INTERMEDIATE WATER QUALITY ASSESSMENT REPORT FOR THE CONFEDERATED TRIBES OF COOS, LOWER UMPQUA AND SIUSLAW INDIANS

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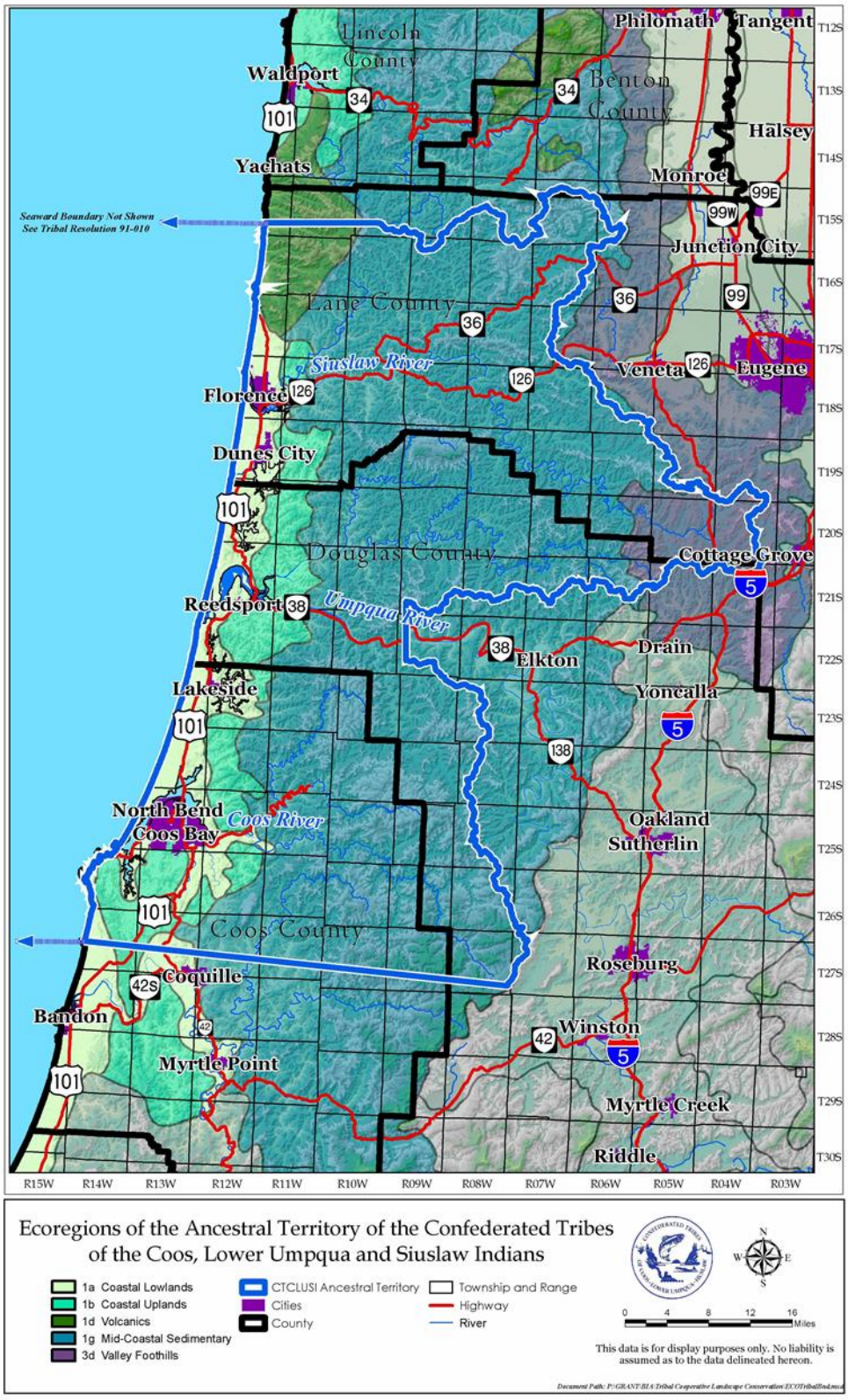
I. Introduction

This assessment report focuses on data collected by the Tribes' Integrated Water Quality Monitoring Program in waters of or pertaining to the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians' (CTCLUSI) reservation or other Tribal lands.

Environmental issues within our ancestral watersheds can take many years to develop or may have an immediate impact on our cultural resources and environment. The Tribes' Natural Resources Department's overarching goal is to continually strengthen and modify the Tribes' 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.

