

TRIBAL WATER QUALITY MONITORING STRATEGY  
(2008-2015)



PREPARED BY:

CONFEDERATED TRIBES OF  
COOS, LOWER UMPQUA, AND SIUSLAW INDIANS  
DEPARTMENT OF NATURAL RESOURCES  
1245 FULTON AVENUE  
COOS BAY, OREGON

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**Tribal Contact:** Margaret Corvi, Director  
Department of Natural Resources (NR)  
1245 Fulton Avenue  
Coos Bay, OR 97420  
Telephone: (541) 888-1304  
[mcorvi@ctclusi.org](mailto:mcorvi@ctclusi.org)

**EPA Contact:** Kristine Carre, EPA Tribal  
Coordinator  
Region 10: Pacific Northwest  
805 SW Broadway, Suite 500  
Portland, OR 97205  
Telephone: (503) 326-7024  
Fax: (503) 326-3399  
[carre.kris@epa.gov](mailto:carre.kris@epa.gov)

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## **A. Introduction**

### **Purpose**

The Environmental Protection Agency's (EPA) *Final Guidance on Awards of Grants to Indian Tribes under Section 106 of the Clean Water Act* (EPA 832-R-06-003) requires Tribes, whose Clean Water Act § 106 grants start in calendar year 2007 with fiscal year 2007 funding, to develop a Tribal Assessment Report. The Tribal Assessment Reports are comprised of three elements: (1) a description of the program's monitoring strategy, (2) a water quality assessment, and (3) electronic copies of surface water quality data for nine basic parameters submitted in a STORET-compatible format. The following Tribal Water Quality Monitoring Strategy (TWQMS) has been completed by the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians' Water Quality Program (WQP) based on guidance and technical assistance provided by EPA. The purpose of the strategy is to provide a long-term plan for meeting identified water resource objectives and satisfy EPA's first element as described above. The strategy describes current and future monitoring plans and incorporates a timeline for implementation, including milestones, to address needed enhancements.

### **Program Background**

The WQP is implemented by the Tribe's Environmental Protection Division within the Natural Resources (NR) department of the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians. The purpose of the program is to assess the ecological health of aquatic resources within Tribal lands as well the Tribes' ancestral territory and develop plans, stewardships, best management practices, standards, and ordinances in an effort to protect and manage Tribal waters for their multiple ecological, cultural, economic, and intrinsic values for the next seven generations. In 2002, EPA approved the Tribe's "treatment in a manner similar to a state" or TAS application under §106 of the Clean Water Act. With this TAS approval, the Tribes became eligible to apply for EPA grants under § 106 of the Clean Water Act to develop and implement a Tribal water quality program. Initially, the development of a water quality monitoring program was the primary focus. Late in 2003 the WQP completed its first ever Quality Assurance Project Plan (QAPP) for surface water quality monitoring. Soon after receiving EPA approval for QAPP 1.8, the WQP collected its first ever water sample on February 5, 2004 on the North Fork of the Siuslaw River. Water quality monitoring was targeted on five core surface water quality parameters:

- Water Temperature
- Turbidity
- Specific Conductivity/Salinity
- pH
- Dissolved Oxygen

Data collection was focused on sampling during spring high-high and low-low tides, which meant that Environmental Protection staff could be collecting samples late at night or early in the morning. Efforts were made to update QAPP 1.8 and improve water quality monitoring at our estuarine sites. In December 2005, EPA approved QAPP 2.0 which incorporated YSI 6600 continuous data loggers at three estuarine monitoring sites. In addition, QAPP 2.0 added chlorophyll and bacteria parameters to the program. QAPP 2.0 improved the program's ability to document and understand tidally influenced water quality fluctuations, and eliminated the need for staff to collect data during non-working hours. QAPP 2.0 also greatly increased the amount of data collected which resulted in the development of a Microsoft Access

database capable of storing and reporting on the dataset. The database was designed so that water quality data stored in the database could be exported into a STORET compatible format. In April 2007, QAPP 3.0 received EPA and Tribal approval. The purpose of QAPP 3.0 was to meet new requirements identified under EPA's *Final Guidance on Awards of Grants to Indian Tribes under Section 106 of the Clean Water Act (EPA 832-R-06-003)*. Three new parameters were added:

- Nutrients
- Macroinvertebrates
- Basic habitat information.

