Addendum to
Quality Assurance Project Plan:
Skokomish River Basin Fecal Coliform TMDL
Attainment Monitoring

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DEPARTMENT OF ECOLOGY

Environmental Assessment Program

April 14, 2009

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THROUGH: George Onwumere, Unit Supervisor, Environmental Assessment Program
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FROM: Scott Collyard, Staff, Environmental Assessment Program

SUBJECT: **ADDENDUM TO QUALITY ASSURANCE PROJECT PLAN FOR: SKOKOMISH RIVER BASIN FECAL COLIFORM TMDL ATTAINMENT MONITORING**

PROJECT CODE: 09-158
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Background

Ecology's 2007 water quality attainment monitoring report on the Skokomish River Basin concluded that all sites assessed, with the exception of Weaver Creek, met the 2001 TMDL target limits for fecal coliform (Sargeant et al., 2007, Seiders et al., 2001). Although Weaver Creek met the *Extraordinary Primary Contact classification* water quality standard (50 cfu/100ml) for recreation, an additional 20% reduction in fecal coliform levels is needed to meet the TMDL target value. Since 2007, more restoration work has been done on Weaver Creek. It is believed that sufficient progress has been made to meet TMDL target limits for fecal coliform.

This addendum uses methods, sampling designs, and quality control procedures outlined in the original attainment monitoring QAPP (Batts D., 2005) to develop a monitoring strategy for Weaver Creek. This sampling strategy will provide sufficient data to determine if Weaver Creek is currently meeting the original TMDL target values for fecal coliform.

Project Goals and Study Objective

The project goal is to (1) evaluate whether fecal coliform bacteria TMDL implementation actions have resulted in Weaver Creek meeting the TMDL target limit and (2) support a systematic review and improvement of water quality. The project goal will be met though the following objectives:

- Determine if fecal coliform targets set by the 2001 TMDL study have been met.
- Determine if Washington State water quality standards for fecal coliform are being met.

Study Design

Monitoring of fecal coliform bacteria is needed to assess if Weaver Creek meets the goals set by the original 2001 TMDL. To meet these objectives, fecal coliform concentrations will be estimated biweekly from two sites on Weaver Creek during the critical period of May though February. The water sampling collection will begin in May 2009 and continue through February 2010. Final results will be reported in a technical memo and final report.

Sampling Locations

The TMDL study (Seiders et al., 2001) describes fecal coliform target limits for one station on Weaver Creek. In 2007, additional sites were sampled in order to provide better spatial identity of areas of fecal coliform pollution (unpublished data, 2007). This study will evaluate whether these stations (Figure 1, Table 1) meet current water quality standard and the target limit set in the original TMDL compliance station (Table 2).

Table 1. Weaver Creek monitoring stations.

Station	Description	Type	Latitude, Longitude (NAD83)
SVRB	Downstream side of Skokomish Valley Road Bridge	Added	47.3086, -123.2024
BRB	Downstream side of the Bourgault Road Bridge	TMDL	47.3060, -123.1795

Table 2. Weaver Creek TMDL recommended fecal coliform targets, TMDL results, and TMDL attainment monitoring results for the critical period (May – February).

Sampling Site	Target		TMDL Study		Attainment Monitoring Study		Required change
	GMV FC/100ml	Geometric 90th percentile FC/100ml	GMV FC/100ml	Geometric 90th percentile FC/100ml	GMV FC/100ml	Geometric 90th percentile FC/100ml	
Weaver Creek (BRB)	17.5	100.0	55.0	314.6	22.0	64.4	-20%

