Quality Assurance Project Plan

Monitoring Fecal Coliform Bacteria in Western Washington Water Bodies

Appendix B3: Southwest Regional Office Sampling Sites for 2019 and 2020

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For the:

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DEPARTMENT OF ECOLOGY
State of Washington

Quality Assurance Project Plan

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Appendix B3:

Southwest Regional Office Sampling Sites for 2019 and 2020

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Acronyms:

WQP SWRO	Water Quality Program Southwest Regional Office
HQ	Department of Ecology Headquarters
EAP	Environmental Assessment Program

Purpose and Scope

This appendix is part of the Quality Assurance Project Plan Monitoring Fecal Coliform Bacteria in Western Washington Water Bodies (Ecology, 2014). This plan describes ongoing efforts of Ecology's Southwest Regional Office (SWRO) water quality inspectors to conduct source identification, short-term ambient water quality monitoring efforts and complaint investigations to meet current needs. It presents sites SWRO staff sampled in 2019 and proposes to sample during 2020. The sites listed are part of short-term ambient monitoring efforts to identify sources that are causing dry or wet weather exceedances. The data collected will be used by water quality inspectors to identify specific stream segments staff should focus on for further investigation. Additional samples will be taken throughout the year as part of the nonpoint team's source identification process and complaint response efforts.

The majority of samples collected will be bacteria samples. Ecology has changed its bacteria indicator from fecal coliform to Escherichia coli (E.coli) in the state water quality standards to more accurately protect against waterborne diseases. This sampling effort will include both fecal coliform bacteria and E. coli for water quality samples taken in targeted watersheds. Watersheds such as the East Fork Lewis River had previous watershed assessment data collected based on fecal coliform. Conducting paired sampling in the East Fork Lewis River will allow comparison of current sampling efforts with prior impairments based on fecal coliform results and establish a baseline for further E. coli sampling.

All short-term ambient water quality samples collected will be recorded into Ecology Information Management (EIM) database per [Water Quality Program Policy 2-01]. During the investigation process, if additional field samples are required such as turbidity or total suspended solids (TSS), staff will follow the Standard Operating Procedures developed by the Water Quality Program.

Source identification process

Ten percent of the budget has been set aside for unscheduled sampling needs. Monitoring for this objective will focus on identifying sources of pollution and be conducted as needed. Site locations will be identified through results from routine sampling locations and nonpoint field assessments. These could also include intermittent flows (such as ditches and drains) that typically do not carry water, but are discharging into the waterbody due to increased rain or other factors. Source identification samples may be analyzed for bacteria, turbidity, or other parameters.

Ambient sampling schedule

East Fork Lewis River

Sampling conducted by Southwest Regional Office Nonpoint and Water Quality Monitoring staff, will occur every two weeks starting in May 2020 for the sites identified in Table B3-2, which lists the monitoring locations for the East Fork Lewis River. The following staff will be sampling the East Fork Lewis River: Molly Gleason, Jennifer Riedmayer and Shawn Ultican.

Stearns Creek

In the Stearns Creek watershed, investigative sampling events were conducted in 2019. Ongoing monthly water quality sampling is conducted by the Confederated Tribes of the Chehalis. Based on those results, if exceedances occur the nonpoint team will conduct additional sampling at the locations identified in Table B3-1 in 2020.

Complaint response

Based on complaints and other water quality data shared with the Southwest Regional Nonpoint staff, investigative water quality samples will be taken as needed throughout 2020. Based on site location and historical data collected, staff will determine if additional paired sampling is needed. The estimated costs associated with these efforts are shown in Table B3-4. The schedule and frequency is subject to change based on funding, the availability of resources and agency policy decisions.

Quality objectives for E. Coli sampling

Water quality criteria for bacteria samples assessed in this study.

Parameter	Criteria
Bacteria	E. Coli organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL

Data quality objectives

The main data quality objective (DQO) for this study is to collect data of sufficient quality for identifying sources of exceedance for bacteria in the watershed identified in this appendix. This object will be met by using standard methods that meet the measurement quality objectives (MQOs) that are described below and that are comparable to previous study results.

