Southwest Regional Office Addendum to Quality Assurance Project Plan Appendix A4

Lower Big Quilcene River Restoration Temperature Characterization Study

By

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For the

Water Quality Program

Washington State Department of Ecology
Olympia, Washington

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This is an addition to an original Quality Assurance Project Plan (QAPP). It is not a correction (erratum) to the original plan.

Data for this project is available in Ecology's EIM Database, Study ID: LBQRT_WQP

Original Quality Assurance Project Plan:
Ultican, S., J. Riedmayer, and M. Gleason. 2021. Quality Assurance Project Plan: Nonpoint Pollution Investigations in Western Washington. Publication 21-10-027. Washington State Department of Ecology, Olympia.
https://apps.ecology.wa.gov/publications/SummaryPages/2110027.html

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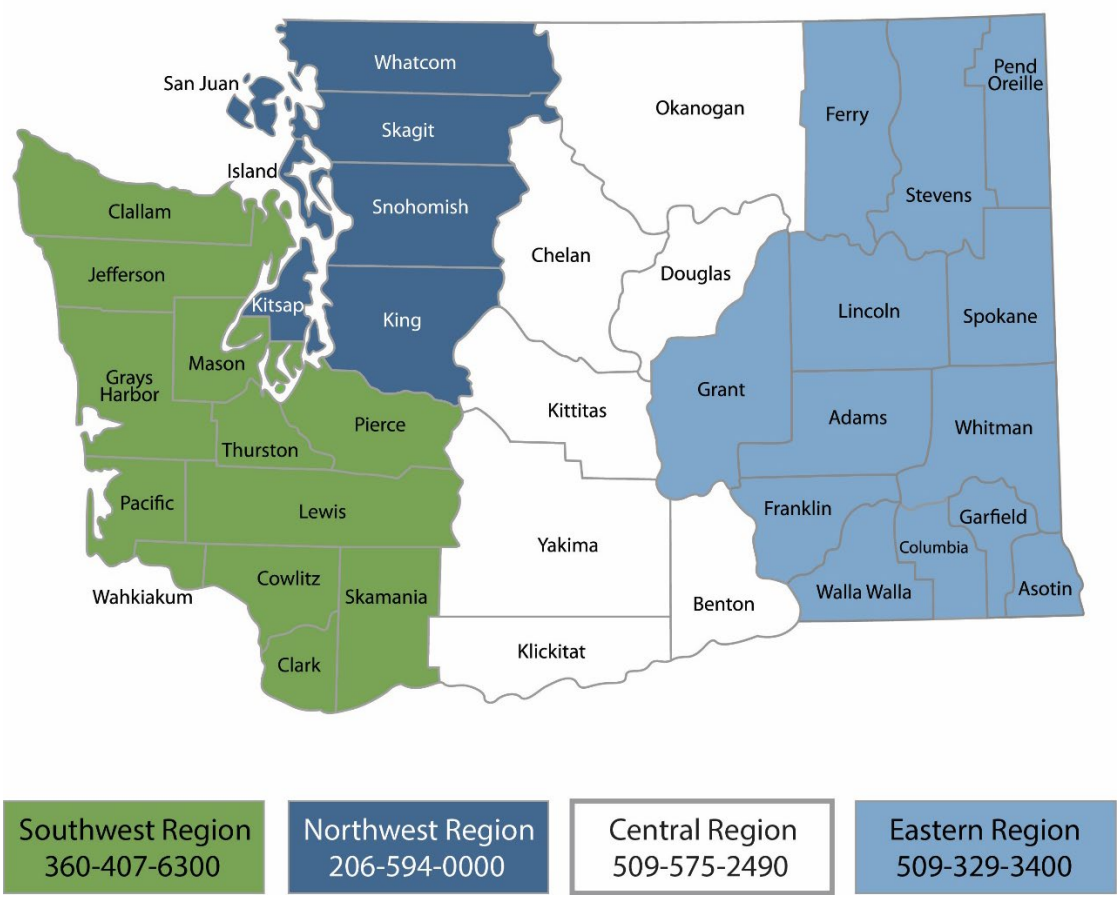
Department of Ecology's Regional Offices

