Sampling and Analysis Plan

Volunteer Water Quality Monitoring

DEQ25-VOL-0020-SAP

NCWA Bacteria, Conductivity, & Flow Monitoring

March 2025

State of Oregon
DEQ Department of Environmental Quality

This document was prepared by
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Version 1.0
Last updated: March 2025

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Project approvals

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Approved by:

_____ **Date:** _____
Dan Brown, Acting DEQ Volunteer Monitoring Coordinator

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1. Project Management

1.1. Distribution List

The following personnel will be emailed regarding all aspects of this sampling and analysis plan (SAP). Deviations from this SAP must be communicated in writing (email is acceptable) to all individuals identified in Table 1. Final reports from the DEQ Laboratory will be emailed and mailed to the project manager, regional monitoring coordinator and laboratory monitoring coordinator/data manager.

Table 1 Distribution List

Name	Phone	Email
Nick Haxton-Evans, DEQ Volunteer Monitoring Program Coordinator	971-806-2462	nick.haxton-evans@deq.oregon.gov
Ben Hamilton, DEQ Field QAO	503-839-6551	benjamin.t.hamilton@deq.oregon.gov
Kelli Daffron, NCWA Project Manager	503-468-0408	ncwaprograms@gmail.com
Graham Klag, NCWA Executive Director	503-468-0408	northcoastwatershedcouncils@gmail.com

1.2. Project/task organization

Sampling Organization(s): North Coast Watershed Association (NCWA)

Analytical Organization: In-house laboratory space at Clatsop Community College
Columbia Hall
1651 Lexington Avenue,
Astoria, OR 97103
Contact Julia Mabry: (503) 338-2415

1.3. Problem definition/background

In 2021 the Clatsop County Water Knowledge Exchange Program was created as a coordinated effort between local water quality monitoring entities, OSU SeaGrant, Clatsop County, and the Association of Oregon Counties. Organizers with SeaGrant reported in January of 2024 during a Clatsop County Working Group meeting that the county suffers from a lack of water quality and quantity data. The NCWA serves 4 of the 7 significant watersheds of Clatsop County, including the Nicolai-Wikiup, Youngs Bay, Skipanon, and Ecola watersheds. Maintaining the quality and quantity of our water is vital to supporting the fishing, logging, brewing, and recreational industries that Clatsop County offers, as well as the unquantifiable environmental benefits for all creatures including humans. This project is a step towards improving and increasing water quality data in Clatsop County.

The river systems of the NCWA's service area host threatened salmonid species including Oregon Coastal and Lower Columbia River chum, chinook, coho, and steelhead. They flow through industrial, state, and county timber lands, small farms, and residential areas which affect sedimentation, nutrient loads, bacteria inputs, and water levels. The John Day River, a bacteria monitoring site, hosts a smattering of house boats and a neighborhood on septic as well as the aforementioned salmon species. The lower portions of the Lewis & Clark

River, Bear Creek, Klaskanine River, Hillcrest Creek, John Day River, and Ferris Creek have been targeted as high priority chum salmon habitat through NCWA's Return of the Redds project. Short Sand Creek, along with Ecola and Logan Creeks, provide key habitat for Coastal salmon species mentioned. Short Sand Creek lies adjacent to a beach trail and is just meters downhill from pit toilets which pose a potential risk to fecal bacteria contamination, particularly during high-use summer months. In Cannon Beach where marine bacterial testing is conducted by the Oregon Department of Human Services several no-swim advisories have been issued, including twice during 2019, due to high E. coli levels and indicate potential issues with human fecal bacteria contamination coming into Logan Creek and/or Ecola Creek. These sites are not currently consistently monitored for bacterial contamination.

The results of this monitoring and analysis will be submitted to DEQ and shared with partners including the Cities of Astoria and Warrenton, Clatsop County, Oregon Department of Fish and Wildlife (ODFW), and the public via NCWA's website. It is our hope that flow data will inform decisions about the maintenance and/or expansion of water infrastructure by the Cities and ODFW; and that bacteria data will help our partners at Community Action Team (CAT) to assist homeowners with damaged or failing septic systems to access DEQ loans to improve them. Trends determined in our temperature data analysis will be used to determine which sites need continued monitoring and which sites don't, as well as where restoration efforts would be most effective with regard to temperature. All data from this project will serve as important baseline data as communities and climates continue to change, for the NCWA, its partners, and the public.