GMV – geometric mean value
FC - Fecal Coliform
BRB – Bourqault road bridge

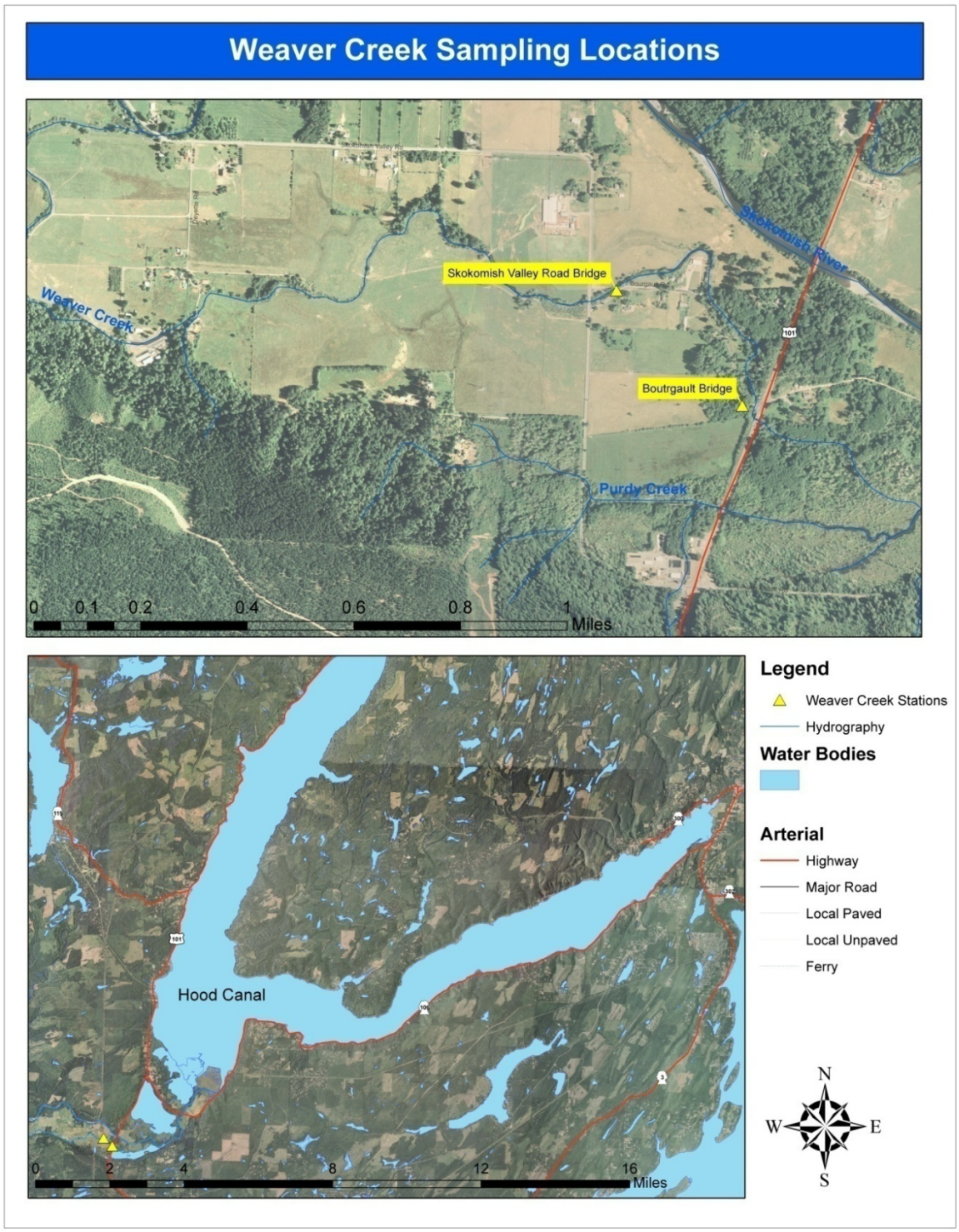

Figure 1. Weaver Creek sampling locations.

Project Organization

Ecology employees involved in this project are listed in Table 3.

Table 3. Organization of project staff and responsibilities.

Staff (EAP unless noted otherwise)	Title	Responsibilities
Scott Collyard Directed Studies Unit WOS, EAP (360) 407-6455	Project Manager and Principal Investigator	Writes the QAPP Addendum. Conducts QA review of data, analyzes and interprets data, prepares data for upload to EIM, and writes the draft and final reports.
Marcus Van Prause Directed Studies Unit WOS, EAP (360) 407-6000	EIM Data Engineer and Field Assistant	Uploads data into EIM. Collects samples and records field information. Transports samples to Manchester Laboratory.
Lydia Wagner Water Cleanup/Tech SWRO (360) 407- 6329	TMDL Coordinator	Provides internal review of the draft QAPP Addendum and reviews and approves the draft and final reports.
Kim McKee Water Cleanup/Tech SWRO (360) 407-6407	EAP Client	Clarifies scope of the project, provides internal review of the draft QAPP Addendum, and reviews and approves the draft and final report.
Garin Schrieve Water Quality Program SWRO (360) 407-0643	EAP Client and Section Manager	Approves QAPP Addendum.
George Onwumere Directed Studies Unit WOS, EAP (360) 407-6730	Project Manager's Unit Supervisor	Reviews and approves the QAPP Addendum, draft technical memo, and draft report. Approves the project budget.
Bob Cusimano EAP (360) 407-6596	Western Operations Section Manager	Approves the QAPP Addendum, technical memo, and draft report.
Stuart Magoon EAP, Manchester Environmental Laboratory (360) 871-8801	Director	Approves the final QAPP Addendum.
William R. Kammin EAP (360) 407-6964	Ecology Quality Assurance Officer	Reviews and approves the draft QAPP Addendum.

