SQUAXIN ISLAND TRIBE SHELLFISH EARLY WARNING SYSTEM QUALITY ASSURANCE PROJECT PLAN (QAPP)

Prepared by:
Squaxin Island Tribe Natural Resources Department
August 1, 2009

APPROVAL:

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Name/Date — Alan Moomaw, *EPA Region 10 Project Officer* 10/2/09

EPA Region 10 QA Officer Signature
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2. Table of Contents

3. Distribution List

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- Anise Ahmed, WDOE Environmental Assessment Program, TEL 360) 407-6767
- Stephanie Kinney, Mason County Environmental Health, TEL (360) 427-9670

4. Project/Task Organization

List key project personnel and their corresponding responsibilities.

Name	Project Title/Responsibility
John Konovsky	Project Manager—Analysis leader
Joe Puhn	Field Technician—Sampling leader
Levi Keesecker	QA Officer—Quality assurance review
WDOE Manchester Lab	Laboratory Analysis
Stephanie Kinney	Experimental Design & Data Review
Lawrence Sullivan	Experimental Design & Data Review

SHELLFISH EARLY WARNING SYSTEM

5. Problem Definition/Background

A. Problem Statement

The Squaxin Island Tribe intends to protect the opportunity to harvest shellfish at all its usual and accustomed grounds and stations reserved in the 1854 Treaty of Medicine Creek. The immediate threat to Squaxin shellfish beds is nonpoint source pollution, primarily failing septic systems and poor livestock management practices contaminating marine waters. Squaxin will monitor the mouths of named streams discharging directly upstream of active Tribal shellfish harvest. The data will provide an early warning of increasing indicator bacteria and pathogen loading so that necessary corrective actions can occur before any shellfish harvest downgrades are necessary.

The National Shellfish Sanitation Program sets a marine water quality standard of 14/43 fecal coliform/100 ml as the upper indication of safe harvest and consumption. The Department of Ecology TMDL Technical Report for Oakland Bay sets a goal of meeting the marine standards at the mouths of all named tributaries.

The first objective is to identify which, if any, of these streams exceed the 14/43 standard at their mouths. The second objective is to calculate bacteria loading rates based on streamflow and rank order the streams for corrective action.

B. Intended Use of Data

On October 1 and April 1 of each year, a list of streams in rank order based on loading rates will be referred to the state Department of Health (DOH) or Mason County Environmental Health for further investigation.

Squaxin has an expectation that one of the two agencies will take responsibility for intensive monitoring and actions to correct nonpoint source pollution on priority streams in a timely manner. Remedial action may require the support of the state Departments of Agriculture or Ecology (DOE).

6. Project/Task Description

A. General Overview

The Treaty fishing area for the Squaxin Island Tribe includes all waters south of the Tacoma Narrows at the headwaters of the Salish Sea (South Puget Sound). Tribal shellfish beds currently harvested are concentrated in Oakland Bay/Hammersley Inlet, North Bay/Case Inlet, Little Skookum Inlet and Squaxin Island.

In coordination with the DOH marine water quality monitoring program, water samples will be collected once each month at twelve stream mouths: Coulter, Sherwood, Campbell, Uncle John, Malaney, Deer, Cranberry, Johns, Shelton, Goldsborough, Mill and Skookum Creeks.

The samples will be analyzed for fecal coliform by the DOE Manchester Lab. Concurrently, a water quality meter will be used to measure temperature, pH, salinity at each sample site. Stream flow will be measured or estimated per the Northwest Indian Fisheries Commission method manual.[1]

B. Project Timetable

Table 1—Summary of Project Activities and Timeline

Activity	Start	End
Monthly water quality sampling	October 2009	September 2014
Monthly streamflow estimations	October 2009	September 2014
Twice yearly loading rate calculations	April 2010	October 2014

7. Data Quality Objectives

The overall data quality objective is to ensure that data of known, acceptable and legally defensible quality are generated. To achieve the objective, data will be reviewed for 1) precision, 2) accuracy, 3) representativeness, 4) comparability and 5) completeness.

A. Precision and Accuracy

Precision is the degree of agreement among repeated measurements of the same characteristic or parameter, and gives information about the consistency of methods. Accuracy is a measure of confidence that describes how close a measurement is to its "true" value.

Field analytical precision will be evaluated by the relative percent differences (RPD) between field duplicate samples or replicate readings using the following formula:

$$RPD = \left[\frac{(R1 - R2)}{((R1 + R2)/2)}\right] \times 100$$

Where R1 = the larger of the two replicate values & R2 = the smaller of the two replicate values. If replicates differ by more than 20% RPD, a judgment will be made to either flag or discard the data per Section 22. Field accuracy will be maintained by 1) collecting and transporting water samples according to this quality assurance plan, and 2) calibrating, operating and maintaining the instruments according to the manufacturer's requirements.