Flow

This monitoring aims to determine summer baseline flow conditions in the NNF Klaskanine River, Bear Creek, and the Lewis and Clark River, all of which have water intake dams. The latter two systems are the highest stream flow restoration priority systems in the Lower Columbia River region for ODFW, the Klaskanine River is a moderate priority. Water level data is used in comprehensive hydrologic models that generate conveyance curves for projects and serve as key reference points for development and adaptation of water management plans.

E. coli/Total coliforms

This project also aims to determine summer E. coli and total coliform levels (sometimes referred to in this document as bacteria or fecal bacteria) at 13 sites throughout the Youngs Bay, Skipanon, Nicolai-Wickiup, and Ecola Creek watersheds in places where sewage and/or livestock inputs have the potential to cause harm to the ecosystem. The Skipanon River, Lewis & Clark River, and Youngs Bay (the receiving body of the Klaskanine River) are 303(d) listed impaired for bacteria, whose growth can be impacted by salinity/conductivity. Bacteria data can provide baseline information where septic and/or livestock restoration activities take place and can indicate where these activities would be most useful.

Conductivity

Conductivity will also be measured at bacteria monitoring sites, opportunistically providing more baseline data that can be used for farm or water management planning and provide context for bacterial communities.

1.4. Project/task description

Flow Monitoring: the NCWA will securely place two HOBO U20 barometric pressure meters (one submerged and one nearby in the air) at each of three flow monitoring sites by June. These will collect continuous

pressure data throughout the summer. NCWA staff and trained volunteers will subsequently visit each site monthly to take discreet flow measurements using the FlowTracker 2; this discreet data will be used to determine a rating curve at each site. Staff at ODFW and OWRD will work with NCWA staff to calculate rating curves. Pressure meters will be collected by November, data downloaded and used in conjunction with FlowTracker data to approximate flows at each site throughout the summer. Summaries of flows at each site will be shared with partners and the public and can be compared to water take statistics collected by cities and ODFW.

Flow sites will be set to the best of the organization's ability and with the advice of the Oregon Water Resources Department (OWRD) water master, who visited the 3 sites in July of 2024 with the NCWA Project Manager. The hydrology above the Lewis and Clark River dam is particularly complex, a small tributary joins the main stem at the point where the river forms a backwater which serves as the City of Warrenton's summer drinking water source. This tributary's contribution to the quantity of the Lewis and Clark River will be difficult to determine; per the advice of OWRD staff we will attempt to measure this tributary's discreet flow separately during site visits; its flow was less than 1" deep during the July 2024 site visit.

Bacteria Monitoring: every 2 weeks from May-October NCWA staff and/or volunteers will collect a water sample from each of 13 sites to be tested for fecal bacteria; collection protocols in the DEQ Volunteer Water Quality Monitoring QAPP version 3.0 will be followed. Sites are determined by hydrological proximity to inputs from septic systems, public restroom facilities, and livestock. Conductivity will be tested at the moment of collection or in the lab, depending on equipment availability. Bacteria samples will be tested using IDEXX disposables and equipment in a lab at Clatsop Community College, following protocols specified by IDEXX and with guidance from the Tillamook Estuaries Partnership (TEP) which has a robust bacteria sampling program using the same equipment.

Bacteria data will be entered into Excel and shared with partners at CAT every 2 months (June, August, October) and shared publicly on the NCWA's website by December of the collection year. Data will be compared to DEQ standards for safety.

Conductivity will be measured using a YSI Meter borrowed from DEQ and reported in microsiemens/cm (µs/cm).

Table 2 NCWA Water Quality Monitoring Expansion Project Gantt Chart

Tasks to be completed	Months for years 2025 - 2026											
	1	2	3	4	5	6	7	8	9	10	11	12
Sampling planning and revision	x	x	x									
Equipment calibration and purchasing	x	x	x	x								
Continuous pressure data collection, monthly discreet flow measurement, and biweekly bacteria & conductivity monitoring					x	x	x	x	x	x		
Temperature data trend analysis		x	x	x	x	x	x	x	x	x	x	x
Bacteria & Conductivity data entry and sharing					x	x	x	x	x	x		
Flow data entry and rating curve honing with OWRD and ODFW					x	x	x	x	x	x	x	
Flow data analysis and sharing	x	x										
Volunteer recruitment and training	x	x	x	x	x	x	x	x	x			

1.5. Quality objectives and criteria

This monitoring is intended to capture summer flows and bacteria levels in locations where restoration actions could mitigate any findings that are not ideal. Conductivity data will supplement bacteria data in areas that are tidal.