Measurement quality objectives

MQOs are performance or acceptance criteria for data quality indicators including precision, bias, sensitivity, representativeness, comparability, and completeness. Field measurements and laboratory analyses both have inherent data variability and as such, MQOs are equally important for both methods. For a measurement of data accuracy, precision and bias are addressed.

MQOs for lab parameter for E. Coli

Parameter	Analytical Method	Precision: Lab Duplicates (RPD)	Precision: Field Duplicates (median)[b]	Bias (% recovery): Matrix Spikes or SRMs	Bias (% recovery): Lab Control Samples	Bias (% recovery): Calibration Standards/ Blanks	Bias (% recovery) : Method Blank Limit	Sensitivity: Method Lower Reporting Limit[a]
E. Coli - MF	SM9222G	40%	Footnote a	n/a	n/a	n/a	<MDL	1.8 cfu/ 100 mL

a 50% of replicate pairs < 20% RSD, and 90% of replicate pairs <50% RSD

Field Procedures for E. Coli sampling

Sample containers, preservation and holding times.

Parameter	Matrix	Recommended Quantity	Container	HoldingTime	Preservative
E. Coli	Water	250 mL, 500 for QC	250 mL glass/polypropylene autoclaved bottle 5	24 hours	Fill the bottle to the shoulder; Cool to ≤10°C

Quality Control samples, type and frequency.

Parameter	Field Replicates	Field Blanks	Lab Check Standards	Lab Method Blanks	Lab Analytical Duplicates	Lab Matrix Spikes
E. Coli	10%	n/a	n/a	n/a	1/batch	n/a