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



Overview of the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians' (CTCLUSI) Reservation and Tribal lands:

- CTCLUSI Reservation and Tribal lands total approximately 160 acres.
- This land base includes approximately 8.54 acres of tidelands and 2.03 miles of shoreline.
- Tribal lands are dispersed among 4th field HUCs.[1]
    - Sixes: 481,819 acres[2]
    - Coos: 576,243 acres[2]
    - Siuslaw: 496,157 acres[2]
- Waters located on Tribal property consist of:
    - 0.12 miles of rivers and streams.
    - 5.5 acres of wetlands, excluding tidelands.
- There are two drinking active water wells that depend on a potable aquifer system located on Tribal lands.

[1] http://cfpub.epa.gov/surf/locate/hucperstate_search.cfm?statepostal=OR
[2] http://watersgeo.epa.gov/mwm/ (Go To: HUC; select Watershed Boundaries from Dropdown menu)

II. Integrated water quality monitoring program and assessment methods

1) Introduction

The purpose of the Tribes' Integrated Water Quality Monitoring Program (IWQMP) is to determine whether water quality criteria/benchmarks are being met and beneficial uses are being supported for waterbodies of or pertaining to the reservation and other Tribal lands. Establishing a baseline of water quality conditions for all Tribal waters and periodically reassessing baseline water quality to evaluate short-term variability and long term trends is an important component of this program objective.

Monitoring Objectives	
Program Area	**Objectives**
Overall Integrated Water Quality Program	1. Establish baseline water quality conditions for all pertinent uses. 2. Document short term and long-term water quality trends. 3. Assess whether water quality standards are being met and beneficial uses are being supported. 3. Develop and test ecological indicators and monitoring designs. 4. Assess local water quality issues such as: low dissolved oxygen, eutrophication, chemical & biological (e.g. bacteria) contamination, habitat modification, and cumulative impacts.
Non-point Source Program	1. Identify and employ monitoring techniques to determine and quantify the effectiveness of watershed improvement projects. 2. Build partnerships with water quality stakeholders to reduce non-point source water pollution.
Water Quality Standards	1. Identify reference conditions for the development of numerical and biological criteria. 2. Develop and refine tribal water quality standards. 3. Determine if water resources are meeting tribal water quality standards.
Wetlands	1. Develop Wetlands Program. 2. Develop indicators and assess beneficial use attainment.

2) Monitoring Program Overview

Water quality monitoring is conducted by the CTCLUSI Department of Natural Resources (DNR) staff and is implemented according to the Tribes' Quality Assurance Program Plan (QAPP) for the IWQMP. This QAPP is approved by the Environmental Protection Agency.

During the 2015 water year, the integrated water quality monitoring program continued to collect baseline estuarine water quality monitoring data at four continuous monitoring stations. These data were collected at 15 minute sample intervals year round. The station locations and parameters measured are listed in the table below. The Tribes' continuous estuarine water monitoring was developed by integrating a combination of the National Estuarine Research Reserve (NERR) System Wide Monitoring Program (SWMP) and USGS recommended equipment and protocols for the collection and management of these data (see CDMO NERR SWMP Data Management Manual and the USGS manual 'Guidelines and Standard Procedures for Continuous Water-Quality Monitors: Station Operation, Record Computation, and Data Reporting').

The Tribes' integrated water quality monitoring program also collects discrete water quality data on a quarterly to annual basis (as staff and resources allow) at one freshwater site, Sixes River (station location and parameters measured are listed in the table below). Protocols implemented for the collection of these data are primarily those outlined in the Oregon Department of Environmental Quality (ODEQ) 'Watersheds Assessment Field Sampling SOP's'.

Monitoring Locations:

Waterbody Name	Lat./Long	Parameters monitored	Monitoring frequency	303d List Parameter(s)
Siuslaw River, Cox Island – Siuslaw Watershed	43° 58' 27" N 124° 04' 16" W	Field Measurements: Water Temperature, Dissolved Oxygen, Salinity/Specific Conductivity, pH, Turbidity, and Depth	Year Round: 15 minute intervals	**Parameter:** Alkalinity **Season:** Year Round **Listed**: 2004 **Beneficial Use(s):** Aquatic Life **Status:** Insufficient data, potential concern **Parameter:** Ammonia **Season:** Year Round **Listed**: 2004 **Beneficial Use(s):** Aquatic Life **Status:** Attaining some criteria/uses **Parameter:** Biological Criteria **Season:** Year Round **Listed** :2010 **Beneficial Use(s):** Aquatic Life **Status:** Water quality limited, 303(d) list, TMDL needed **Parameter:** Chloride **Season:** Year Round **Listed**: 2004 **Beneficial Use(s):** Aquatic Life **Status:** Insufficient data **Parameter:** Chlorophyll a **Season:** Fall, Winter, Spring; Summer **Listed**: 2004 **Beneficial Use(s):** Water supply; Water contact recreation; Fishing; Aesthetics; Livestock watering **Status:** Insufficient data; Attaining some criteria/uses **Parameter:** Dissolved Oxygen **Season:** Year Round (Non-spawning); Year Round **Listed:** 2004; 2002 **Beneficial Use(s):** Estuarine water, Cold-water aquatic life; Anadromous fish passage; Salmonid fish rearing; Salmonid fish spawning **Status:** Attaining some criteria/uses; Water quality limited, 303(d) list, TMDL needed **Parameter:** Fecal Coliform **Season:** Year Round **Listed:** 2004 **Beneficial Use(s)** Water contact recreation**,** Shellfish growing **Status:** Water quality limited, 303(d) list, TMDL needed. **Parameter:** Nutrients **Season**: Undefined **Listed**: 1998 **Beneficial Use(s):** Aesthetics **Status:** Insufficient data **Parameter:** pH **Season**: Year Round **Listed**: 2004 **Beneficial Use(s):** Water contact recreation; Salmonid fish spawning; Resident fish and aquatic life; Anadromous fish passage; Salmonid fish rearing **Status:** Attaining some criteria/uses **Parameter:** Phosphate Phosphorus **Season**: Summer **Listed**: 2004 **Beneficial Use(s):** Aquatic life **Status:** Insufficient data **Parameter:** Sedimentation **Season:** Undefined **Listed:** 1998 **Beneficial Use(s):** Salmonid fish rearing; Resident fish and aquatic life; Salmonid fish spawning **Status:** Insufficient data **Parameter:** Temperature **Season**: Year Round (Non-spawning) **Listed**: 2004 **Beneficial Use(s):** Salmon and trout rearing and migration **Status:** Water quality limited, 303(d) list, TMDL needed.
		Laboratory: Bacteria (E.*coli and enterococcus*)	Monthly/After storm events	
		Laboratory: Nutrients (TN and TP), and Chlorophyll	Seasonally	
North Fork Siuslaw River – Siuslaw Watershed	43° 58' 40" N 124° 04' 48" W	Field Measurements: Water Temperature, Dissolved Oxygen, Salinity/Specific Conductivity, pH, Turbidity, and Depth	Year Round: 15 minute intervals	**Parameter:** Sedimentation **Season:** Undefined **Listed:**1998 **Beneficial Use(s):** Resident fish and aquatic life , Salmonid fish rearing, Salmonid fish spawning **Status:** Water quality limited, 303(d) list, TMDL needed