For laboratory accuracy and precision, the WDOE Manchester Laboratory maintains over 130 SOP's and is accredited for analysis of fecal coliform in water. The lab will strictly adhere to the appropriate SOP's to ensure quality data, and at least 10% of the samples will include either duplicate samples or laboratory control check duplicate samples. If replicates differ by more than 20% RPD, a judgment will be made to either flag or discard the data per Section 22.

[1] Pleus, A. 1999. Method Manual for Wadable Stream Discharge Measurement. TFW-AM9-99-009.

B. Data Representativeness

Representativeness is the extent to which measurements actually represent the true environmental condition. The design of the sampling scheme and the number of samples provide representativeness of the part of the watershed that is being monitored. As a whole, representativeness of the samples collected will be determined during the data assessment and data interpretation phases.

D. Data Comparability

Comparability is the degree to which data can be compared directly to similar studies. Using standardized sampling, analytical methods and units of reporting with comparable sensitivity helps ensure comparability. This program has selected testing methods that are EPA-approved or currently being employed by other Tribal water quality monitoring programs in the Pacific Northwest. Efforts will be made to duplicate the effort of past studies where possible.

E. Data Completeness

Completeness is the comparison between the amounts of usable data collected versus the amount of data called for in the sampling plan. The target completeness goal is 90% or better. Percent completeness will be calculated using the following formula:

$$\% \text{ Completeness} = \left[\frac{\#\text{ of valid results}}{\#\text{ of samples taken}}\right] \times 100$$

Table 2—Summary of Project Data Quality Objectives

Matrix	Parameter	Range	Accuracy	Resolution
Water w/meter	Instantaneous Temperature	-5° – 50° C	±0.2° C	0.01°C
Water w/meter	pH	2 – 12 units	±0.2 units	0.01 units
Water w/meter	Specific Conductance	0 – 100 mS/cm	±1% of reading ±1 count	4 digits
Water w/sample to lab	Fecal Coliform Bacteria	Per WDOE Manchester Lab SOP by membrane filtration		
Water w/flow meter	Streamflow	Per Northwest Indian Fisheries Commission method manual[1]		

8. Training Requirements and Certification

The personnel involved with water quality monitoring and transport shall be familiar with all collection and preservation procedures, and the maintenance, operation, and calibration of any instruments described in this quality assurance plan. Additional training and field supervision will be provided by the project manager or instrument manufacturers at a minimum of once each year.

9. Documentation and Records

At each sampling site, the date, time, station ID, data logger sample ID number and sampler name are recorded in a write-in-the-rain notebook. The water quality data logger records and stores the data for

later download by data logger sample ID number. Any problems or abnormalities with sampling procedures, instruments or site conditions will be entered in the notebook as comments. Upon return to the office, the data logger will be downloaded, the data files checked for any inconsistencies, and the files stored on a server for later analysis.

Monitoring instruments will be inspected upon check-out, check-in and during calibration sessions. A calibration notebook will be maintained documenting the date, time, instrument condition and success of each calibration procedure.

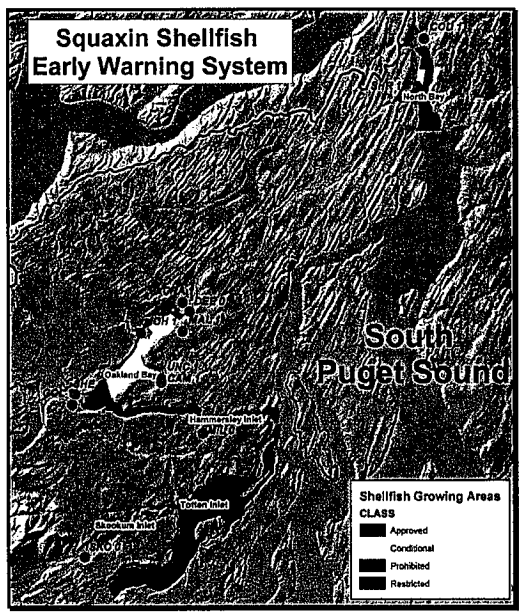
For water samples, the bottles will be labeled with the project name, station ID, date, time, name of sampler and laboratory ID number. The sampler, station ID, date and time will also be recorded in the write-in-the-rain notebook. At the end of the sampling day, a chain-of-custody sheet in triplicate will be filled out with the project name, sampling date and times, station ID, laboratory ID number, matrix code, source code and number of containers. After transport, a copy of the signed chain-of-custody sheet will be returned to the office. The WDOE Manchester Lab provides both electronic and hard-copy datasheets when the laboratory analysis is complete and quality checked.

All records, documents and files are kept at the Squaxin Island Tribe Natural Resources office and are available for inspection. Raw data generated during the laboratory analyses will be archived at the WDOE Manchester Lab and kept for 5 years. Project analytical data and other associated documentation both hard copy and electronic, will not be disposed without an approval from the Squaxin Tribe and EPA.

