate characterization shoul be visually similar in surface substrate appearance as the Surber location. Each substrate particle is selected from the targeted area with a single finger while looking away to avoid selection bias (of larger particles) and is then measured using the Vernier calipers for the b-axis dimension (in millimeters). This is the second longest dimension from three possible: length (a), width (b), and depth (c). Twenty-five individual observations will be recorded (See Section 10.2 for records management). If the finger touches sand (≤2 mm), the number recorded is 2 (mm). If the substrate is silty, slimy, or contains organic material, the number entered is 0.06 (mm), consistent with EMAP protocols (Lazorchak et al. 1998). A total of 200 pebbles should be measured for the eight Surber locations.

Substrate b-axis for measurement



7.7 Sample Processing

After eight riffles have been sampled, the net is held vertically and organisms washed into the collecting cup at the end of the Surber net. The collector can use a spray bottle or splash water against the side of the net to wash invertebrates and other vegetative debris into the collection jar. Fine sediment is washed out through the net to concentrate the sample. Large rocks are removed from the sample, after they have been cleaned and inspected to minimize damage to organisms in the sample during transport.

To ensure that no organisms remain entrapped on the sampling equipment, thorough inspection of the equipment will be conducted. One team member will turn the Surber sampler net inside out for visual inspection and remove any macroinvertebrates or detritus. Any mussels, crayfish, or fish that are found will be noted and returned to the stream. The sampler net will be rinsed well in the stream before the next sample is collected. If time permits, the Surber sampler net can be soaked in a sink at the laboratory overnight in Liquinox© soap (or equivalent). The net is then washed with tap water in order to remove any sign of the soap.

Review electronic field forms for completeness before leaving the field site and a final check made in the office before the field season ends. If there are data that had not been collected, it is possible to deploy a team to complete the field work before the sampling index period ends (October 15th).

7.8 Sample Preservation and Documentation

The sample will be poured into the jar wide mouth Nalgene® jar, and the spray bottle or stream current used to concentrate the sample material in the collection jar. The sample is preserved with 99% alcohol (denatured) while field collection is occurring. Immediate preservation of the sample during field collection is recommended to neutralize activity of the larger predators and reduce the chance prey items are consumed. About twice as much alcohol preservative to volume of sample should be used. One sampling label (made using waterproof paper) will be placed in the jar and a second label taped on the outside of the jar is attached following return to the office. The site date and site name will be recorded. Labels are written in pencil.

SNOHOMISH COUNTY
SURFACE WATER MANAGEMENT

BENTHIC INVERTEBRATE SAMPLE
SAMPLE ID:_____
DATE:_____
CONTAINER ____ OF ____

Figure 4. Collection label for inclusion in the sampling jar and affixed on the outside of the jar.

Upon returning from the field, staff complete the following tasks;

- inventory supplies available and restock if needed for the following day,
- if possible coordinate with the next days' field team to provide vehicle keys, gas card, field notebook and determine next route for sample site evaluation and sampling

Upon collection of status and trend sites, the annual field sampling is complete. At this point the following tasks are completed:

- Check that sample labels are correct against electronic field forms, check that jar lids are sealed with tape and not leaking.

- A Chain of Custody (COC) form is established before the beginning of the field season with additions made as samples are collected and prepared for shipping. The COC form, once completed following receipt of the last sample, is signed by the lead Benthic Macroinvertebrate scientist and included with the sample shipment. The taxonomic laboratory receiver shall sign and date the form as well. A PDF copy of the fully signed COC form is sent by the laboratory by email. A sample of the COC form is provided in the QAMP (Appendix A); Snohomish County State of Our Waters Quality Assurance Monitoring Plan.

- Once all samples have been prepared for shipment, the lab is contacted and provided instruction on where and how to retrieve samples.

8.0 Taxonomic Laboratory Analysis

8.1 Lab Analysis

Over the years, Snohomish County has contracted with two laboratories for taxonomic services, these include EcoAnalysts and Rithron and Associates. Historical data in lab reports are found at X:\Wq\Bioassessment\SWM bug data

Since 2010, a continually renewed contract for taxonomic services was awarded to Rithron and Associates through a competitive bid process. The current contract for services was approved by Snohomish County Council and services carry through January 31, 2023.

8.2 Field Quality Assurance

A minimum of 10% of sites are selected for measurement of several types of variability inherent with the benthic macroinvertebrate sampling process. The following are sources for error and approach in identifying magnitude for error.

1. Random error in laboratory sample analysis
    - samples are re-analyzed with two different taxonomists
2. Patch variability in habitat
    - samples are collected side-by-side with two Surber samplers
3. Temporal variability
    - sites are re-visited on a different date and samples collected from the same habitat type, but may not be the same riffles (depending on water level in a stream, riffle habitat previously sampled may not be available for re-visit)

Assessment tools, like the expression BIBI, account for much of the types of error or variability encountered in the sampling and laboratory analysis process. Biometrics don't recognize the identity of individual taxa for simple counts and are not influenced by rare taxa

with dominance or proportionate biometrics. This means taxa that have greater density in a sample are more likely to be collected in the field and sub-sampled in the laboratory.