Currently the WQP is capable of collecting water quality data for all nine EPA required monitoring parameters. These parameters include:

- Water Temperature
- pH
- Dissolved Oxygen
- Turbidity
- Bacteria
- Phosphorous
- Total Nitrogen
- Macroinvertebrates
- Basic habitat information.

\* *Other parameters that are currently measured but are not required by EPA include: chlorophyll, specific conductivity/salinity, depth, and algae.*

## **Environmental Issues**

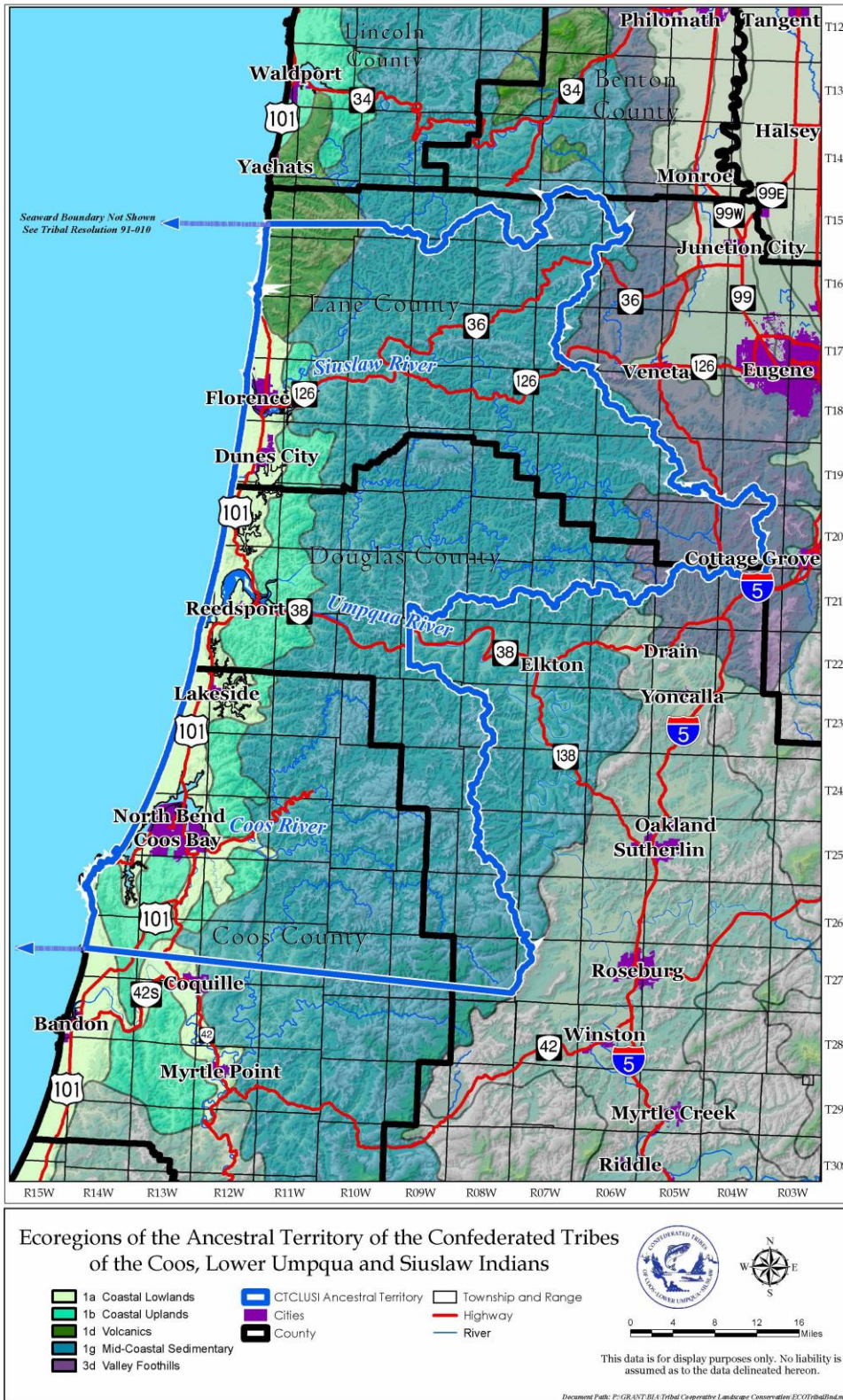
Environmental issues within our ancestral watersheds can take many years to develop or may have an immediate impact on our cultural resources and environment. Funding to develop and implement programs that address these environmental issues continues to be limited and often difficult to secure. The NR continues to focus on building in-house capacity to develop and sustain environmental programs that address natural and cultural resource issues and concerns on and off Tribal lands. Below is a broad list of natural and cultural resource issues and concerns within our ancestral watersheds in no particular order of importance.