10. Sampling Process Design

A. Rationale for Selection of Sampling Sites

The twelve named streams discharging on or near shellfish beds harvested by the Squaxin Island Tribe represent largest potential loads of indicator bacteria and pathogens. Therefore, they are the focus of the early warning system.



B. Sample Design Logistics

Table 3—Summary of Sampling

	Type of Sample/ Parameter	Number of Samples	Sampling Frequency	Sampling Period
Biological	Fecal coliform bacteria—water column	720 (12 sites x 60 months)	Monthly	October 2009 to September 2014
Physical	Instantaneous temperature	720	Monthly	October 2009 to September 2014
	pH	720	Monthly	October 2009 to September 2014
	Salinity	720	Monthly	October 2009 to September 2014
	Streamflow	720	Monthly	October 2009 to September 2014

11. Sampling Method Requirements

General observations on weather, shoreline, stream channel and substrate appearance, and confounding conditions or procedural anomalies will be written as comments in a write-in-the-rain notebook each sampling day. Grab water samples will be collected and transported to WDOE Manchester Laboratory for fecal coliform bacteria analysis.

Table 4—Summary of Parameters, sampling equipment needed and sampling methods

Parameter	Sampling Equipment	Sampling Method
Water	1 Bottle & boat	Grab
Instantaneous temperature	Water quality meter	Probe immersion
pH	Water quality meter	Probe immersion
Salinity	Water quality meter	Probe immersion
Streamflow	Streamflow meter	Wading

A. Sample Containers

Certified pre-cleaned, sterile bottles with protective foil around the cap for bacteria analsyis will be provided by the WDOE Manchester Lab. All bottles will be prepared according to WDOE Manchester Lab SOP's.

B. Water

The water samples will be collected at each stream mouth by wading in at low tide and facing upstream in the thalweg.

Upon arrival, proceed as follows:

- Remove the protective foil and cap carefully, ensuring that neither the inside of the sample bottle nor the cap is touched.
- Hold the foil and cap with one hand; do not set it down.
- With the other hand, hold the bottle near its base and plunge the neck downward below the surface.
- Turn the bottle up until the neck points slightly upward.
- Collect the sample far enough below the surface to avoid contamination with any surface scum or floating detritus.
- Recap the bottle securely and leave the foil cap in place.
- Label and record each bottle according to Section 9.

C. Meter

Measurement of instantaneous temperature, pH, and salinity will be made with an instrument calibrated per manufacturer specifications just after collecting the water sample.

At each sampling station, the probe will be held in the water for at least two minutes until the specific conductance reading stabilizes. Once it does, all other readings are assumed to have stabilized. At that point, the values are recorded automatically in the associated data logger for later download.

D. Streamflow

If streamflows are low enough to wade, streamflow will be measured directly.[1] If water levels are too high for wading, streamflow will be estimated based on the USGS gage on Goldsborough Creek (see http://nwis.waterdata.usgs.gov/wa/nwis/uv/?site_no=12076800&PARAmeter_cd=00060,00065).

12. Sample Handling and Custody Procedure

Within two hours of collection, all sample bottles will be stored in a cooler with ice at 4^0 C. The chain-of-custody (COC) form will be filled–out per Section 9. Samples will be hand-delivered to the WDOE Manchester Lab Sample Custodian. The Sample Custodian shall ensure that the samples and information listed on the COCs are consistent with the sample labels and other sample collection documentation, sign and secure custody and log–in the samples. All samples will be analyzed for fecal coliform bacteria within twenty-four hours of collection time.

13. Analytical Methods Requirements

The WDOE Manchester Lab will use the *Fecal Coliforms Membrane Filter Technique, Standard Method 9222 D, Modified for water column bacteria.*

14. Quality Control Requirements

A. Field QC Checks

Data quality is in large part addressed by consistent performance of valid procedures documented in this quality assurance project plan. The experience of project staff and documentation of project activities enhance it. Sampling locations are clearly established. Three other keys are proper calibration and maintenance of field instruments, proper collection and handling of the sample bottles, and clear, accurate recording of information.

One field blank will be collected every sampling event for each parameter analyzed. A temperature blank shall be included in each cooler to monitor the cooler's temperature.

B. Laboratory QC Checks

The WDOE Manchester Lab shall analyze all the required QC samples specified in their standard operating procedure. At least 10% of the water samples collected will include a laboratory control check duplicate sample.

C. Data Analysis QC Checks

Data are checked in the field and in the office by the project manager. They are cross-checked after entry into a database and reviewed again at the end of each year by the quality assurance officer. Laboratory data undergoes a series of peer and supervisor reviews before it is sent to the clients.