Discreet discharge data will be collected at each site once a month as a minimum threshold for calculation of a rating curve per the guidance of ODFW and OWRD staff, as well as protocols outlined in the Coos Watershed Association's Water Quality QAPP. Data that does not meet the typical standards outlined by these partners' documents will be notated as such when reporting to DEQ per the Volunteer Monitoring QAPP section 2.9. HOBO U20 pressure transducer loggers meet EPA accuracy standards for depths up to 30', and during monthly site visits the depth of water at the precise location of the submerged logger will be recorded and used to correlate measured depth with recorded pressure at each site using HOBO Pro software.

Bacteria and conductivity data quality will be determined using DEQ's Data Quality Matrix version 5.0 with the intention of attaining 'A' level data.

1.6. Training Requirements and Certification

The NCWA Project Manager will communicate with and abide by Oregon DEQ's standards for Volunteer Water Quality Monitoring and has received training from this program's Coordinator, Nick Haxton-Evans.

Volunteers will be trained in the field by the NCWA Project Manager and will receive a printed Standard Operating Procedure (SOP) for bacteria monitoring. The SOP will be developed by the Project Manager and will be modeled after neighboring Tillamook Estuaries Partnership's (TEP's) volunteer bacteria monitoring protocol. Training will occur at specific site(s) where volunteers will be taking E. coli/total coliform samples. Materials including sample jars, a cooler, and data sheets will be provided to volunteers. If a volunteer is sampling concurrently with the Project Manager, volunteers will take additional sample(s) of water to be tested for conductivity in the lab for lack of multiple YSI Meters.

1.7. Documentation and Records

Approved copies of this SAP will be distributed to those listed in Table 1 by the DEQ QAO.

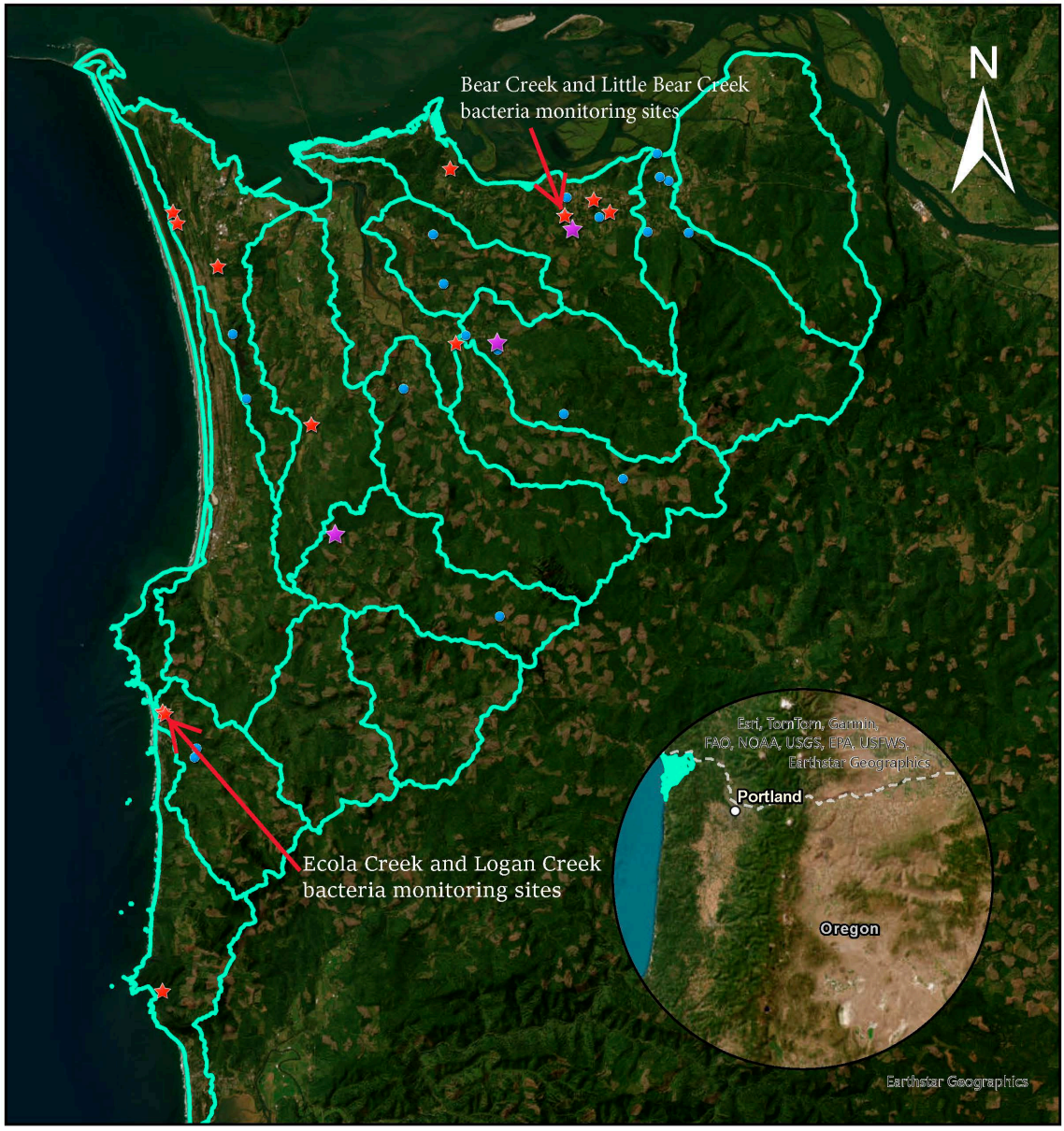
In order to assure data quality over time, groups will follow the Document Retention Policy outlined in the DEQ Volunteer Monitoring QAPP for all documents relevant to their study. Key documents of that policy are listed in Table 3.