Map of Counties Served



Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	P.O. Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	P.O. Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 West Alder Street Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 North Monroe Spokane, WA 99205	509-329-3400
Headquarters	Statewide	P.O. Box 46700 Olympia, WA 98504	360-407-6000

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DEPARTMENT OF
ECOLOGY
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Introduction and Problem Statement

The Big Quilcene River in Jefferson County is listed on Washington State's 303(d) list of impaired waterbodies for temperature and dissolved oxygen (DO). The lower 3 miles of the Big Quilcene River, extending upstream from the mouth to approximately the Highway 101 bridge, have been the focus of over a decade of restoration efforts for salmon recovery. One of those projects, Big Quilcene Moon Valley Restoration, is located roughly in the upper one mile of that reach below Highway 101. The restoration project aims to realign the river channel in the floodplain to create a more sinuous, lower-gradient reach that will improve instream habitat. The purpose of this study is to establish a baseline of temperature above, within and below this project area, and to observe any effect the project has on stream temperatures.

Study Area and Surroundings

The Big Quilcene River in Jefferson County, WA is a 68 square mile drainage flowing into the Hood Canal on the eastern slopes of the Olympic Peninsula. The upper watershed is contained within the Olympic National Forest, before flowing through state- and privately-owned forest land followed by residential land through the lower reaches. The study area will be in this lower portion of the watershed, below the Highway 101 bridge. This segment of the river has been an area of focus for the recovery of ESA-listed Hood Canal summer chum. The river flows into Quilcene Bay, which is a large shellfish growing area.

Figure 1. The Big Quilcene River drainage highlighted in the northeast corner of the Olympic Peninsula.