15. Instrument/Equipment Testing, Inspection and Maintenance Requirements

The Squaxin Island Tribe owns a Hydrolab Quanta with probes for temperature, pH, specific conductance and turbidity. Preventive maintenance of field equipment is an ongoing task. Field personnel routinely inspect equipment for defects, wear and tear, and proper calibration. The measurement equipment is cleaned and calibrated according to the manufacturer's instructions just prior to sampling and at the end of the sampling period.

Table 5—Instrument Maintenance

Equipment Type	Inspection Frequency	Type of Inspection
Hydrolab Quanta Water Quality Meter	Monthly	▪ For storage, clean sensors w/alcohol; remove batteries; fill storage cup ¼ full of tap water; store away from direct sunlight ▪ For use, install batteries; clean sensors; replace DO membrane, refill pH reference sleeve, and replace pH reference junction as needed

16. Instrument Calibration and Frequency

Table 6—Instrument Calibration

Equipment Type	Calibration Frequency	Standard or Calibration Instrument Used	Allowable Error Limits
Hydrolab temperature probe	Annually	Calibrate to NIST certified thermometer in ice bath	As per manufacturer's specifications
Hydrolab pH probe	Pre- and post- sampling	Calibrate to 7-pH standard and 10-pH standard	As per manufacturer's specifications
Hydrolab specific conductance probe	Pre- and post- sampling	Zero is factory set, so calibrate to 1.0 mS/cm standard	As per manufacturer's specifications

17. Inspection/Acceptance Requirements

All supplies and equipment are purchased under the supervision of the project manager and inspected upon arrival at the office. Any item that does not meet program standards is returned to the supplier for replacement. Chemical supplies are kept in a locked cabinet. Only the project manager and the project QA officer have access. Any expired chemicals are discarded and no unused chemicals are ever returned to their original bottles.

Sample bottles are supplied and certified clean by the WDOE Manchester Laboratory.

18. Data Acquisition Requirements

The Squaxin Island Tribe receives data from the Departments of Ecology and Health, plus Mason County. Each agency or local government maintains a quality assurance plan. The Tribe will not accept data that fails to meet the collecting agency or local government's quality assurance standards.

19. Data Management

Each parameter is recorded in a single designated unit of measure. After each sampling event, duplicates of all field data and laboratory analyses will be made and kept in separate files. Data entry and cross checking will be done within the week that field work and analyses are performed. Cross-checked data will be entered into the Squaxin Island Tribe water quality database for analysis, and stored in both digital and paper formats along with all of the original datasheets and field notebooks. At the end of each calendar year, new data is downloaded into STORET per grant requirements.

20. Assessment and Response Actions

Review of field activities, instrument reliability, chain-of-custody protocol, and data management is the responsibility of the project quality assurance officer. S/he is responsible for observing all data collection, instrument calibration and data management techniques to ensure the data is collected conscientiously, carefully, and in compliance with these written protocols. The project QA officer has complete authority to institute any necessary changes to bring this program into compliance.

Accompanied by the tribal project team, EPA shall have the option to observe and evaluate sample collection procedures and documentation during one of the scheduled sampling events.

A routine Management System Review of the WDOE laboratory is conducted by the EPA Quality Staff every three years. WDOE also participates regularly on PE and performance evaluation studies, so additional EPA laboratory evaluation is not necessary.

In cases where deviations from this QAPP are warranted, a Project Manager shall fill-out a Sample Alteration Plan (Attachment 1) and send to EPA as an Addendum to this QAPP for review and approval.

Problems encountered and resolutions made during the duration of this project shall be documented in the Corrective Action Form (Attachment 2). All forms generated shall be included in the project file and submitted as enclosures of the report.

21. Reports

An annual report shall be submitted to EPA discussing the interim interpretation of results, project status and accomplishments and plans for the following year. A final report shall be submitted by September 2014. The report will analyze the data and identify potential strategies to test that might limit or eliminate fecal coliform on intertidal sediment surfaces.

22. Data Review, Validation and Verification

All data collected are reviewed annually by the project QA officer to determine if the data meet QAPP objectives. Decisions to reject or qualify data are made jointly by the project manager and the project QA officer.

23. Validation and Verification Methods

Field notebooks and bottle labels are filled out completely before leaving each sampling site. An inspection is completed before leaving the site. They are inspected again for precision, missing or illegible information, or errors in numbers once back in the office or lab. The program manager fills out and initials the chain-of-custody sheet upon completion of this inspection. Any questionable data is resolved using the guidelines in Section 22. Any changes made will be initialed by the project QA officer. Field and laboratory data will then be entered into a database

and again checked by the project QC Officer to ensure accuracy in data entry.

The project QA officer will compare 10% of the original field data sheets with database entries to ensure accurate data entry. Data that has been checked for accuracy will be initialed by the project QA officer.