Table 3 Controlled Documents

Document or Record Name and Description	Storage Location	Storage Time
DEQ Quality Assurance Project Plan (QAPP) (v.3.0)- DEQ04-LAB-0047-QAPP project description and assurance procedures.	DEQ Internet Page	10 years
NCWA Water Quality Expansion Sample and Analysis Plan- specific sampling information for each groups activities.	DEQ Laboratory and NCWA office	10 years
DEQ Laboratory Mode of Operations Manual- Methods manual	NCWA office	10 years
Equipment records - records of quality control checks, calibrations and maintenance.	DEQ equipment case, NCWA Dropbox	10 years

Document or Record Name and Description	Storage Location	Storage Time
Field Data or Chain of Custody Sheets/Electronic Files – Field forms containing sampling meta data and raw field data.	NCWA office and Dropbox	10 years

Figure 1. Map of NCWA Bacteria and Flow sites



Legend

Locations of NCWA Water Monitoring Sites

- Bacteria Sites/Conductivity Sites
- Flow Sites
- Temperature Sites (2022 SAP)
- NCWA & NWC Watersheds

0 3 6 12 Miles

All Flow monitoring sites overlap with Temperature monitoring sites. Bacteria monitoring sites at confluences may appear as one site for scale.
Credit: North Coast Watershed Association

2. Data Generation and Acquisition

2.1. Sampling Process Design

Sampling design, collection, methods and handling will be managed by the sampling organization identified in section 1.2. The sampling organization will ensure that all samples will be collected in the appropriate sample containers, preserved as identified in the appropriate reference methods, and transported to the analytical organization within the appropriate sample holding times, with the appropriate documentation, and under the appropriate sample transport conditions. Analytical laboratories assume no responsibility for the quality of data resulting from samples that were collected, shipped, or stored under inappropriate conditions.

Flow/continuous water level will be collected on streams that have been identified as high priority flow restoration systems by ODFW and contain major diversion dams. If any new sites are added to this protocol they will meet similar criteria. Summer low flows are of the highest interest and will be the simplest to begin measuring. Discreet flow measurements coupled with continuous water levels can be used to approximate flows using a rating curve. Timing of discreet flow measurements will be determined by staff availability and weather, with the intention of assembling data from a variety of weather conditions to improve the quality of the rating curve. To determine flow rates, continuous water levels will be measured every 30 minutes using HOBO U20 pressure transducer loggers secured at each site, one submerged and one in the air nearby to measure barometric pressure. Loggers will be borrowed from DEQ and audited in accordance with DEQ's Volunteer Monitoring QAPP. HOBO Pro software takes these two data sets (water and air pressure), coupled with measured depth at deployment and retrieval, to yield a continuous summer depth measurement for each site. To determine flow, discreet discharge measurements will be taken at least monthly at each site using the Sontek FlowTracker 2. During monthly site visits HOBO loggers will be checked and a new depth measurement will be recorded for the submerged logger to help ensure accuracy of depth relevant to measured pressure. A rating curve will be calculated based on continuous depth measurements compared with discreet flow measurements using methods employed by the US Geological Survey (USGS) and with oversight from OWRD and ODFW. This data will be made available to partners and the public on the NCWA's website.