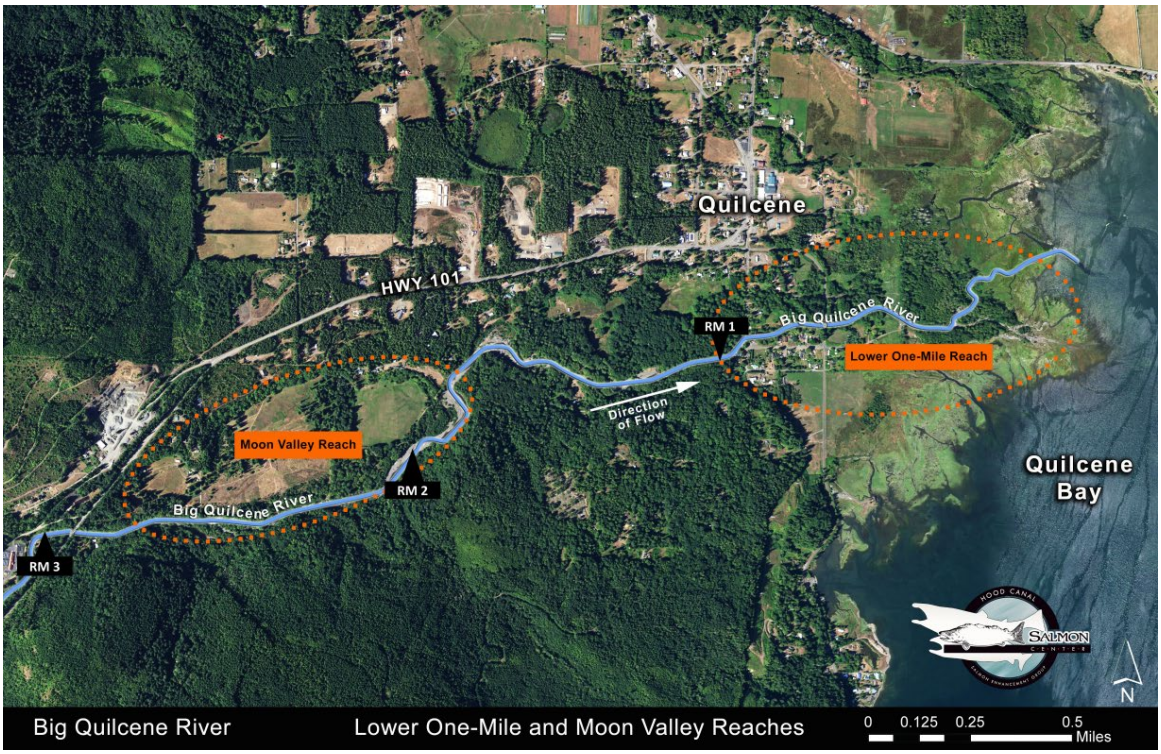

Figure 2. Lower three miles of the Big Quilcene River, with the project area on the left labeled "Moon Valley Reach" (Source: Recreation and Conservation Office Project Snapshot #24-1094)

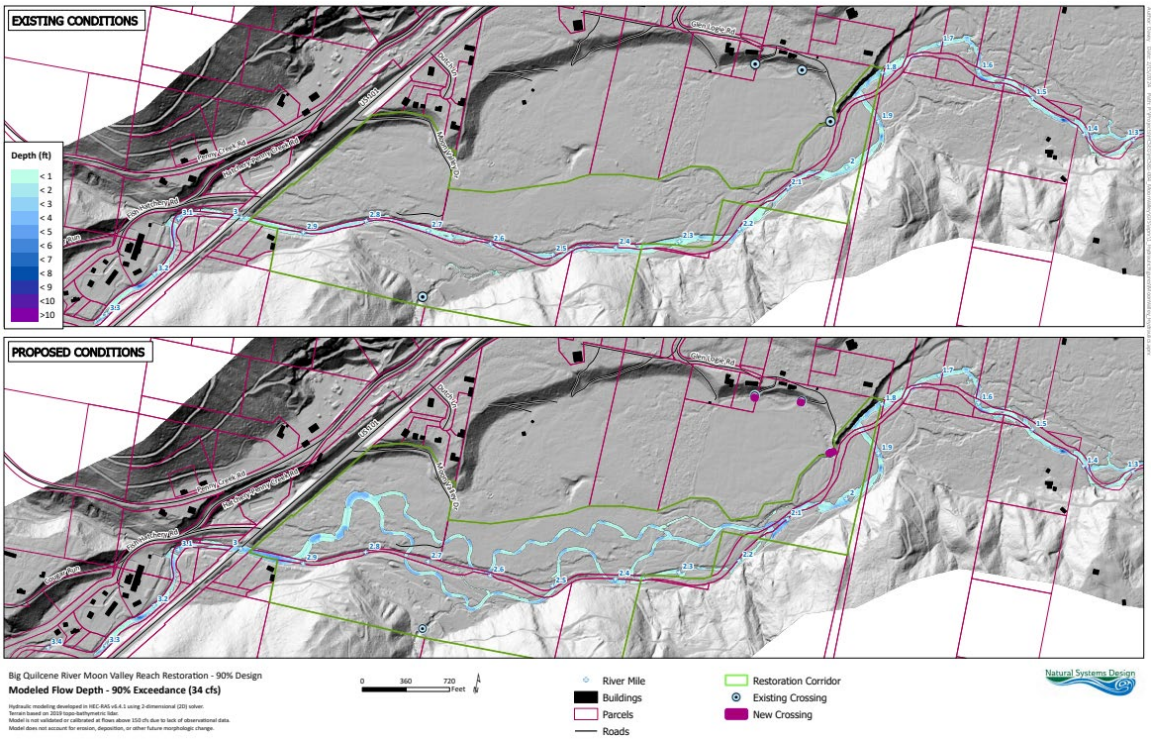

Figure 3. Proposed realignment of the Big Quilcene River in the Moon Valley reach (Source: Recreation and Conservation Office Project Snapshot #24-1094).