8.3 Laboratory Quality Assurance

A minimum of 10% of identified samples are fully re-identified and re-enumerated by a second taxonomist using the same sub-sample. This procedure evaluates taxonomic precision and enumeration of individual taxa by more than one taxonomist in the laboratory. The individual samples to be checked are randomly chosen before a project begins, and taxonomists do not know which samples have been selected for quality checking. The second taxonomist performs a blind quality check; that is, the taxonomic and count data generated by the first taxonomist are not made available to the QA taxonomist. Results from the 2 identifications are compared by means of the Bray-Curtis similarity calculation, which combines taxonomy and enumeration into a single conservative statistic, maximizing potential error. The Lead Taxonomist, assisted by the Chief Biologist, oversees the application of QA/QC protocols, tracks statistics for individual taxonomists and for projects, and institutes corrective actions.

The taxonomic consulting laboratory implements a thorough check on performance of each step in sample processing. A complete description the laboratory quality assurance program and details about analytical methods is located in the QAMP, Section B.4 (Benthic Macroinvertebrate Monitoring).

8.4 Taxonomic Resolution

The contract laboratory (Rithron, Missoula, MT) provides taxonomic identification, at a minimum, to the levels outlined in Table 1.

Table 1. Taxonomic level required for identification of aquatic organisms sub-sampled at each site.

Taxa Group	**"Fine" Standard Taxonomic Effort**
Oligochaeta	Sub-family/Genus
Acari	Genus
Gastropoda	Genus
Dytiscidae	Genus (adults and larvae)
Simuliidae	Genus (larvae and pupae)
Chironomidae (larvae and pupae)	Genus/species/species group
Trichoptera	Genus/species/species group
All Other Taxonomic Groups	Lowest practical level: typically genus & species

King County, 2014

8.5 Reporting Methods

Once laboratory analysis of samples is completed, final data and QC results are available by February 1st following the year of sampling, by the contract laboratory, in electronic format. The reporting timeline usually takes approximately four months from receipt of samples by the laboratory.

9.0 Post Laboratory Analysis/Data Management

The taxonomic consultant (Rhithron Associates, Inc.) prepares three files in Microsoft Excel® each reporting results from laboratory sample processing and analysis of benthic macroinvertebrate data. A single Technical Summary file is provided that contains information about sample processing, quality control procedures, data analysis, and results. In addition, each site has a complete set of taxonomic results and a BIBI score for the site.

The Excel files contain taxonomic information including sub-sample counts, density estimates, and taxonomic names for each of the organisms identified from a sample. Two of the files have the same names, but are constructed differently (e.g., flat file format and matrix format) for further analysis and for inclusion in a database. The third Excel file contains a complete set of biometrics for each of the sites. Information from all three Excel files can be queried and recombined as each contains key fields as reference.

9.1 Status and Trend Site Data Analysis

Data derived from status trend and site samples are used to determine if biological conditions at streams visited from each of the four land uses (urban, rural, agricultural, and forested) are either improving or declining in health. A description of overall stream biological health is described through use of cumulative frequency distribution (CDF) curves. The stream biological condition is described in terms of the percentage of river miles in a basin or throughout Snohomish County.

Data are analyzed using CDF curves at two spatial scales: County, and Water Resource Inventory Areas (WRIA). WRIAs in Snohomish County are WRIA 5 (Stillaguamish), WRIA 7 (Snohomish), and WRIA 8 (Lake Washington/Cedar-Sammamish). In addition, CDF curves will be constructed based on sites from the four land uses. Annual differences in biological condition can be determined and trends can be identified over a five-year period at each of the spatial scales.

10.0 Records Management

10.1 Fine Substrate

The measure for Fine Substrate is determined using the grid method described in Section 7.4 with a photo of the grid in Section 5.0. A single number from 0 through 25 will be determined from the method and recorded in the iPad® on the designated entry line for each of the eight riffles. Data will be transferred to the Cloud by pressing “Update” on the screen once entry is

completed. All grid counts of fine sediment are pooled for 8 Surber net samples. The total number of fine sediment points observed divided by the total of 200 grid points represents the fraction or percent fines estimate from within the placed Surber sampler.

10.2 Pebble Count

The measure for substrate size characterization is determined using the Vernier calipers and the method described in Section 7.6 with a photo of the calipers in Section 5.0. Twenty-five observations for dimension b-axis will be entered into the iPad® for each of eight riffles. Data will be transferred to the Cloud by pressing "Update" on the screen once entry is completed. As with fine sediment estimates, the total number of pebble measured is 200. From this sample, cumulative particle size dimensions (i.e., D10, D35, D50, and D84) are calculated.

10.3 WISKI Database

Data is initially stored in the Cloud as shapefiles. These files are then reviewed through a quality assurance process and finalized. Once completed, the shapefiles are exported as *.csv files for further analysis and import to the WISKI database.