Fecal bacteria monitoring will occur in accessible areas where inputs from septic systems, public pit toilets, and/or livestock are possible. Any new sites will satisfy similar criteria. Summer sampling for fecal bacteria will minimize inputs brought into streams by rainwater, will reflect higher concentrations during lower flows, and is timely for when most people might be swimming. As such, sampling events will not occur within 24hrs of ≥3mm of rain unless rain is consistent and would push sampling outside of the timing window (every other week). Access to the private site at North Leinenweber Lake may be affected if the homeowners move. Bacterial levels will be determined by grab samples using IDEXX Colilert-18 disposables which yield a Geometric Mean per 100mL, the threshold value for sites to meet is set by Oregon DEQ at ≤126 cfu/100mL to be considered safe for freshwater human exposure. Colilert-18 detects E. coli and total coliforms at 1 organism per 100mL and is EPA approved for ambient water testing. Duplicate water samples will be collected at 10% of sites within 10 feet and 10 minutes of the original sample as a method of Quality Control (QC). This QC data will be recorded and shared with regular data. Samples will be collected and transported per DEQ's Volunteer Monitoring QAPP to the lab at Clatsop Community College in Astoria where trained NCWA staff and/or volunteers will perform the analysis.

Conductivity monitoring is set to take place alongside bacteria monitoring as a compliment to this parameter and an opportunity to collect more consistent baseline data for the NCWA's service area. Conductivity measurements will be recorded at 13 bacteria monitoring sites using a YSI Meter borrowed and audited by Oregon DEQ. Results will be shared annually with DEQ.

The locations to be sampled are summarized in Table 4.

Table 4 Summary of the sampling locations

DEQ Station ID *	Latitude/Longitude	Station Description	Parameters
23975	46.09022, -123.716	NNF Klaskanine above Hatchery	Flow
39472	45.99338, -123.834	Lewis & Clark at ODFW Fish Ladder	Flow
	46.11245, -123.632	Bear Creek above dam	Flow (option)
26122	46.14737, -123.66142	Bear Creek at Svensen Market Rd	Flow (option)
	46.156059 -123.634393	Ferris Creek at Savola Rd	Bacteria, Conductivity
	46.16219 -123.646165	Hillcrest Creek at Old Hwy 30	Bacteria, Conductivity
26121	46.154237 -123.667337	Little Bear at Maki Road	Bacteria, Conductivity
	46.154217 -123.667108	Bear Creek above Little Bear confluence	Bacteria, Conductivity
	46.177824 -123.750525	John Day River at Boat Ramp	Bacteria, Conductivity
	46.128587 -123.919643	Skipanon River at Perkins Rd	Bacteria, Conductivity
41458	46.048640 -123.851560	Lewis and Clark River .8 miles S of Melville	Bacteria, Conductivity
	46.089727 -123.746362	SF Klaskanine at Olney Cutoff Rd	Bacteria, Conductivity
	46.155798, -123.952289	North Leinenweber Lake	Bacteria, Conductivity
	46.150435 -123.94918	South Leinenweber Lake	Bacteria, Conductivity
	45.903534 -123.959854	Logan Creek at Les Shirley Park	Bacteria, Conductivity
	45.9023 -123.957883	Ecola Creek at Fir Street Bridge	Bacteria, Conductivity
	45.761674 -123.960004	Short Sand Creek at Beach Trail	Bacteria, Conductivity

*If a Station ID number is not available during QAPP/SAP development, the DEQ Laboratory will generate the unique identifier prior to data processing.

2.2. Sampling methods

Flow

- Measurement of discreet discharge utilizing methods outlined in Sontek's FlowTracker 2 User's Manual v1.6 will occur at a point on a system that is wadable and best meets guidelines in the EPA's Best Practices for Continuous Monitoring of Temperature and Flow in Wadeable Streams (September, 2014).