SWRO Watersheds & Sites Chosen for FC & E. Coli Sampling 2020

Stearns Creek Watershed Map

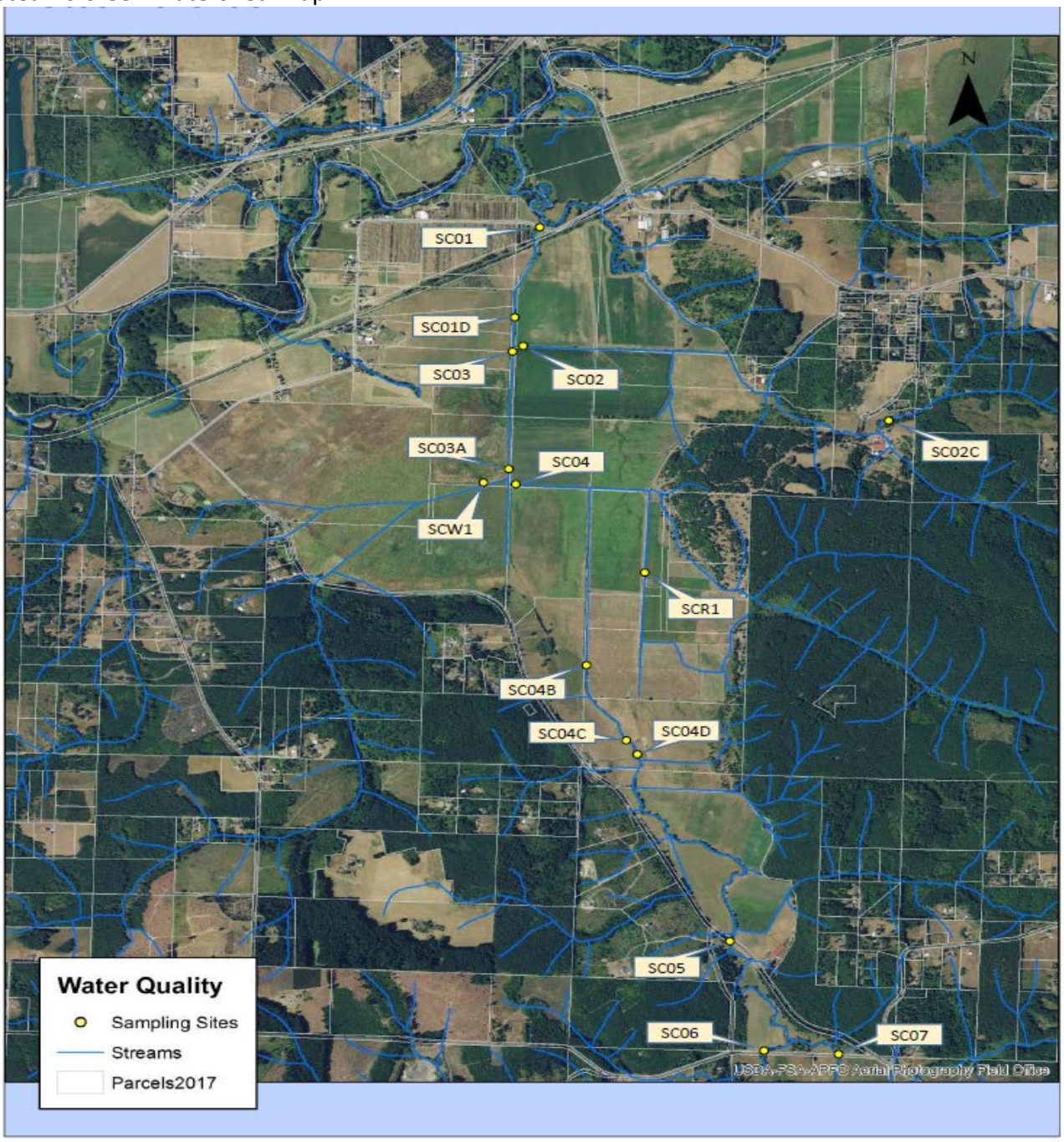

Figure B3-1 Sites on Stearns Creek, a tributary to the Chehalis River. These sites will be sampled during dry seasons to determine causes of high bacteria counts shown in previous monitoring data.

Stearns Creek Sampling Sites

#	Site ID	Description	Latitude	Longitude	RM	Status
1	SC01	Twin Oaks Road Bridge	46.63314	-123.01726	.70	Add
2	SC01D	Howell property, section of flowing water below beaver dam.	46.62859	-123.01881	.90	Add
3	SC02	East tributary on Young property. Access from field north of stream. Sample flowing water below beaver dam.	46.62711	-123.01814	1.1	Add
4	SC02C	Tributary east of Nix home, flow from across Nix Rd, south of 189 Nix Rd. Access in pasture behind barn.	46.62412	-122.99415	1.20	Add
5	SC02D	Upstream SC02C, at fence line entering Nix property.	46.62406	-122.99253	1.17	Add
6	SC03	Main channel, upstream confluence with SC02 tributary. Immediately beaver dam, above SC01E	46.62690	-123.01874	1.57	Add
7	SC04	Main channel, upstream concrete bridge on Young property.	46.61985	-123.01844	1.55	Add
8	SCR1	Tributary to east, upstream culvert, upstream of SC04. On Nix property, within “railroad easement.”	46.61515	-123.00968	.34	Add
9	SC04B	Main channel, in section of flowing water. (Robert Nix)	46.61111	-123.01319	2.36	Add
10	SC04C	Main channel, just downstream of pit toilet outhouses. (Fletcher Anderson)	46.60648	-123.01004	2.75	Add
11	SC04D	Main channel, downstream covered bridge in section of flowing water.	46.60594	-123.00982	2.85	Add
12	SC05	Pleasant Valley Road Bridge	46.59639	-123.00310	3.08	Add
13	SC06	West tributary, culvert under Brown Rd. W	46.59076	-123.00075	3.70	Add
14	SC07	Eastern tributary, bridge at Brown Rd. W	46.59074	-122.99599	3.76	Add