Summary of Previous Studies and Existing Data

Statewide River and Stream Ambient Monitoring

The purpose of this ongoing study conducted by the Washington State Department of Ecology (ECY) is to "collect long-term water quality data from a state-wide network of stations. Thirteen conventional constituents are measured monthly at 82 stations…". In this project area, this is collected near the mouth of the Big Quilcene River.

Hood Canal Watershed Clean Water Project

With data collection from April 2012 through September 2013, this project aimed to address low dissolved oxygen, high temperatures and fecal coliform pollution in the streams and rivers flowing into Hood Canal. In the proposed study area, this project collected data near the mouth of the river. Data was also collected upstream of the study area, on Penny Creek as well as the Big Quilcene River mainstem above the confluence with Penny Creek.

Freshwater Monitoring Unit Continuous Flow and Water Quality Data

Ecology's Freshwater Monitoring Unit collects continuous flow and water quality data at select stream locations. In this project area, this was collected near the mouth of the Big Quilcene River from 2019 into 2022.

Quilcene-Dabob Bay Pollution Identification and Correction

This project collected samples for nutrients and bacteria at the downstream site near the mouth from November 2016 to October, 2017. The project description is as follows: "Non-point sources of pollution will be identified in Quilcene and Dabob Bays, both high-priority areas of Hood Canal. Fecal bacteria and nutrient inputs will be analyzed and shoreline septic systems will be assessed through sanitary surveys. Correction activities will be performed to repair all high-risk failing systems."

Jefferson County Foundational Monitoring and PIC

This project collected field measurements and samples for bacteria at the downstream site near the mouth from December 2020 to December 2021. The project description is as follows: "Jefferson County Public Health…will implement a Foundational Monitoring program for the county Clean Water District utilizing existing Pollution Identification and Correction (PIC) methods to protect water quality from threats of non-point source pollution."

Hood Canal Clean Streams Initiative

This project collected field measurements and samples for bacteria at the downstream site near the mouth from January 2014 to October 2016. The project description is as follows: "The Hood Canal Clean Streams Initiative will address impaired waterbodies with the highest concentration of streams exceeding temperature standards in Jefferson County that drain into Hood Canal.

This project will prioritize areas for riparian restoration through water quality monitoring and implement restoration plantings on 2.5 river miles."

Table 1. Current listings in the project area.

Waterbody	EIM Location ID(s)	EIM Study ID(s)	Category 5 Listing(s)	Category 2 Listing(s)	Category 1 Listing(s)
Big Quilcene River	17A060; HCCWP-0374; 17A070; BQU/2.9; HCCWP-0953	AMS001; AMS001-2; AMS001E; AMS004; FMUFLOW&WQ; G1400530; EF160640; G0800055; G1100189; WQC-2020-00036	Temperature: 21943; 21944; DO: 82214; 82084; 81275	pH; 10925	Bacteria: 16735; 16736; 88371;
Penny Creek	PEN/0.0; PEN/2.3	G1100189	DO: 81758;		

Parameters of Interest and Potential Sources

This study will focus on stream temperatures of the Big Quilcene River mainstem. The upper portion of this watershed is in federal, state and private forest land where commercial forestry is the primary impact to effective stream shade. In the lower portion where this study is focused there are more impacts to shade and hydrology from residential development and changes to stream morphology. The Moon Valley restoration project is likely to raise the water table in that portion of the river, potentially changing local stream temperature characteristics. There will also be a temporary decrease in shade while plantings associated with the project are established and grow to heights that can provide effective shade. Documenting how a project of this scale affects stream temperature can inform future decisions for implementation on streams impacted by temperature.

Tasks Required

Objective 1: Collect baseline temperature in the reach

Task 1: Deploy temperature loggers above, within and below the target reach of the Big Quilcene River prior to restoration.