A stage four data validation shall be conducted by the DOE QA staff prior to submission to the Squaxin Tribe. Calculation checks, bias and limitations of the results reported shall be discussed in the data validation report accompanying each dataset submitted by the laboratory to the Tribe. Appropriate data qualifiers shall be applied by the data validator to the results to indicate QC criteria that were not met. Recurring problems will be resolved by the lab in consultation with the Tribe's QA Officer and Project Manager. Data that were deemed impaired due to laboratory's performance will be corrected by the lab; data impaired due to field activities will be resolved by the Tribal project team.

24. Reconciliation with DQO's

Data validity will be confirmed by 1) correlation with other factors known to influence particular water quality parameters, 2) comparison with the range of published results from other studies and established water quality standards and tolerances, and 3) comparison of replicate measures previously described.

All analytical data generated shall be plotted and mapped using GIS application tools. Correlations and trends between water quality parameters, fecal coliform and other parameter results will be determined and established.

Based on the data generated, better management practices will be developed for the Oakland Bay.

Attachment 1 – Sample Alteration Form

Project Name and Number: _____

Sample Matrix: _____

Measurement Parameter: _____

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):

_____

_____

Reason for Change in Field Procedure or Analysis Variation:

_____

_____

Variation from Field or Analytical Procedure:

_____

_____

Special Equipment, Materials or Personnel Required:

_____

_____

Initiators Name:_____ Date: _____

Project Officer:_____ Date: _____

QA Staff:_____ Date: _____

Attachment 2 – Corrective Action Form

Project Name and Number:_____

Sample Dates Involved:_____

Measurement Parameter:_____

Acceptable Data Range:_____

Problem Areas Requiring Corrective Action:_____

Measures Required to Correct Problem(s):

_____

Means of Detecting Problems and Verifying Correction:

_____

Initiators Name:_____ Date:_____

Project Officer:_____ Date: _____

Quality Staff:_____ Date: _____

QUANTA CALIBRATION

There is a "HOT" key on the Quanta display for the circulator. Do not press the Esc button from any of the "Main Menu" options (ex. when all menu options are visible Calib – Review – Screen – Store – Setup). Esc is the "HOT" key to turn the circulator on/off from the "Main Menu".

I. **Conductivity** (includes TDS, Salinity, Resistivity)

a. Zero is factory set, single point calibration with "slope" buffer.
b. Rinse the calibration cup twice with deionized (or distilled) water.
c. Rinse twice with the high-end standard you will be using (Ex. 1.412 mS/cm).
d. Fill the calibration cup with standard until the D.O. membrane is submerged.
e. Remove all air bubbles from inside the conductivity sensor block (insulated wire works well).
f. Allow several minutes for readings to stabilize on your Quanta display.
g. On your Quanta display cursor to the "Calib" menu, press "Enter", cursor to "SpC", press "Enter", using the arrow keys cursor in the appropriate value of your slope in "mS/cm" (millisiemens), press "Enter".
h. Calibration complete, Esc to main menu.

II. pH

a. Rinse the calibration cup twice with deionized (or distilled) water.
b. Rinse the calibration cup twice with a small amount of 7-pH standard.
c. Fill the calibration cup with 7-pH standard until the D.O. membrane is submerged.
d. Allow several minutes for readings to stabilize on your Quanta display.
e. On your Quanta display cursor to the "Calib" menu, press "Enter", cursor to "pH", press "Enter", using the arrow keys cursor in the appropriate value "7", press "Enter". Esc to main menu.
f. Rinse the calibration cup twice with deionized (or distilled) water.
g. Rinse the calibration cup twice with a small amount of high-end standard (Ex. 10-pH).
h. Fill the calibration cup with the high-end standard to establish your slope.
i. Allow several minutes for readings to stabilize on your display.
j. On your Quanta display cursor to the "Calib" menu, press "Enter", cursor to "pH", press "Enter", using the arrow keys cursor in the appropriate value (Ex. "10"), press "Enter".
k. Calibration complete, Esc to main menu.

III. Dissolved Oxygen - saturated-air-calibration.

a. Fill the calibration cup with tap water until the water is level with the D.O. sensor O-ring.
b. Remove any water droplets from the surface of the membrane (chem-wipes and Q-tips work well).
c. Cover the end of the calibration cup to prevent airflow from affecting readings (set calibration cup lid on upside down).
d. On the Quanta display cursor left or right until "Screen" is blinking, press "Enter".
e. Allow several minutes for readings to stabilize on your Quanta display.
f. As soon as the DO% saturation value stabilizes cursor to the "Calib" menu, press "Enter", cursor to DO%, press "Enter", using the arrow keys cursor in the appropriate barometric pressure value, press "Enter".
   There are a number of ways to find the barometric pressure (ex. you can procure a wall or hand-held barometer, contact your local airport or weather station, or you can calculate an average barometric pressure by using the following equation *BP=760-2.5*(A/100)*).

g. Enter the barometric pressure in mmHg (it will default to last value entered).
h. Calibration complete, Esc to main menu.