		Laboratory: Bacteria (E.*col and enterococcus*)	Monthly/After storm events	**Parameter:** Temperature **Season**: Year Round (Non-spawning) **Listed** :2004 **Beneficial Use(s):** Salmon and trout rearing and migration **Status:** Water quality limited, 303(d) list, TMDL needed.
		Laboratory: Nutrients (TN and TP), and Chlorophyll	Seasonally	
		Laboratory: Bacteria (*E.coli*)	Monthly/After storm events	
		Laboratory: Nutrients (TN and TP), and Chlorophyll	Seasonally	
		Laboratory: Toxic Algae	Seasonally	
Coos River, Lower Bay, North Spit, BLM boat ramp – Coos Watershed	43° 24' 54.83" N 124° 16' 42.60" W	Field Measurements: Water Temperature, Dissolved Oxygen, Salinity/Specific Conductivity, pH, Turbidity, and Depth	Year Round: 15 minute intervals	**Parameter:** Ammonia S**eason:** Year Round **Listed:** 2004 **Beneficial Use(s):** Aquatic life **Status:** Insufficient data **Parameter:** Chlorophyll a **Season**: Summer **Listed:** 2004 **Beneficial Uses**: Water contact recreation; Aesthetics; Livestock watering; Water supply; Fishing **Status:** Insufficient data **Parameter:** Fecal Coliform **Season:** Year Round **Listed**: 2004 **Beneficial Use(s):** Shellfish growing; Water contact recreation **Status:** Water quality limited, 303(d) list, TMDL needed **Parameter:** pH S**eason:** Year Round **Listed:** 2004 **Beneficial Use(s):** Resident fish and aquatic life; Water contact recreation **Status:** Insufficient data **Parameter:** Sedimentation **Season:** Undefined **Listed:** 1998 **Beneficial Use(s):** Salmonid fish rearing; Salmonid fish spawning; Resident fish and aquatic life **Status:** Insufficient data
		Laboratory: Bacteria (E.*coli and enterococcus)*	Monthly/After storm events	
		Laboratory: Nutrients (TN and TP), and Chlorophyll	Seasonally to Quarterly (as staff and resources allow)	
Coos River, Lower Bay, Empire Docks – Coos Watershed	43° 23' 39.37" N 124° 16' 49.80" W	Field Measurements: Water Temperature, Dissolved Oxygen, Salinity/Specific Conductivity, pH, Turbidity, and Depth	Year Round: 15 minute intervals	**Parameter:** Ammonia S**eason:** Year Round **Listed:** 2004 **Beneficial Use(s):** Aquatic life **Status:** Insufficient data **Parameter:** Chlorophyll a **Season**: Summer **Listed:** 2004 **Beneficial Uses**: Water contact recreation; Aesthetics; Livestock watering; Water supply; Fishing **Status:** Insufficient data **Parameter:** Fecal Coliform **Season:** Year Around **Listed**: 2004 **Beneficial Use(s):** Shellfish growing; Water contact recreation **Status:** Water quality limited, 303(d) list, TMDL needed **Parameter:** pH S**eason:** Year Round **Listed:** 2004 **Beneficial Use(s):** Resident fish and aquatic life; Water contact recreation **Status:** Insufficient data **Parameter:** Sedimentation **Season:** Undefined **Listed:** 1998 **Beneficial Use(s):** Salmonid fish rearing; Salmonid fish spawning; Resident fish and aquatic life **Status:** Insufficient data
		Laboratory: Bacteria (E.*coli enterococcus*)	Monthly/After storm events	
		Laboratory: Nutrients (TN and TP), and Chlorophyll,	Seasonally to Quarterly (as staff and resources allow)	
		Laboratory: Bacteria (enterococcus)		