Objective 2: Collect post-restoration temperature in the reach

Task 1: Deploy temperature loggers above, within and below the target reach of the Big Quilcene River during and after restoration has been completed.

Proposed Project Schedule

Construction for the restoration project is scheduled to be completed during the summer of 2026. Baseline temperature data will be collected during summer 2025, before restoration occurs. Continuous temperature will then be collected during construction in the summer of 2026 to capture the timeframe when the river is moved to its new channel. The following summer, in 2027, temperature will be monitored again to measure temperature characteristics after the river has had a full wet season to become established in its new channel. Future monitoring may be conducted by Ecology unless a local partner is able to take on such efforts.

Table 2. Project timeline

Category	Time Period
Pre-project baseline data	Summer 2025
Construction	Summer 2026
Post-construction	Summer 2027
Long-term	2028 and beyond

Budget and Funding

No laboratory samples are being collected for this study. The Watershed Cleanup and Technical Assistance Unit already has all equipment and supplies needed for this data collection.

Sampling Locations and Frequency

Sample locations will be finalized during deployment efforts based on stream conditions, access and proximity to the restoration area. An existing site at the Highway 101 bridge will be used during all monitoring periods (Table 3) and a minimum of one downstream site will be used during all monitoring periods. There will be a minimum of four locations with temperature loggers monitored. Some of these locations may need to be moved after the project construction if they are located in the footprint of the channel that is being realigned. The naming convention used for any new sites will use a two-digit WRIA number, followed by an abbreviated name of the stream, and the river mile location on that stream (see example in Table 3).

Table 3. Locations for monthly ambient monitoring.

EIM Location ID	Description	Latitude	Longitude
17A070	Big Quilcene River at Highway 101 bridge	47.8108	-122.9092
Example: 17-BQU-1.6*	Big Quilcene River at RM 1.6	47.8160	-122.8907

*This example is for WRIA 17, Big Quilcene River, at river mile 1.6.

Field Parameters and Laboratory Analytes to be Measured

Field Parameters

This project will only collect continuous temperature data. This will be collected using Onset Hobo Tidbit V2 and MX loggers in accordance with EAP080 *Continuous Temperature Monitoring of Freshwater Rivers and Streams* (Ecology, 2022). Specifications and MQO's are outlined in Table 5.

Table 4. MQOs for continuous temperature measurements.

Parameter	Equipment	Duplicate Measurements: Precision	Equipment Information: Accuracy	Equipment Information: Resolution	Equipment Information: Range	Expected Range
Water Temperature	HOBO TidbiT / MX	± 0.2°C	± 0.2°C	0.01°C	-20-70°C	0-30°C

Invasive Species Evaluation and Applicable Procedures

The Big Quilcene River is not included in the map of areas of extreme concern for invasive species. Field staff will be trained and adhere to Standard Operating Procedure EAP070 *Minimize the Spread of Invasive Species* (Ecology, 2018).

EIM Data Upload Procedures, Including Project EIM Study ID When Applicable

All data collected from this study will be reviewed for quality objectives and data verification requirements outlined in the Nonpoint Pollution Investigations QAPP (Ecology, 2021) and uploaded to EIM under the Study ID LBQRT_WQP.

Responsible Personnel and Contact Information

Sampling, data management and analysis will be completed by the SWRO WQP Water Quality Monitoring and Data Analysis Specialist. Other WQP staff may assist in field sampling as needed.

References

Ecology, 2021. Quality Assurance Project Plan – Nonpoint Pollution Investigations in Western Washington. Publication No. 21-10-027. Washington State Department of Ecology, Olympia, WA. https://apps.ecology.wa.gov/publications/SummaryPages/2110027.html

Ecology, 2018. Standard Operating Procedure EAP070, Version 2.2 – Minimize the Spread of Invasive Species. Publication No. 18-03-201. Washington State Department of Ecology, Olympia, WA. https://apps.ecology.wa.gov/publications/SummaryPages/1803201.html

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