- The FlowTracker device will be audited and maintained in accordance with the manufacturer's instructions.
- HOBO pressure loggers will be secured submerged in a protective cinder block secured in the talweg of the stream where continuous flow is anticipated throughout the summer. Loggers for barometric pressure will be secured in a nearby tree, hidden to avoid tampering.
    - Logger's will be placed using guidance from the EPA's Best Practices for Continuous Monitoring of Temperature and Flow in Wadeable Streams but for conducting an elevation survey, which is intended to better track movement of equipment in the field. To mitigate for not conducting an elevation survey, logger locations will be tracked monthly during discharge measurement visits using GIS equipment, multiple photos from various angles to reference at each site visit, and extra care taken to secure loggers.
- Loggers will record pressure readings every 30 minutes.

Bacteria

- Samples will be collected in sterile plastic disposable containers purchased through IDEXX.
- Samples will be collected in accordance with specifications outlined in Section 2.3 of the Volunteer Monitoring Program QAPP.
- Because the containers holding samples are disposable, decontamination is not necessary. Lab equipment will be cleaned using antibacterial spray before and after use.

Conductivity

- When possible this will be measured at the site in accordance with DEQ's MOMs version 4.0 but when equipment limitations make it necessary to take a sample, it will be taken in a clean sample jar rinsed with distilled water.

YSI Meter is borrowed from DEQ and will be audited and maintained in accordance with their standards.

2.3. Sample handling and custody

Table 5 Summary of sampling parameters

Sample Type	Container	Preservation	Holding Time
Escheria coli and total coliforms	Sterile bottle; 120 mL	Refrigerate on ice at 4^{o} C	8 hours
Conductivity	In-stream or clean sampling container; 250 mL	Refrigerate on ice at 4^{o} C	28 days

Continuous water level loggers will be placed by early June and collected by the end of October, up to 6 months of continuous data will be downloaded after the loggers are collected. Deployment parameters including logger depth, maximum depth (the depth of the stream at the deepest point near the logger, likely where the logger will be), GPS location, a photo, date, and time will be recorded into a form created in Survey123. Depth of the submerged logger at each site will be recorded during monthly flow measurements and recorded with flow data.

Discreet flow measurements will be taken monthly at the 3 sites where water level loggers are deployed. The timing of monthly visits will be determined based on staff availability and weather, with the intention of assembling data from a variety of weather conditions to improve the quality of the rating curve. These measurements will be recorded using the Sontek FlowTracker 2 device. Data from these monthly visits will be recorded in the device, and metrics including recent weather conditions, GPS location, date, time, and flow rate will be recorded into a Survey123 form.

Bacteria sampling sites will be assigned a number which will be used with the date of sampling as the identifier for each sample (e.g. site#-4-4-2025); if additional samples are taken at a site a '2' will be added to the end of the identifier. This identifier, GPS location, site name, sampler's name, the date and time will be recorded during each sampling event using Survey123. For volunteers who want a paper data sheet, one will be provided.

Conductivity will be measured at all bacteria sites and will be entered into the same data sheet. If a sample is taken to the lab due to equipment availability, the site's number will be written on the jar so that the lab can test and correctly match the measurement taken into the corresponding data sheet.

2.4. Analytical methods

Water levels will be continuously monitored by HOBO U20 loggers borrowed from DEQ and maintained in accordance with their standards. Two loggers placed at each of 3 sites will simultaneously measure air and water barometric pressure which can be converted to a water level using real-time measurements in HOBO Pro software.

Discreet discharge measurements will be taken at each of the 3 flow monitoring sites monthly during the deployment of the loggers from June-October using the Sontek FlowTracker 2. The date and time of each discharge measurement will be recorded into a Survey123 form and used to develop a rating curve for each site to approximate flow throughout the summer. Calculation of rating curves and approximate discharges/flows relative to water levels will be calculated using the EPA's Best Practices for Continuous Monitoring of Temperature and Flow in Wadeable Streams (September, 2014) and with guidance from OWRD and ODFW.

The NCWA will follow the methods outlined in the IDEXX Colilert-18 protocol.

Lab Equipment Preparation:

Turn on incubator and ensure that it reaches the 35^{o}C for sample incubation. Turn on Quanti-Tray Sealer. Ensure that all samples have been received and properly collected using sterile 120mL bottles.

Sample Processing:

When all samples have been received, NCWA staff and/or trained volunteers will check samples with data sheets for accuracy and consistency. Excess water from each bottle is poured off to reach 100mL; one packet of Colilert-18 and 5 drops of Antifoam Solution are added to each bottle, the bottle is capped and shaken thoroughly until no large media particles remain then allowed to settle for a minute. A Quanti-Tray is labeled to match the sample's identification number, then the contents of the bottle are emptied into the matching tray and sealed in the sealer.