11.0 Safety Requirements

11.1 Apparel and Equipment

Staff are provided appropriate Personal Protection Equipment (PPE) to minimize hazards. Teams of two should be considered especially for sites where samples are collected on larger streams/rivers or access is long distance from the vehicle or over difficult terrain.

11.2 Training Requirements

Washington State Department of Labor and Industries requires that employers provide a safe work environment through communicating hazards and providing adequate training. Required safety training, inclusive of General Field Safety and Swiftwater Rescue and awareness have been identified by position. Additional requirements include: Defensive Driving, First Aid, and CPR/AED training.

12.0 Invasive Species and Decontamination Procedures

Special care must be taken to prevent the spread of aquatic invasive species (AIS). Two problem species have been tentatively or definitively identified in western Washington watersheds. These include *Didymosphenia geminata* (Didymo) and New Zealand Mud Snail (*Potamopyrgus anitpodarum*).

Washington Department of Ecology currently identify problem invasive species by two categories: Areas of Extreme Concern and Areas of Moderate Concern. Watersheds with New Zealand Mud Snails are Areas of Extreme Concern. Staff must follow standard operating procedures as adapted from (Parsons et al., 2012) to ensure sampling in areas where the New

Zealand Mudsnail exists do not unintentionally promote distribution into other waterbodies.

Any sampling planned in watersheds of Lake Washington should be followed by decontamination procedures for Areas of Extreme Concern.

- Benthic sampling involves contacting stream water or wet streamside soils during sample collection so should be subjected to decontamination procedures using chemicals or heat, especially when cold treatment (4 hrs at -40^{o}C) or drying (48 hours to fully dry) cannot be completed in time.
- Wearing short rubber boots will simplify decontamination, while wearing felt-soled boots will make decontamination more difficult. Check regulations from Washington Department of Fish and Wildlife to ensure felt-bottomed soles are legal for use in specific waterbodies.

New Zealand Mud Snails

New Zealand Mud Snails have been found in numerous areas of Washington State, where they can potentially cause tremendous environmental and economic impacts. These areas are now considered to be of Extreme Concern. In western Washington they include Marathon Park, Capital Lake (Olympia), and Kelsey and Thornton Creeks in the Seattle area, and Union Slough in the lower Snohomish River.

Review Appendix B in the Quality Assurance Monitoring Plan for State of Our Waters Monitoring for detailed decontamination instructions for equipment that may contact waters known to contain aquatic invasive species (Snohomish County 2019).

13.0 References

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Surber, E.W. 1936. Rainbow trout and bottom fauna production in one mile of stream. Transactions of the American Fisheries Society, Vol. 66. pp 193-202.

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APPENDIX A: Chain of Custody Form

Packing Container	Site Code	Sample Code	Sample Date	# Jars per Sample	Notes
1	SWFB	003691	06-27-2019	1	Received by Rhithron 7/19
1	TMBK	017179	07-02-2019	1	Received by Rhithron 7/19
1	TAMB	077947	07-09-2019	2	Received by Rhithron 7/19
1	SCTT	020287	07-10-2019	1	Received by Rhithron 7/19
1	SULFUR	052587	07-10-2019	2	Received by Rhithron 7/19
1	PORU	075012	07-11-2019	1	Received by Rhithron 7/19
1	PCNC	126779	07-12-2019	1	Received by Rhithron 7/19
1	FCSP	008335	07-15-2019	1	
1	WAGC	021003	07-16-2019	1	
1	TROT	016107	07-17-2019	1	
1	RICI	027899	07-18-2019	1	
1	MRSH	014331	07-22-2019	1	
1	HIGG	129204	07-23-2019	1	
1	ASHT	086408	07-24-2019	1	
1	LBWM	046555	07-25-2019	1	
1	NCCW	115979	07-25-2019	1	
1	NCCW-Side Channel	115979	07-26-2019	1	
1	CRYL	109051	07-03-2019	2	Received by Rhithron 7/19
1	TBRD	025099	07-30-2019	1	
1	MCGV	010228	07-31-2019	1	
1	TRFT	063252	07-31-2019	2	Only 5 ft^2 collected
1	DOUG	087176	08-01-2019	1	
1	JICR	002596	08-06-2019	1	
1	LARI	098875	08-12-2019	1	
1	WDRD	015355	08-13-2019	1	
1	ELWL	024971	08-14-2019	1	
1	WDOP	031259	08-15-2019	1	
1	NCCW-DUP	115979D	08-19-2019	2	
1	JRDN	005780	08-20-2019	1	
1	JRDN-DUP	005780	08-20-2019	1	
1	BNSN	002948	08-21-2019	1	
1	OLNY	013455	08-22-2019	2	
1	ELWL	024971	08-26-2019	1	
1	WALR	072267	08-27-2019	1	
1	BLDR	031252	08-28-2019	1	
1	CNYN	007700	08-29-2019	1	
1	SQCR	008180	09-04-2019	1	
1	JRDN-DUP	005780D	09-05-2019	1	
1	WALR-DUP	072267D	09-13-2019	1	

CHAIN OF CUSTODY RECORD											
Relinquished By:	Received By:	Yr		Mo		Day		Hr		Min	