- Downward trend of salmonid and lamprey returns and habitat.
- Environmental and cultural resource impacts linked to natural resource extraction and recreation.
- Water quality degradation due to point and non-point water pollution, including agricultural and storm sewer runoff.
- Urban, industrial, and energy production discharges.
- Environmental changes attributed to climate change.
- Spreading of existing and new non-native invasive species.
- Toxins within water, sediments, and traditional foods and cultural resources.
- Maritime spill response and impacts to traditional foods and cultural resources.

## **Tribal Lands**

The ancestral homelands of the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians totals approximately 1.6 million acres located in southwestern Oregon (see Figure 1). After the Tribes were federally restored in 1984, the Tribes held less than 8 acres of reservation lands.

**Figure 1. Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians Ancestral Territory**



Today, Tribal lands have grown to approximately 547 acres. 160 acres of the Tribes' lands are held in trust by the Bureau of Indian Affairs and are located within/near the coastal cities of Coos Bay and Florence, Oregon. EPA defines Tribal lands as: "All land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation. Tribal lands held in trust are also considered "...an informal reservation and is Indian country under 18 U.S.C. § 1151(a)." Below is a list of water sources on Tribal lands in which the Tribes' are required to implement the WQP (current as of 10/29/2015).

- Tribal lands total approximately 160 acres.
- Approximately 2.03 miles of coastline.
- Approximately 8.54 acres of tidelands.
- There are 5.5 acres of wetlands, excluding tidelands.
- Tribal lands are located within three different 4<sup>th</sup> field HUC watersheds.
  - Sixes: 481,819 acres
  - Coos: 576,243 acres
  - Siuslaw: 496,157 acres
- There are 0.12 miles of rivers and streams.
- There are two drinking active water wells that depend on a potable aquifer system located on Tribal lands.



## **B. ELEMENTS OF A TRIBAL WATER QUALITY MONITORING STRATEGY (1-X)**

### **I. MONITORING PROGRAM STRATEGY**

Below are the specific requirements by EPA to become an Intermediate/Mature Programs. The WQP currently monitors for **all nine** of EPA's required monitoring parameters, and is able to answer yes to all of the following questions.

#### **EPA REQUIREMENTS FOR INTERMEDIATE/MATURE PROGRAMS**

A. Does your Monitoring Strategy cover each of the Elements 11-X below? **YES**

B. Does your Monitoring Strategy consider all waterbody types on the Reservation - e.g., streams, rivers, lakes, ponds, springs, wetlands, great lakes, groundwater, estuaries, reservoirs, and coastal areas? **YES**

C. Does your Monitoring Strategy consider current and future monitoring needs (that is, does it plan for environmental information needs as your programs expand)? **YES**

In addition to general resource needs, consider:

- Research or pilot testing that might be needed to develop certain aspects of your program.
- Training
- Laboratory needs
- FTE (staffing needs)
- Equipment

D. Does your Strategy extend over a 5-10 year period? **YES**

E. Does your Strategy include a schedule, not to exceed ten years, for implementation (including plans to address gaps/weaknesses to achieve current and future objectives)? **YES**

## II. Monitoring Objectives

The WQP's monitoring objective is to collect high-grade water quality data that results in a representative dataset that documents short-term variability and long-term trends of Tribal estuarine, stream, groundwater, and lake water quality.