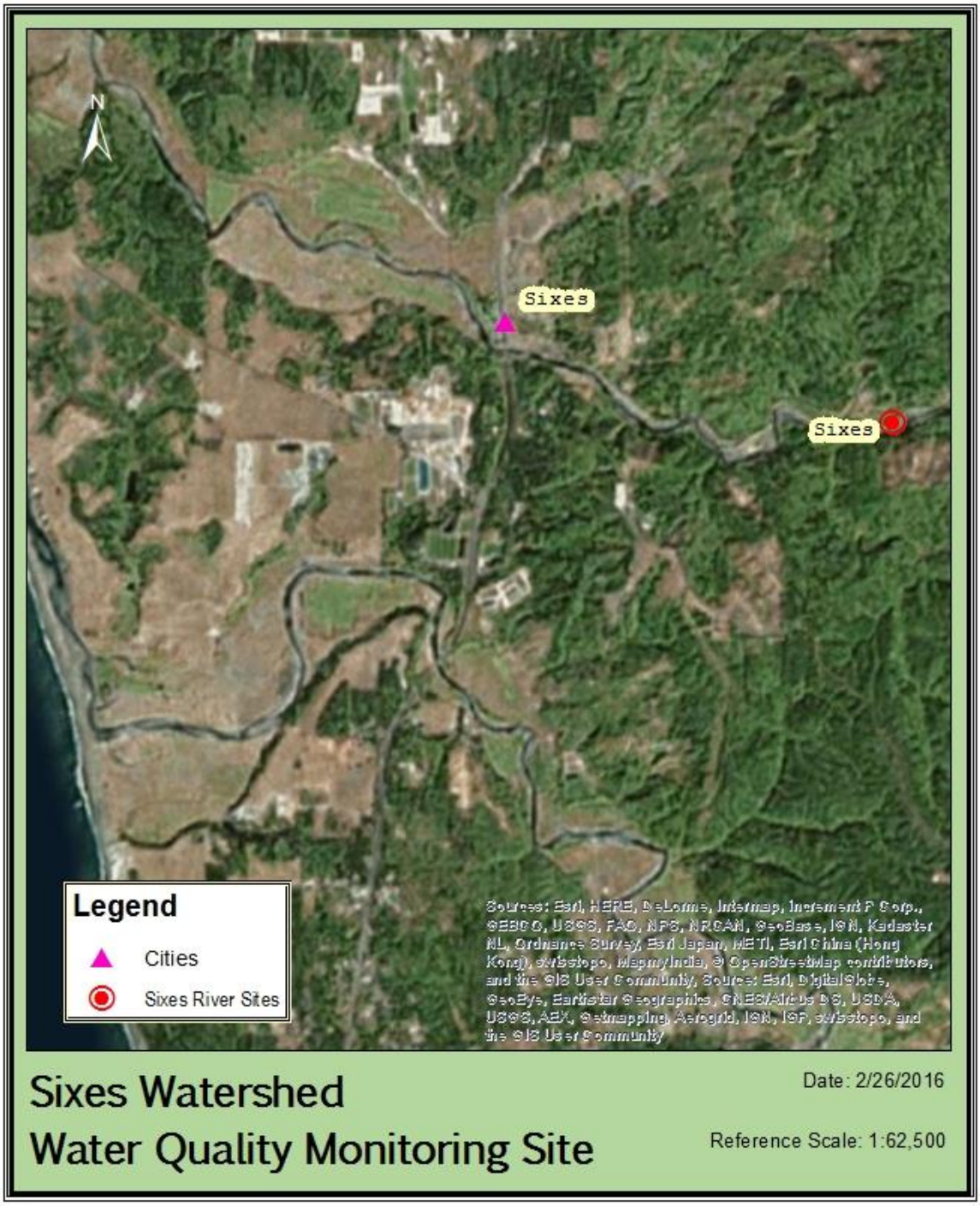
Sixes River – Sixes Watershed	42° 48' 39.5" N 124° 26' 43.3" W	Field Measurements: Water Temperature, Dissolved Oxygen, Salinity/Specific Conductivity, pH, Turbidity, and Depth	Seasonally to Quarterly (as staff and resources allow)	**Parameter:** Alkalinity **Season:** Year Round **Listed**: 2004 **Beneficial Use(s):** Aquatic life **Status:** Insufficient data, potential concern **Parameter:** Ammonia **Season:** Year Round **Listed**: 2004 **Beneficial Use(s):** Aquatic life **Status:** Attaining some criteria/uses **Parameter:** Biological Criteria **Season:** Year Round **Listed** :2010 **Beneficial Use(s):** Aquatic Life **Status:** Water quality limited, 303(d) list, TMDL needed **Parameter:** Chloride **Season:** Year Round **Listed**: 2004 **Beneficial Use(s):** Aquatic Life **Status:** Insufficient data **Parameter:** Chlorophyll a **Season:** Fall, Winter, Spring; Summer **Listed**: 2004 **Beneficial Use(s):** Fishing; Aesthetics; Livestock watering; Water supply; Water contact recreation **Status:** Insufficient data; Attaining some criteria/uses (Summer) **Parameter:** Dissolved Oxygen **Season:** Year Round (Non-spawning); Oct. 15 to May15 **Listed**: 2010; 2004 **Beneficial Use(s):** Cold-water aquatic life; Salmon and steelhead spawning **Status:** Water quality limited, 303(d) listed, TMDL needed. **Parameter:** E.Coli **Season:** Year Around **Listed**: 2004 **Beneficial Use(s):** Water contact recreation **Status:** Attaining some criteria/uses **Parameter:** Fecal Coliform **Season:** Year Around **Listed**: 1998 **Beneficial Use(s):** Water contact recreation **Status:** Attaining some criteria/uses **Parameter:** pH **Season:** Year Round **Listed**: 2004 **Beneficial Use(s):** Water contact recreation; Salmonid fish spawning; Resident fish and aquatic life; Anadromous fish passage; Salmonid fish rearing **Status:** Attaining some criteria/uses **Parameter:** Sedimentation **Season:** Undefined **Listed**: 1998 **Beneficial Use(s):** Salmonid fish rearing; Salmonid fish spawning; Resident fish and aquatic life **Status:** Insufficient data **Parameter:** Temperature **Season:** Year Round (Non-spawning) **Listed**: 2004 **Beneficial Use(s):** Salmon and trout rearing and migration **Status:** Water quality limited, 303(d) list, TMDL needed.
		Laboratory: Bacteria (*E.coli*)		
		Laboratory: Nutrients (TN and TP), Chlorophyll, Basic Habitat Information, and Macroinvertebrates		