Sample Analysis:

Once all samples have been transferred into Quanti-Trays they are placed into the incubator at 35^{o}C for 18-22 hours and read using a UV lamp. Positive results for total coliforms appear magenta and fluoresce under UV light when they also contain E. coli. Small and large wells of each positive type are counted and then the Quanti-Tray MPN (Most Probable Number) Table is used to determine the MPN for fecal bacteria present in a sample.

Table 6 Summary of analytical parameters and methods

Sample Type	Parameter	Reference Method (required)
Surface water sample	E.coli/total coliforms	NEMI Method SM 9223B
Field measurement	Flow	EPA/600/R-13/17OF
Field or Lab	Specific Conductance	EPA 120.1

2.5. Quality control

During monthly discreet discharge measurements using the Sontek FlowTracker 2 NCWA staff will take a duplicate measurement at one of the 3 sites, alternating between sites each month so that each site will have at least one duplicate measurement recorded over 5 months.

Duplicate bacteria samples will be used to determine precision. NCWA staff and volunteers will take duplicate samples at 10% of sites within 10' and 10 minutes of the original sample. Sites where duplicates are taken will alternate to cover all sites throughout the sampling season. One blank sample will be taken per sampling event at a rotating site using deionized water to control for contamination of samples.

Additional readings of conductivity will be taken at sites when a second bacterial sample is taken for continuity and quality control purposes.

Any data that exceeds quality control standards in Table 8 of the DEQ Volunteer Water Quality Monitoring QAPP will be qualified as such when reported.

If data is consistently failing to meet the 'A' level data threshold then the volunteer monitoring Coordinator will be contacted to initiate corrective action.

2.6. Instrument/equipment testing, inspection, and maintenance requirements

Continuous water levels will be measured by HOBO pressure transducer loggers borrowed from DEQ, audited and maintained in accordance with the Volunteer Water Quality Monitoring QAPP Table 9 Section 2.6. The Sontek FlowTracker2 used to take discreet discharge measurements will be audited and maintained according to the instructions of the manufacturer. If equipment does not meet quality control standards this will be noted in the data sent to DEQ and other partners; this data may not be shared publicly if it is deemed to potentially give grossly inaccurate impressions of flows.

IDEXX Colilert-18 reagents will be tested with IDEXX Quanti-Cult culture to test the media at the start and end of the monitoring year. Incubator temperatures will be checked at the beginning and end of each incubation and recorded in a log book kept with the incubator along with date, time and who completed the equipment check. The Quanti-Tray Sealer and Incubator will be maintained according to Table 9 of the Volunteer Water Quality Monitoring QAPP.

Conductivity monitoring equipment will be audited annually by DEQ staff and monitoring results will be bracketed from a minimum of two tests conducted at each site, as outlined in the Volunteer Water Quality Monitoring QAPP Section 2.6.

2.7. Instrument calibration and frequency

The NCWA will follow the Instrument Calibration and Frequency table in Section 2.7 of the Volunteer Water Quality Monitoring QAPP for the Conductivity meter, as well as IDEXX and Sontek maintenance protocols.

2.8. Non-direct measurements

Not applicable.

2.9. Data management

Flow

- Continuous water level loggers' field data will be recorded into a Survey123 form created by NCWA staff. Each logger, 2 at each site, will have its own form recording GPS location of logger, site name, a photo of the logger in place, date, time, and depth (for submerged logger). Field notes will be taken on the locations and depth of the logger placement for quality control purposes.
- Each monthly site visit will have field data recorded into a Survey123 form including GPS location, site photo, site name, and the discreet discharge measurement taken in cubic feet per second (cfs). Discharge will also be recorded in a field notebook for quality control purposes.
- Data from Survey123 forms is stored on the device taking the data, on the ESRI cloud, and will be uploaded to the NCWA's Dropbox files.
- The NCWA Project Manager is responsible for taking this data and maintaining databases.
- At the end of each field day the Project Manager and/or volunteers will review data as it is transferred from ESRI to Dropbox files via an exported Excel file. This file will be checked against field notes taken and errors will be corrected using the field notes as a primary guide.
- HOBO Pro software will utilize data from both loggers from each site in conjunction with field measurements to produce continuous water level data. This can be graphed temporally against monthly cfs measurements to determine a rating curve which will be used to approximate flows throughout the loggers' deployment.
- Flow data will be submitted to DEQ as separate entities, continuous water level measurements and grab discreet discharge measurements, using the respective forms on their website.