<b>Monitoring Objectives</b>	
<b>Program Area</b>	<b>Objectives</b>
Overall Water Quality Program	<ol style="list-style-type: none"> <li>1. Establish baseline water quality conditions for all pertinent uses.</li> <li>2. Document short term and long-term water quality trends.</li> <li>3. Assess whether water quality standards are being met and beneficial uses are being supported.</li> <li>3. Develop and test ecological indicators and monitoring designs.</li> <li>4. Assess local water quality issues such as; low dissolved oxygen, eutrophication, chemical &amp; biological (e.g. bacteria) contamination, habitat modification, and cumulative impacts.</li> </ol>
Non-point Source Program	<ol style="list-style-type: none"> <li>1. Identify and employ monitoring techniques to determine and quantify the effectiveness of watershed improvement projects.</li> <li>2. Build partnerships/stewardships with water quality stakeholders and private land owners to reduce non- point source water pollution.</li> </ol>
Water Quality Standards	<ol style="list-style-type: none"> <li>1. Identify reference conditions for the development of numerical and biological criteria.</li> <li>2. Develop and refine Tribal water quality standards.</li> <li>3. Determine if water resources are meeting Tribal water quality standards.</li> </ol>
Wetlands	<ol style="list-style-type: none"> <li>1. Develop Wetlands Program.</li> <li>2. Develop indicators and assess beneficial use attainment.</li> </ol>

### III. Monitoring Design

The program currently collects discrete water quality data at two freshwater sites and a beach site. One of the freshwater sites is located on Sixes River and the other is located on Tenmile Lake. The beach monitoring site is located at Baldich Beach. Four continuous water quality monitoring stations have been established. Two are located in the lower Coos River estuary and the other two within the Siuslaw River estuary.

Monitoring Design					
Program Area	Design	# Sites	Frequency	Resources (optional)	Brief Program Description
Overall Water Quality (Estuary)	Fixed Station	4	Sample collected every 15 minutes; Monthly	NA	Fixed data logger stations. Parameters include water temperature, conductivity/salinity, turbidity, dissolved oxygen, depth, chlorophyll, and pH.
Overall Water Quality (Stream)	Discrete Sample	1	Seasonally	NA	Sixes River discrete sampling site. Parameters include water temperature, sp. conductivity/salinity, turbidity, dissolved oxygen, bacteria, and pH.
Overall Water Quality (Lake)	Fixed Station	1	Sample collected every 15 minutes/Monthly	NA	Fixed data logger station at Tenmile lake property. Parameters include water temperature, sp. conductivity/salinity, turbidity, dissolved oxygen, bacteria, depth, and pH.
Overall Water Quality (Beach)	Discrete Sample	1	Monthly	NA	Baldich discrete sampling site. Parameters include water temperature, sp. conductivity/salinity, turbidity, dissolved oxygen, bacteria, depth, and pH.
Overall Water Quality (Bacteria)	Discrete Sample	7	Monthly; Seasonally	NA	Collect bacteria (E. Coli. & Enterococcus) samples at all active monitoring sites.
Overall Water Quality (Algae)	Discrete Sample	1	Seasonally/Quarterly	NA	Collect algal samples at Tenmile Lake property.

Overall Water Quality (Nutrients & Macroinvertebrates)	Discrete Sample	7	Seasonally/Quarterly	NA	Collect nutrient samples at all active monitoring sites and macroinvertebrates at Sixes River site.
NPS Effectiveness Monitoring*	NA	NA	NA	NA	NA

*\*The WQP has not completed a NPS project that requires NPS effectiveness monitoring.*

#### IV. Core and Supplemental Water Quality Indicators

Continuous samples of the surface water quality (temperature, pH, dissolved oxygen, turbidity, and specific conductivity/salinity) and physical (depth/tidal stage) parameters are collected using automated data loggers at four estuarine sites every 15 minutes. Discrete samples of the surface water quality (temperature, pH, dissolved oxygen, turbidity, and specific conductivity/salinity) and physical (depth) parameters are collected using hand-held meters at two freshwater sites monthly or seasonally/quarterly and a beach site monthly. In addition, monthly water samples are collected for the quantitative analysis of bacteria (e.coli and enterococcus) at the estuarine sites, monthly enterococcus at the beach site, monthly e.coli at the Tenmile Lake site, and seasonally/quarterly for e.coli at the Sixes River site. Discrete seasonally/quarterly nutrient sampling is conducted at all monitoring sites. Macroinvertebrate and habitat assessment data is collected seasonally/quarterly at the stream site. Toxic algal samples are taken seasonally at the Tenmile Lake site.