IV. Redox

a. Rinse the calibration cup twice with deionized (or distilled) water.
b. Rinse the calibration cup twice with a small amount of the standard you are using (**recommend calibration with Calitech ORP solution**).
c. Fill the calibration cup with the standard being used for calibration.
d. On the Quanta display cursor left or right until "Screen" is blinking, press "Enter".
e. Allow several minutes for readings to stabilize on your Quanta display.
f. On your Quanta display cursor to the "Calib" menu, press "Enter", cursor to "ORP", press "Enter", using the arrow keys cursor in the appropriate value in mV from the chart on the label of the solution, press "Enter".
g. Calibration Complete, Esc to main menu.

V. Four Beam Turbidity

a. Rinse the calibration cup twice with deionized (or distilled) water.
b. Rinse the calibration cup twice with a small amount of 0 NTU standard.
c. Fill the calibration cup with enough 0 NTU standard to cover the turbidity sensor when the Quanta is inverted (sensors pointed towards floor). This will save on standards.
d. Allow several minutes for readings to stabilize on your Quanta display.
e. On your Quanta display cursor to the "Calib" menu, press "Enter", cursor to "Turb", press "Enter", using the arrow keys cursor in the appropriate value "0", press "Enter". Esc to main menu.
f. Rinse the calibration cup twice with deionized (or distilled) water.
g. Rinse the calibration cup twice with a small amount of high-end standard (Example 100 NTU).
h. Fill the calibration cup with enough high-end standard to cover the turbidity sensor when the Quanta is inverted (sensors pointed towards floor). This will save on standards and establish your slope.
i. Allow several minutes for readings to stabilize on your Quanta display.
j. On your Quanta display cursor to the "Calib" menu, press "Enter", cursor to "Turb", press "Enter", using the arrow keys cursor in the appropriate value (Example: "100"), press "Enter".
k. Calibration Complete, Esc to main menu.

VI. Depth

On-site calibration for depth sensor (zero out sensor for accurate readings).
Install sensor guard on Quanta transmitter, hold unit just above water level.
On your Quanta display cursor to the "Calib" menu, press "Enter", cursor to "Depth", press "Enter", using the arrow keys cursor in "0" as the appropriate value, press "Enter".
Calibration Complete, Esc to main menu.

VII. Special notes

a. It is a good idea to check linearity on most sensors with a mid-range standard if at all possible.
b. Always allow readings to stabilize before entering the standard's value when calibrating sensors.

VIII. Storage of Hydrolab Multiprobes

Whenever storing multiprobes for extended periods, follow the steps below.

a. Thoroughly clean all sensors.

b. Remove any batteries that are installed (AA batteries, C batteries, polarizing batteries) except lithium or clock battery.
c. Fill the storage cup about 1/4 full of **tap** water. If there is a possibility of your multiprobe being exposed to freezing temperatures, use a 50/50 solution of tap water and alcohol or methanol to prevent damaging of your sensors.
d. To prolong the life of your dissolved oxygen sensor, remove the DO membrane and electrolyte, rinse with deionized (or distilled water) and install a new membrane without refilling the DO reservoir with electrolyte. When you remove your equipment from storage add new membrane and recalibrate the sensor.
d. Store Sonde away from direct sunlight.
e. When removed from storage, all sensors must be re-cleaned and prepped and allowed to equilibrate (soak in tap water) overnight before calibration.

Appendix 2—WDOE Manchester Lab Chain-of-Custody Form

Laboratory Analyses Required

Page ____ of ____

Project Name: ____________________

SIC: ___ ___ ___ ___ **Program:** ____________________

Send Results to: ____________________ **Mail Stop:** ____________________

☐ Preliminary Investigation ☐ For HW Designation

☐ Monitoring ☐ For NPDES

Date Results needed by: ____________________

Name/Reference # of QAPP for this project: ____________________

Sampling: Date (Year: ☐) Mo Day	Sampling: Time (Military) 0001 - 2400 Hr Mn	Field Station Identification	Manchester Lab Sample Number	Matrix Code	Source Code	No. of Containers	General Chemistry	Micro	Metals	Organic Chemistry
							Alkalinity Conductivity pH Turbidity ☐ Chloride ☐ Sulfate Fluoride Total Suspended Solids Total Dissolved Solids ☐ Total Solids ☐ % Sol ☐ % Vol Sol TOC DOC BOD5 Oil & Grease (HEM) Ammonia Nitrite/Nitrate Total Phosphorus Orthophosphate TPN Chlorophyll ☐ filters	Fecal Coliform ☐ MF ☐ MPN Total Coliform ☐ MF ☐ MPN E. Coli ☐ MF ☐ MPN % Klebsiella Enterococcus	PP Mets Mercury (Hg) ☐ low level Hardness Individual Elements (please list) ☐ Total ☐ Dissolved	VOA BTEX TPHG TPHD HCID Only (Hydrocarbon ID) PCB aroclors ☐ Pest 1 ☐ w/PCB aroclors ☐ Pest 2 ☐ w/PCB aroclors ☐ Pest 3 ☐ w/PCB aroclors Carbamates PESTMS Herbicides PBDE BNA PAH

Project Officer: ____________________

Phone Number: ____________________

Cell Number: ____________________

Samplers: ____________________

____

____

Recorder: ____________________

Chain of Custody Record

Relinquished By:	Received By:	Yr	Mo	Da	Hr	Mn	Seal I.D.	Condition of Seals	Comments (Temperature, Preserv., etc.)