3) Maps of Monitoring Sites

North Fork and Cox Island Siuslaw Sonde Stations

Coos Bay Sonde Stations

Sixes River Sample Site



4) Total Extent of Waters Assessed

During the 2015 water year, our program continuously monitored baseline water quality at 4 locations on two rivers pertaining to Tribal lands (the Coos and North Fork Siuslaw River). Those data collected at the continuous monitoring stations represent approximately 75% of the total stream and 90% of the total tideland miles (approx. 0.12 miles of rivers and streams and 2.03 miles of tideland) of or pertaining to Tribal lands. Additional water quality assessment data such as nutrient, bacteria and benthic macroinvertebrate data were collected less frequently and included sample sites other than the continuous monitoring sites. The reduced sampling frequency and disparity among parameters monitored at different sites is due primarily to funding and staff resource constraints (see table above for parameters measured at each site and monitoring frequency). The program did not do any significant monitoring of wetlands or lakes due to funding and staff resource constraints.

The integrated water quality monitoring program plans to add testing for microcystin and other toxins from harmful algal blooms (HAB) in Tenmile Lake during summer 2016. A quick microcystin strip test (Abraxis brand) was done on visible algal scums at North Tenmile Lake on 8/6/15 with positive results of 5ppb to >10 ppb.

Satellite telemetry was added to one of the Tribes' Coos Bay monitoring stations (CTCNSWQ) in June of 2014, with South Slough National Estuarine Research Reserve (SSNERR) collaboration. The real-time data can be accessed online through NOAA's Satellite and Information Service:
http://amazon.nws.noaa.gov/cgi-bin/hads/interactiveDisplays/displayMetaData.pl?table=dcp&nesdis_id=346F229A

5) Data Analysis and Assessment

The goal for all waters of or pertaining to Tribal lands is to support the following Tribal and/or state designated beneficial uses.

Tribal Goals/Designated Beneficial Uses for the Waters of or Pertaining to Tribal Lands

Designated Use	Coos River/Lower Bay	North Fork/ Mainstem Siuslaw River	Sixes River
Salmon and Trout Rearing and Migration	X	X	X
Commercial and/or Recreational Shellfish Harvesting	X	X	----
Aesthetic Quality	X	X	X
Water Contact Recreation	X	X	X

CTCLUSI does not yet have Tribal or EPA approved water quality standards. Therefore, our program primarily refers to ODEQ water quality standards to evaluate water quality data generated by our integrated water quality monitoring program. In addition to ODEQ criteria, our program refers to the Oregon Watershed Enhancement Board (OWEB) recommended indicator criteria to evaluate total nitrogen, total phosphorus and turbidity data generated by the Tribes' integrated water quality monitoring program. In addition to the water quality parameters listed below, the Tribes' water quality monitoring program also collects annual macroinvertebrate samples from the Sixes River sample site. Macroinvertebrate data collected by our program are evaluated per the Benthic Invertebrate Index of Biological Integrity – BIBI (modified Karr 1998).

Designated Uses	*Water Quality Parameter*			
Aquatic Life	**Temp***	**D.O.**	**Turbidity**	**pH**
Salmon and Trout Rearing and Migration	***Summer and Early Fall*** **Not greater than 18° C** 7-day max daily average	For estuarine water, the dissolved oxygen concentrations may not be less than **6.5 mg/**l (for coastal water bodies)	Indicator: 50 NTU maximum above background	6.5 - 8.5
	Citation			
	OAR 340-041-0028: WATER POLLUTION DIVISION 41 WATER QUALITY STANDARDS: BENEFICIAL USES, POLICIES, AND CRITERIA FOR OREGON	OAR 340-041-0016: ibid	OWEB Watershed Assessment Manual	OAR 340-041-0021; 0225 (b);0305 (a): ibid

Water Contact	**Enterococci organism levels**
Recreational Uses	No more than 158 colony forming units (158 MPN) per 100 milliliters of marine water
	Citation
	Oregon Department of Human Services
	E.coli organism levels
	126 E. coli/100 ml (30-day log mean—minimum 5 samples) 406 E. coli/100 ml (no single sample can exceed the criteria)
	Citation
	OAR 340-041-0009: WATER POLLUTION DIVISION 41 WATER QUALITY STANDARDS: BENEFICIAL USES, POLICIES, AND CRITERIA FOR OREGON