Indicator Sampled by Monitoring Objective									
Monitoring Objective	DO	Temp	pH	Turb.	Nutrients (TP/TN)	Habitat	Macro inverts.	Pathogens	Other
Overall Water Quality	X	X	X	X	X	X	X	X	X**
Water Quality Status & Trends	X	X	X	X	X	X	X	X	X**
NPS Effectiveness Monitoring	*	*	*	*	*	*	*	*	**

\* The WQP has yet to complete a NPS project that requires NPS effectiveness monitoring.

\*\* Other includes chlorophyll, specific conductivity/salinity, depth, and algae.

## V. Quality Assurance

The table below lists all of the QAPPs, Quality Assurance/Quality Controls (QA/QC), and Standard Operating Procedures (SOP's) as of December 2007. EPA approved Quality Assurance Project Plans (QAPP) are completed prior to any environmental data collection using EPA funds.

Quality Assurance Documents			
Type	Title	Completion Date	EPA Approval Date
QAPP	QAPP 4.0 for the Tribal Water Quality Monitoring Program	Ongoing	NA
SOP	YSI EXO1 and EXO2 Sonde Calibration and Data Upload	Ongoing	NA
QAPP	QAPP 3.1 for the Tribal Water Quality Monitoring Program	10/31/2008	02/25/2009
QAPP	QAPP 3.0 for the Tribal Water Quality Monitoring Program	12/28/2006	4/30/2007
QA/QC	YSI 6600 Data Editing and Management	09/06/2006	NA
SOP	Water Quality Monitoring Program	06/05/2006	NA
SOP	YSI 6600 EDS Sonde Retrieval	06/06/2006	NA
QA/QC	YSI 556 & YSI 650 Data Upload	3/10/2006	NA
QAPP	QAPP 2.0 for Water Quality Monitoring on the Tribal Reservation	12/16/2005	01/03/2006
QAPP	QAPP 1.8 for Baseline Water Quality Monitoring Project on the Tribal Reservation	12/10/2003	12/29/2003

## VI. Data Management

The WQP is responsible for the management of all water quality data collected. All discrete water quality samples collected up to September 2014 have been uploaded into EPA's STORET database. Efforts are under way to upload all continuous datasets into STORET. The table below describes data management activities completed by the program.

<b>Data Management</b>				
<b>Monitoring Objective</b>	<b>Data Mgmt -on site</b>	<b>STORET</b>	<b>Land use data</b>	<b>Geo-referencin</b>
Overall Water Quality	A combination of Access database and Excel spreadsheet applications.	In the process of uploading data into EPA's STORET database.	ESRI ArcGIS data files, USGS 1:24,000 Topographic Maps.	Yes
Water Quality Status & Trends	Same as above	Same as above	Same as above	Same as above
NPS Effectiveness Monitoring	Same as above	Same as above	Same as above	Same as above

## **VII. Data Analysis/Assessment**

The following sections outline the kind of software and types of statistical tests or graphical displays used to analyze and report on data to EPA.

### **Continuous Data Analysis**

Exploratory trend analysis of our continuous water quality monitoring data has been applied to these data in the form of box plots. This analysis was done via Excel spreadsheet applications. This inductive procedure was used to summarize, rather than test, these data. The results of the exploratory analysis of these data provide guidance toward the selection of appropriate deductive hypothesis testing procedures implemented by WQP for future non-point source pollution assessments and/or reports. Our analysis of continuous water quality data collected by our program was implemented following the recommendations cited in the USGS Book 4. Hydrologic Analysis and Interpretation: Statistical Methods in Water Resources.

### **Discrete Data Analysis**

Upon reading USGS technical reports, we learned that overlapping histograms are not recommended for the display of discrete water quality data because histograms provide poor visual discrimination among multiple data sets. It is for this reason that we have chosen to display those discrete water quality monitoring data collected by our program in a line graph format.