Bacteria

- Bacteria field data will be taken on paper data sheets which record the site number (assigned by NCWA), site name, conductivity, date, time, and the site identifier composed of the number plus the date which will be written on the bottle in which that sample was taken. If multiple samples are taken at a single site both can be written on the same data sheet with a 2 added to the identifier. Data sheets will be filled out by NCWA staff and/or trained volunteers and turned in along with samples on ice to the NCWA Project Manager for analysis the day of sampling.
- The Project Manager and/or trained volunteers will record the results of the analysis on the corresponding data sheet, calculating the MPN for E. coli and total coliforms using the IDEXX Colilert-18 protocol and table.
- Data sheets with field and lab data recorded for each site will be entered into an NCWA database and backed up to Dropbox by the Project Manager who will check the data for continuity and accuracy when entering it.
- Data will be submitted to DEQ using the grab data template provided on the website.

Conductivity

- Conductivity data will be collected at each bacteria monitoring site during each visit, or a sample will be taken in a clean vessel and taken to the lab for analysis. Whether the reading is taken at the site or later in the lab will be recorded in the notes section of each site's data sheet.
- This data will be submitted to DEQ using the grab data template provided on the website.

3. Assessment and Oversight

Project assessment and oversight, including field activities, will be the responsibility of the project manager.

3.1. Assessment and response actions

The NCWA agrees to follow the Assessment and Response Actions section 3.1 of the DEQ Volunteer Water Quality Monitoring QAPP.

3.2. Reports to management

The NCWA Project Manager will assess any field and pre/post deployment audits conducted by the organization and its volunteers and communicate to members of the distribution list when data quality does not meet identified levels. The NCWA will follow the Review and Reports to Management section 3.2 of the DEQ Volunteer Water Quality Monitoring QAPP.

4. Data validation and usability

Data quality levels (DQL) will be assigned in accordance to DEQ guidance document *Data Validation and Qualification* (DEQ09-LAB-0006-QAG). Generally, only targeted DQLs of “A”, or “B” will be acceptable unless the basis for the data acceptability is approved and documented by the project manager and DEQ Volunteer Monitoring Coordinator. All data verification, validation, and assessment activities for project purposes are the responsibility of the project manager.

4.1. Data review, validation, and verification

The NCWA will follow the Data Review, Validation and Verification section 4.1 of the DEQ Volunteer Water Quality Monitoring QAPP.

4.2. Validation and verification methods

The NCWA will follow the Validation and Verification Methods section 4.2 of the DEQ Volunteer Water Quality Monitoring QAPP.

4.3. Reconciliation with data quality objectives

The NCWA will follow the Reconciliation with Date Quality Objectives section 4.3 of the DEQ Volunteer Water Quality Monitoring QAPP.

5. Revision History

Table 7 Revision History

Revision	Date	Changes	Editor
1.0	3/28/2025	Initial Document	Kelli Daffron

Figure 2 Sample Bacteria Survey Field Form

North Coast Watershed Association

Bacteria Water Quality Monitoring Program

Collector's Name:				Start time:		Processor's Name:					Reader's Name:			
Date Collected:				End time:		Date Processed:					Date Read:			
Site #	Site Name	Identifier (e.g. LC1-4-1-2025)	Time Collected	Time Processed	Time Read	Total coli. Large	Total coli. Small	Total coli. MPN	E. coli Large	E. coli Small	E. coli MPN	Conductivity (µs/cm)		Notes:
LC1	Ferris Creek at Savola Road												Lab/Field	
LC2	Hillcrest Creek at Old Hwy 30												Lab/Field	
LC3	Little Bear Creek at Maki Road												Lab/Field	
LC4	Bear Creek above Little Bear Confluence												Lab/Field	
LC5	John Day River at John Day Boat Ramp												Lab/Field	
LC6	Skipanon River at Perkins Road												Lab/Field	
YB1	Lewis & Clark River 0.8 miles S. of Melville												Lab/Field	
YB2	South Fork Klaskanine River at Olney Cutoff R												Lab/Field	
DL1	Leinenweber Lake North												Lab/Field	
DL2	Leinenweber Lake South												Lab/Field	
NC1	Logan Creek at Les Shirley Park												Lab/Field	
NC2	Ecola Creek at Fir Street Bridge												Lab/Field	
NC3	Short Sand Creek at Beach Trail												Lab/Field	
Duplicates														