Comments: ____________________

ECY 040-115 (Rev. 10/05)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

October 24, 2012

Reply to
Attn of: **OEA-095**

MEMORANDUM

SUBJECT: Review of Squaxin Island Tribe Shellfish Early Warning System Quality Assurance Project Plan (QAPP) Amendment prepared by Squaxin Island Tribe Natural Resource Department

FROM: Raymond Wu, QA Chemist
Environmental Services Unit,
Office of Environmental Assessment (OEA-095)
USEPA Region 10

TO: Alan Moomaw, Project Manager
Tribal Trust and Assistance Unit,
Office of Ecosystem, Tribal & Public Affairs (WOO)
USEPA Region 10

The review of the above referenced document has been completed. The QAPP Addendum was submitted by Squaxin Island Tribe to USEPA Region 10. It met & followed the content and format requirements of the EPA QA-R5 document "*EPA Requirements for Quality Assurance Project Plans*", *Final March 2001*. The approval of the QAPP Addendum is recommended.

If you have any questions, please contact me at (206) 553-1413

SQUAXIN ISLAND TRIBE SHELLFISH EARLY WARNING SYSTEM QUALITY ASSURANCE PROJECT PLAN (QAPP) AMENDMENT

Prepared by:
Squaxin Island Tribe Natural Resources Department
October 2012

APPROVAL:

SIT Project Manager Signature

Name/Date _____ John Konovsky, *Biologist/Environmental Manager*

MC Project Manager Signature

Name/Date _____ Stephanie Kenny, *Environmental Health Specialist*

SIT Project QA Officer Signature

Name/Date _____ Brian McTeague, *GIS Specialist*

EPA Region 10 Project Officer

Name/Date _____ Alan Moomaw, *EPA Region 10 Project Officer*

EPA Region 10 QA Officer Signature

Name/Date _____ Gina Grepo-Grove, *EPA Region 10 QA Manager*

3. Distribution List

Names and telephone numbers of those receiving copies of this QAPP Amendment:

- Alan Moomaw, EPA Region 10 Tribal Coordinator, TEL 360-743-8071
- Andy Whitener, SIT Natural Resources Director, TEL (360) 432-3809
- Brian McTeague, SIT Quantitative Services Specialist, TEL (360) 432-3800
- Gina Grepo-Grove, EPA Region 10 QA Manager, TEL (206) 553-1632
- John Konovsky, SIT Environmental Program Manager, TEL (360) 432-3804
- Jule Schultz, DOH Shellfish Growing Area Program, TEL (360) 236-3349
- Mary Knackstedt, DOH EPA Grant Coordinator, TEL (360) 236-3319
- Stephanie Kinney, Mason County Environmental Health, TEL (360) 427-9670

4. Project/Task Organization

List key project personnel and their corresponding responsibilities.

Name	Project Title/Responsibility
John Konovsky	Project Co-manager
Joe Puhn	Field Technician—Sampling leader
Brian McTeague	QA Officer—Quality assurance review
WDOE Manchester Lab	Laboratory Analysis
Stephanie Kinney	Project Co-manager

5. Expansion of Problem Definition

The original scope of this QAPP was to identify streams with high concentrations of fecal coliform bacteria at their mouths just above shellfish beds, rank them, and refer them to the local Health Department for further investigation. As part of a new partnership, the Squaxin Island Tribe and Mason County will now jointly investigate priority streams to identify specific pollution sources. Mason County or the Department of Health will still be responsible for corrective actions related to onsite sewage systems. Mason Conservation District or the Department of Ecology will be responsible for corrective actions related to agricultural activities. Referrals will occur per the original QAPP.

6. New Project/Task Description

Priority streams identified in the Early Warning System will be segmented and further sampled according to this QAPP. Intensive sampling at convenient public access points will identify specific reaches where fecal coliform concentrations exceed standards. Priority reaches will be further segmented at property lines to isolate specific pollution sources.

Initially, Uncle John Creek, a tributary to Chapman Cove in Oakland Bay, is a priority for further segmentation. Chapman Cove is currently classified as conditionally approved for shellfish harvest. Fecal coliform sampling at the mouth has identified Uncle John Creek as having the highest, ongoing concentration of any tributary to Oakland Bay.

Other streams may be added in the future as indicated by the Early Warning System results.