### **Water Quality Assessment**

The continuous and discrete water quality data collected by our program was analyzed per the above listed methods and general watershed and water quality information for each of the sites actively monitored by our program applied to the interpretation of these data. Graphs were created in Excel displaying data collected by our program relative to current ODEQ standards and/or any 303(d) listings for waters running through each monitoring location. This has been done in an attempt to provide a quick identification of impairments potentially recorded in our monitoring data. Excel generated tables summarizing water quality data collected at the site follow the graphical analysis.

The process of summarizing water quality data collected by our program has significantly enhanced the Tribes' understanding of emerging trends in water quality occurring within waters on or pertaining to Tribally owned land. As our understanding of baseline water quality conditions continues to expand, the Tribes' WQP will continue to build the internal capacity necessary for the assessment of attainment of water quality standards and pursue opportunities to address impairments to Tribal water quality by partnering with local private landowners and stakeholder organizations to improve the quality of Tribal waters.

Current gaps in our program's analytical abilities include the need to build capacity for the support of hydrological modeling and spatial watershed analysis.



## VIII. Reporting

An annual Tribal Water Quality Assessment Report is completed and submitted to our EPA Tribal Coordinator at the end of each calendar year. The report includes a graphical display of the data collected during the water year (Oct. thru Sept.), and provides a brief narrative for each monitoring site. The final report is available on the tribal website ([www.ctclusi.org](http://www.ctclusi.org)) within the Water Quality Program webpage. In addition, Quarterly Performance Reports are completed thirty days after each fiscal quarter. These reports describe the quarterly activities completed by the WQP, and are provided to our EPA Tribal Coordinator.

<b>Tribal Reports</b>			
<b>Report</b>	<b>Timeframe</b>	<b>Entities receiving copies of the report</b>	<b>Comments</b>
Tribal Water Quality Assessment Report	Annually	EPA Tribal Coordinator, Posted on Tribal website at ( <a href="http://www.ctclusi.org">www.ctclusi.org</a> )	Graphical and narrative report on all water quality data collected during the water year (Oct-Sept).
Quarterly Performance Reports	Thirty days after each Fiscal Quarter	EPA Tribal Coordinator	Report on activities conducted by the WQP throughout the quarter.
STORET	Semi-Annual	EPA's STORET Database	Discrete data has been uploaded into STORET. Still working on uploading continuous dataset into STORET.

## **IX. Programmatic Evaluation**

The Director of the Department of Natural Resources, Water Quality Protection Specialist I & II, and the Air and Water Protection Specialist meet every quarter to evaluate the performance of the WQP, and identify any current issues or changes that need to be made to the program. Based on the outcome of these discussions, improvements are made to the program as funding resources allow.

## X. General Support and Infrastructure

As of 2015, CWA § 106 funding provides the WQP with 0.57 FTE to complete all monitoring and reporting tasks. The current funding level allows the WQP to meet EPA program requirements, but limits the growth of the program. As the Tribes monitoring needs expand, the need to identify funding support to supplement current funding will be necessary. The Tribes continue to work on increasing their land base. The Ancestral Land Restoration Project is currently working on returning forest land on seven different tracts encompassing forest land within the Coos, Lower Umpqua, and Siuslaw's ancestral territory to the Tribes ([www.ctclusi.org](http://www.ctclusi.org)). Efforts are under way to establish a tribal environmental lab.

A primary need identified through the development of this Monitoring Strategy is the need for additional funding to support the WQP. The decreasing amount CWA § 106 funding levels limits the potential growth of the program. Unless CWA § 106 funding levels increase, the program will need to identify additional funding resources to meet growing Tribal water quality monitoring needs.

### Current and Future Water Quality Program

WQP Year	Staffing	Training	Equipment	Lab Resources
2007	Water Quality Protection Specialist II (0.50 FTE)  Water Quality Protection Specialist I (0.30 FTE)	<b><u>Water Quality Specialist II</u></b> <i>College Degree:</i> BA Urban Studies and Planning, Minor in Biology from California State University Northridge.  <i>EPA Sponsored Trainings:</i> Final Guidance on Tribal CWA 106 Program, PPG, STORET, Statistics, and WebSim.	1- 18' Smoker Craft Aluminum Flat Bottom Boat and Trailer.  1- 40 hp Yamaha Outboard Motor.  1- 8 hp Yamaha Outboard Motor (backup).  7- YSI 6600 EDS Data Sondes each with a complete set of probes.	Nutrient samples are sent out to independent lab. Analysis of bacteria samples in-house using IDEXX Bacteria Lab. In-house lab space is currently mixed with admin. office spaces. Need Tribal Environmental Lab.