EAP – Environmental Assessment Program
EIM – Environmental Information Management system
QAPP – Quality Assurance Project Plan
QA – Quality Assurance

Schedule

Project Schedule

The project schedule is present in Table 4.

Table 4. Proposed schedule for completing field and laboratory work, entering data into EIM, and writing the final report.

Field and Laboratory work	
Field Work	Biweekly: May 2009 – February 2010
Laboratory analyses completed	March 2010
Environmental Information System (EIM) Data Set	
EIM Data Engineer	Marcus Von Prause
EIM User Study ID	SCOL0001
EIM Study Name	Weaver Creek Fecal Coliform TMDL Attainment Monitoring
EIM Completion Due	June 2010
Final Report	
Author Lead	Scott Collyard
Schedule	
Draft due to supervisor	June 2010
Draft due to client/peer reviewer	July 2010
Draft due to external reviewer	August 2010
Final report due on web	October 2010

Sampling Schedule

The tentative field sampling schedule is listed below. Some dates will likely change due to unanticipated circumstances.

- May 4, 2009
- May 28, 2009
- June 1, 2009
- June 15, 2009
- June 29, 2009
- July 13, 2009
- July 27, 2009
- August 10, 2009
- August 24, 2009
- September 7, 2009
- September 28, 2009
- October 5, 2009
- October 19, 2009
- November 2, 2009
- November 16, 2009
- November 30, 2009
- December 14, 2009
- December 28, 2009
- January 11, 2010
- January 25, 2010
- February 8, 2010
- February 22, 2010

Costs

The total project costs are approximately $2,322.

Laboratory

Theses cost were calculated using the Manchester Environmental Laboratory's (MEL) price list for FY2009. A 50% discount is included for using MEL.

Fecal coliform by MPN: 54 samples @ $43/sample = $2,322.

Experimental Design

The intent of this study is to collect fecal coliform data at high enough frequency and a long enough time span to (1) obtain a reasonable level of confidence in the results and (2) meet the objectives of this project. To mimic the 2001 TMDL study, field sampling will be performed biweekly beginning May 2009 through February 2010.

Water samples from all stations will be analyzed by the Most Probable Number (MPN) method to stay consistent with the original TMDL analysis. A field duplicate MPN sample will be collected each month at a location specified in Table 2. This provides a greater than 20% field duplication rate for MPN.

Table 5. Allocation of fecal coliform samples on Weaver Creek.

Station ID	May 2009		June 2009		July 2009			Aug. 2009		Sept. 2009	
SVRB	1	2	1	1	1	1	2	1	1	1	2
BRB	1	1	1	2	1	1	1	1	2	1	1

Station ID	Oct. 2009		Nov. 2009			Dec. 2009		Jan. 2010		Feb. 2010	
SVRB	1	1	1	1	2	1	1	1	2	1	1
BRB	1	2	1	1	1	1	2	1	1	1	2

cc: Derek Rockett, Water Quality Program
Stuart Magoon, Manchester Environmental Laboratory
Bill Kammin, Ecology Quality Assurance Officer

References

Batts, D., 2005. Quality Assurance Project Plan: Skokomish River Basin Fecal Coliform TMDL Attainment Monitoring. Washington State Department of Ecology, Olympia, WA. January 2005. Publication No. 05-03-201. www.ecy.wa.gov/biblio/0503201.html

Sargeant, D. and C. Hempleman, 2007. Skokomish River Basin Fecal Coliform Bacteria Total Maximum Daily Load Study Water Quality Attainment Monitoring Report. Washington State Department of Ecology, Olympia, WA. Publication No. 07-03-054. www.ecy.wa.gov/biblio/0703054.html

Seiders, K., G. Hoyle-Dodson, and P. Pickett, 2001. Skokomish River Basin Fecal Coliform Bacteria Total Maximum Daily Load Study. Washington State Department of Ecology, Olympia, WA. Publication No. 01-03-014. www.ecy.wa.gov/biblio/0103014.html

Unpublished data, 2007. Data collect at three sites on Weaver Creek from March through June 2007 by Derek Rockett. Washington State Department of Ecology, Olympia, WA.