Table B3-1. Sampling Stations for Stearns Creek, Lewis County, WA

East Fork Lewis River Water Quality Map

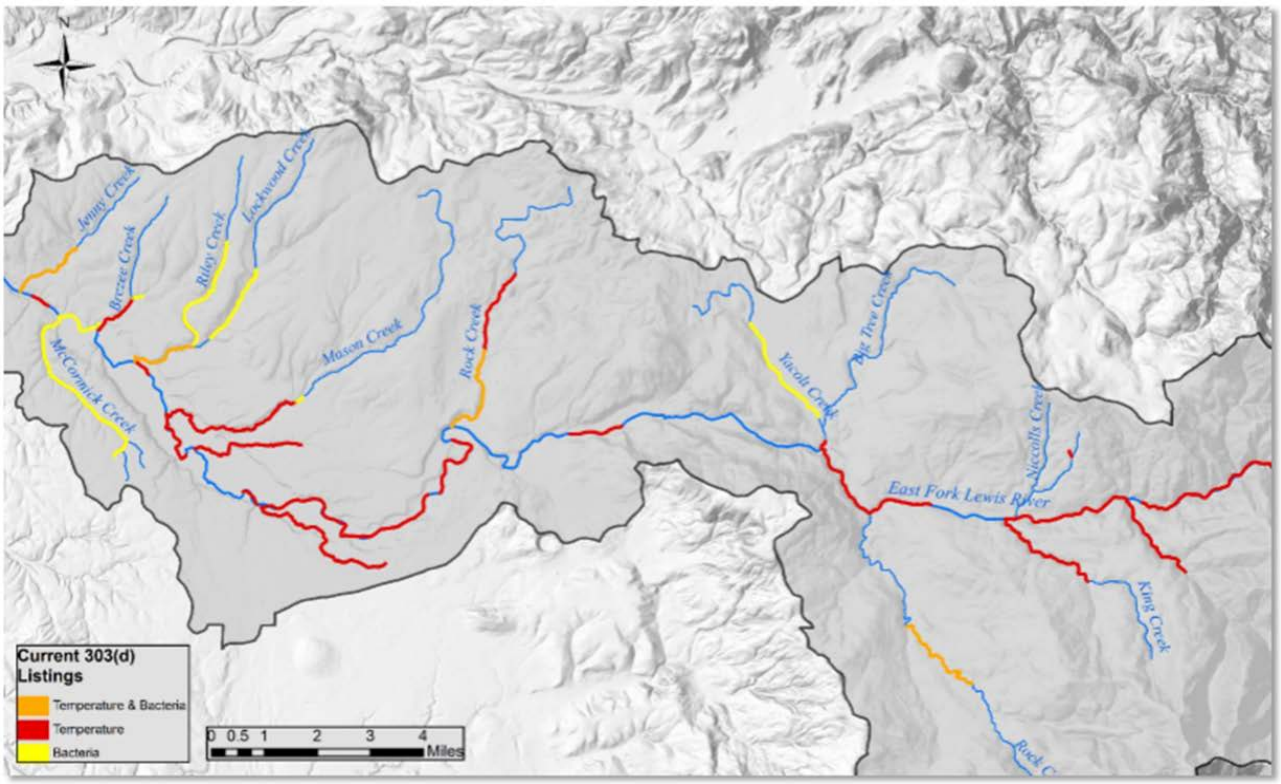

Figure B3-2. Map showing the East Fork Lewis River and tributaries. Highlighted sections are listed as impaired under section 303(d) of the Clean Water Act. This project will use bracket sampling to identify potential sources of pollution. During sampling events, if a new source is identified staff will take samples to identify the source of pollution. The nonpoint staff will use this data to identify a path forward for correction.