WQP Year	Staffing	Training	Equipment	Lab Resources
		<p><i>Other Trainings:</i> Groundwater Chemistry and Contaminate Transport Training,</p> <p><b><u>Water Quality Specialist I</u></b> <i>College Degree:</i> BS Biology from Oregon State University</p> <p>Other Trainings: SCUBA Certification</p>	<p>1- YSI 556 Handheld Multi-Paramter Meter. Two field cables (10 and 4 meter) and a complete set of probes.</p> <p>1- YSI 665 Handheld Multi-Parameter Meter. 75 ft. field cable and complete set of probes.</p> <p>1- IDEXX Bacteria Lab (Quant-Tray sealer and trays, supplies, and 4 incubators.)</p> <p>1- Leica 12.5 Stereoscope with digital camera and software.</p> <p>5- HOBO Water Temperature data loggers and software.</p> <p>2- Vemco Water Temperature data loggers and software.</p> <p>1- Trimble Geo XT GPS Receiver and software.</p> <p>1- Workstation computer and software.</p>	

WQP Year	Staffing	Training	Equipment	Lab Resources
			1- Desktop computer and software.	
2013	<p>Water Quality Protection Specialist II (1 FTE)</p> <p>Water Quality Protection Specialist I (0.5FTE)</p> <p>Water Quality Technician (0.5 FTE)</p>	<p><i>Needed EPA Training: STORET &amp; WebSim Training.</i></p> <p>Development and application of Tribal Water Quality Standards Training. Tribal CWA 106 Program Requirements Training.</p>	<p>2- Flat Bottom Boats and Trailers. One stationed in the Coos Watershed and the other in the Siuslaw Watershed.</p> <p>2- 40 hp Yamaha Outboard Motor.</p> <p>2- 8 hp Yamaha Outboard Motor.</p> <p>15- YSI 6600 EDS data loggers or comparable each with a complete set of probes.</p> <p>1- Nutrient AutoAnalyzer.</p> <p>1- Autoclave.</p> <p>2- YSI 665 Handheld Multi-Parameter Meter each with cables and complete set of probes.</p> <p>20- HOBO Water Temperature data loggers and software.</p>	Tribal Environmental Lab.

WQP Year	Staffing	Training	Equipment	Lab
2015	<p>Water Quality Protection Specialist II (1.0 FTE)</p> <p>Water Quality Protection Specialist I (0.5 FTE)</p> <p>Air and Water Quality Protection Specialist I (0.5 FTE)</p>	<p><i>Needed EPA Training: STORET &amp; WebSim Training. Development and application of Tribal Water Quality Standards Training. Tribal CWA 106 Program Requirements Training.</i></p> <p><i>Other Trainings: SCUBA Certification</i></p>	<p>3- Workstation computers &amp; software.</p> <p>1- Rugged field laptop and software.</p> <p>2- Sub-meter or better GPS receivers and software.</p> <p>1- Flat Bottom Boat and Trailer.</p> <p>1- 40 hp Yamaha Outboard Motor.</p> <p>1- 8 hp Yamaha Outboard Motor.</p> <p>11 - YSI 6600 EDS data loggers or comparable each with a complete set of probes.</p> <p>7 - YSI EXO 2 data loggers with a complete set of probes</p> <p>1- Nutrient AutoAnalyzer.</p> <p>1 - Autoclave</p> <p>2- IDEXX Bacteria Lab Quant-Tray sealer and trays, supplies, and 4 incubators.)</p> <p>1 - YSI 665 Handheld Multi- Parameter Meter with cables and complete set of probes.</p> <p>1- YSI EXO 1 Handheld Multi-Parameter Sonde Probe with cable and complete set of probes</p>	Tribal Environmental Lab

			<p>10 - HOBO Water Temperature data loggers and software.</p> <p>3- Workstation computers &amp; software.</p> <p>1 - Rugged field laptop and software.</p> <p>2- Sub-meter or better GPS receivers and software.</p>	
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