Project Timetable

Table 1- Dates and start times for Uncle John Creek sampling.

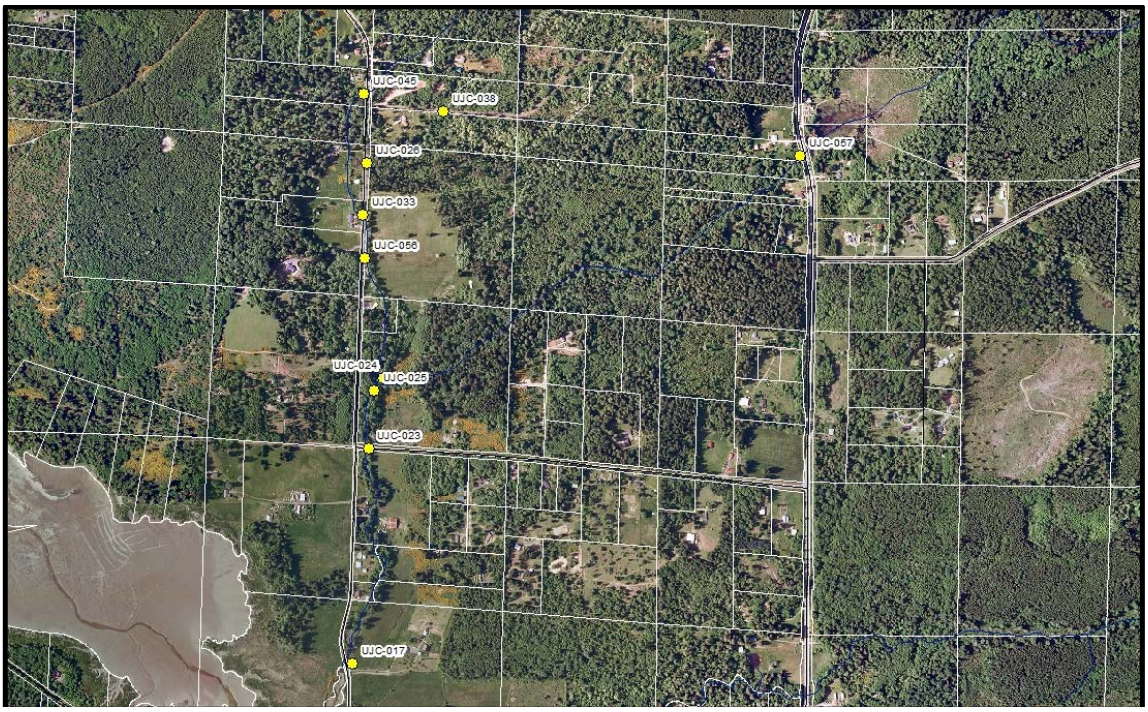
2012-13	Low Tide
29-Oct	13:34
13-Nov	11:56
26-Nov	11:42
10-Dec	9:40
14-Jan	15:04
28-Jan	14:03
11-Feb	13:51
25-Feb	12:56

Sampling dates may be adjusted to capture significant rainfall events. Sampling in tidally influenced portions of the stream will occur at low tide. Sampling will transition from reach identification to specific property identification over the course of the 8 sampling events.

10. Additional Sampling Design Process

The reach level sampling will occur at the following locations:

Site	Description	lat	long
UJC-017	1141 Agate Lp. Rd., UJC entering culvert	47.22352400	-123.02863100
UJC-023	UJC, entering culvert at intersection of Agate Lp. Rd. & Daniels Rd.	47.22869500	-123.02830600
UJC-024	Daniels Rd. trib 25ft before joining UJC	47.23039694	-123.02787976
UJC-025	UCJ 25ft before confluence with Daniels Rd. trib	47.23009628	-123.02817573
UJC-026	Daniels Rd. trib at farthest upstream road access (Daniels Rd.) flows off of 530 Daniels Rd.	47.23554519	-123.02867546
UJC-033	entering triple road culvert at 331 Daniels Rd.	47.23431682	-123.02876204
UJC-038	580 Daniels Rd. trib exiting driveway culvert marked with blue paint before 530 Daniels Rd.	47.23686140	-123.02604681
UJC-045	Exiting culvert onto 611 Daniels Rd.	47.23721495	-123.02886514
UJC-056	exiting road culvert to ag. property upstream of 220 Daniels	47.23326400	-123.02865200
UJC-057	UJC exiting road culvert on Agate RD	47.236045	-123.01343



Sampling at property lines will be based on the reach level sampling results. Property lines are noted on the map.

Table 2—Summary of Sampling

	Parameter	**Number**	**Frequency**	**Period**
Biological	Fecal coliform bacteria—water column	8 sampling events x 20 samples/event = 160 samples	Twice monthly	October 2012 to February 2013

All other aspects of this sampling program will be carried out in accordance with the original QAPP.