East Fork Lewis River Watershed Map

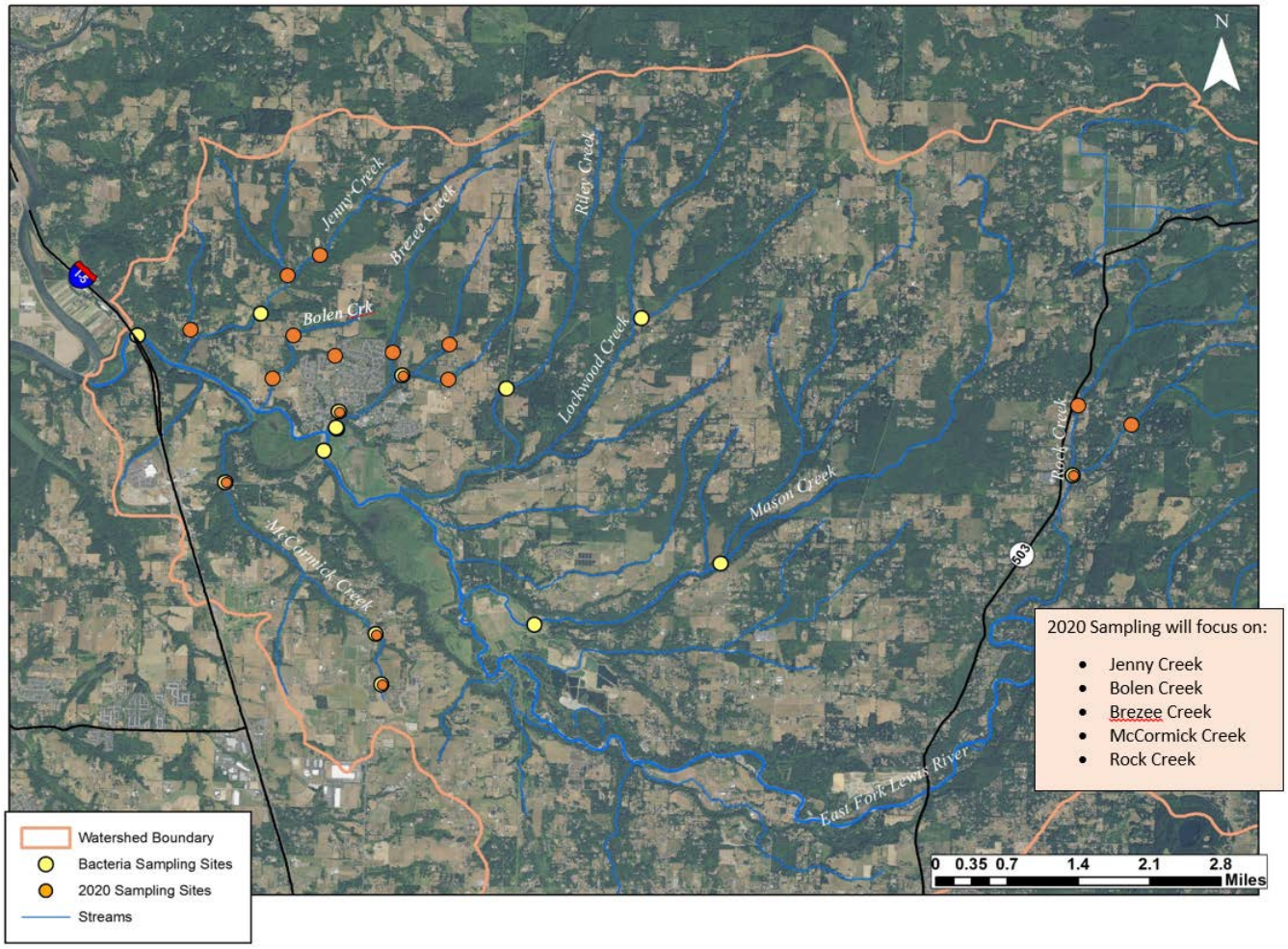

Figure B3-3. Map showing the location of sampling stations listed in Table B3-2 on the following page. Note that some stations were established for the previous Source Assessments, and others are new locations. Sampling sites may be changed during the project depending on site access, safety concerns, or stream flow conditions.

East Fork Lewis River Sampling Sites

#	Site ID	Description	Latitude	Longitude	RM	Status
1	BCK-1.02	Bolen Creek – Upstream culvert on Aspen Ave	45.87094	-122.67037	1.02	Add
2	BCK-0.37	Bolen Creek – Upstream culvert, NW Pacific Hwy	45.86740	-122.68315	.37	Add
3	BCK-0.46	Bolen Creek – Culvert at driveway to 34901 NW 9th Ave (Vermillion Res)	45.87382	-122.67891	.46	Add
4	RCN-1.87	Rock Creek North – near 14710 NE 319th St, Dead End, E of 503	45.85339	-122.52084	1.87	Continue
5	RCN-2.36	Downstream bridge, near 32809 NE Sako Dr (West Fork)	45.85976	-122.51928	2.36	Add
6	RCN-2.78	NE 159th Ave, Gate Code #4715 (Dallimore) @ bridge (East Fork)	45.86395	-122.50810	2.78	Add
7	McC-1.18	McCormick Creek - La Center Rd, upstream culverts @ sewer stn	45.85192	-122.69197	1.18	Continue
8	McC-3.4	NE 289TH ST, upstream culvert, near #1200	45.83052	-122.66045	3.4	Continue
9	McC-Trib2	NE 279th St, upstream culvert, east of #1019 279th	45.82313	-122.65897	3.96	Add
10	BRZ-SW2	Stormwater, downstream path below La Center WWTP	45.86118	-122.67072	.118	Continue
11	BRZ–5th	Brezee Crk- upstream culvert, west of 105 W 5th	45.86315	-122.67204	.351	Add
12	BRZ-14th	Branch of Breeze Creek at 14th, upstream culvert	45.86815	-122.65651	.411	Add
13	BRZ-Mid	NE 23rd Ave, upstream culvert, near #34717 (Middle trib)	45.87279	-122.64727	1.56	Add
14	BRZ-East	NE 23rd Ave, upstream culvert, near #34110 (East trib)	45.87279	-122.64717	1.73	Add
15	JEN-1.03	Jenny Creek at NW 14th Ave, upstream culvert, near 354th St	45.876595	-122.685656	1.03	Continue
16	JEN-1.48	culvert at #818 NW 359th	45.88069	-122.680611	1.48	Add
17	JEN-2.8	Jenny Creek Rd, downstream driveway #36601/36525	45.88529	-122.67412	2.8	Add

Table B3-2. Table B3-2 Sampling Stations in East Fork Lewis River, Clark County, WA

Budget

Table B3-3 shows the estimated number of samples that will be collected for the short-term ambient monitoring locations for the East Fork Lewis River and the approximate laboratory budget associated with their analysis.

East Fork Lewis River Sampling Budget

Month	Total No. Samples	Field Replicates[1]	Events Per Month	FC (MF) & E. Coli Sampling Cost[2]
June	38	2	2	$1,596
July	57	6	3	$2,394
August	38	4	2	$1,596
September	38	4	2	$1,596
Totals	209	18	11	$8,778

Table B3-3. Estimated number of ambient samples for the East Fork Lewis River Source Identification and estimated budget for 2020.

FC = fecal coliform, MF = membrane filtered
Field Replicates[1] = 10% of field sample number. The total number of field replicates is included in the total number of samples.
Lab Replicates = 5% of field sample number
Cost[2] = estimated cost assumes $42 / sample covered by SWRO WQP funding

Note*:* The schedule and frequency of sampling is subject to change based on funding, the availability of resources and agency policy decisions.

The budget shown below in Table B3-4 is for analysis of bacteria samples taken for complaint response efforts. The budget is based on average monthly sampling conducted by the Southwest Regional Office Watershed Resources Unit nonpoint staff. All samples collected will be sent to Ecology's Manchester Environmental Laboratory in Port Orchard, WA.

Costs associated with collection and analysis of all 2020 samples will be covered by SWRO Water Quality Program funds.

Complaint response sampling budget

Month	Complaint Response Samples	Cost ($)
January	0	$0
February	0	$0
March	0	$0
April	0	$0
May	0	$0
June	17	$714
July	17	$714
August	17	$714
September	17	$714
October	18	$756
November	17	$714
December	17	$714
Totals	120	$5,040

Table B3-4. Estimated number of monthly complaint response samples collected by SWRO staff for analysis of FC / MF and E. Coli analysis in the Southwest Regional Office watersheds. Below is an approximate analytical costs in 2020.

FC = fecal coliform
MF = membrane filtered
Cost = estimated cost assumes $42 / sample covered by WQP funds