Aesthetics	**Nutrients**	**Turbidity**
	Total Phosphorus Evaluation Criteria: greater than 0.05 mg/l Total Nitrate Evaluation Criteria: greater than 0.30 mg/l	Indicator Criteria: Background < 50 NTU + 5 NTU or more Indicator Criteria: Background > 50NTU + 10% or more
	Citation	
	OWEB Watershed Assessment Manual	

* OAR 340-041-0028, (7): Oceans and Bays. Except for the Columbia River above river mile 7, ocean and bay waters may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the natural condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life. Absent a discharge or human modification that would reasonably be expected to increase temperature, DEQ will presume that the ambient temperature of the ocean or bay is the same as its natural thermal condition.

III. Data Analysis Results

A. Summary of Data Collected

The following data summaries of Tribal discrete (grab) and continuous (sonde) water quality monitoring data are for the 2015 water year (unless otherwise indicated) and are presented in tabular format.

Lower Coos Surface Water Quality Monitoring Data for Water Year 2015
(Oct 2014 to Sept 2015)*

BLM Discrete Data Summary **							
BLM Grabs Wet Season: 10/01/2014 to 05/31/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	12.57	39.81	25.30	95.68	20.53	7.83	2.85
Median	12.03	39.69	25.31	96.30	9.14	7.84	2.45
Minimum	11.31	33.17	20.22	89.20	8.90	7.73	2.10
Maximum	14.72	45.90	29.69	101.90	77.70	7.90	4.14
Count	6	6	6	6	6	6	6
BLM Grabs Dry Season: 06/01/2014 to 09/30/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	13.21	49.47	32.07	101.77	8.78	7.79	3.23
Median	14.79	49.57	31.97	87.00	7.51	7.75	3.31
Minimum	13.59	48.93	31.90	83.60	7.03	7.59	2.18
Maximum	15.91	49.91	32.35	134.70	11.80	8.04	4.20
Count	3	3	3	3	3	3	3
BLM Continuous Data Summary **							
BLM Sonde Wet Season: 10/01/2014 to 05/31/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	12.64	38.21	24.35	95.51	8.83	7.89	9.12
Median	12.44	39.43	25.13	95.20	8.88	7.94	3.40
Minimum	8.71	5.14	2.78	70.50	6.57	6.71	-1.20
Maximum	17.34	51.65	33.66	127.00	11.20	8.19	**973.60**
Count	23316	19429	19429	23316	20691	20691	18388
BLM Sonde Dry Season: 06/01/2015 to 09/30/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	14.60	48.22	31.45	98.39	8.26	7.92	7.32
Median	14.80	48.90	31.94	96.50	8.07	7.91	3.60
Minimum	8.46	38.26	24.37	63.30	**5.88**	7.22	-0.30
Maximum	**19.21**	51.85	33.95	150.60	13.81	8.34	**924.60**
Count	11141	11141	11141	11140	11140	7813	5552

* Values in bold represent exceedences in maximum single values but are generally considered to be possible anomalies attributable to seasonal extremes (temp) or localized conditions (turbidity). ** Estuary habitat tends to have tidal (salinity/ temp) and open water characteristics (high temp/ low DO) that are not comparable to mainstem and side channel water quality parameters.

Data Summary (cont.)

Lower Coos Surface Water Quality Monitoring Data for Water Year 2015
(Oct 2014 to Sept 2015)*

Empire Discrete Data Summary**							
Empire Grabs Wet Season: 10/01/2014 to 05/31/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	12.24	42.58	27.32	95.15	8.76	7.88	3.33
Median	11.92	43.03	27.62	95.60	8.93	7.88	2.86
Minimum	11.01	36.68	23.14	91.90	7.86	7.78	1.83
Maximum	14.74	48.06	31.22	98.30	9.16	7.93	5.93
Count	6	6	6	6	6	6	6
Empire Grabs Dry Season: 06/01/2015 to 09/30/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	14.11	49.64	32.42	107.55	9.53	7.86	2.53
Median	14.11	49.64	32.42	107.55	9.53	7.86	2.53
Minimum	12.82	49.12	32.09	83.30	7.42	7.64	2.09
Maximum	15.40	50.15	32.75	131.80	11.64	8.08	2.97
Count	2	2	2	2	2	2	2
Empire Continuous Data Summary **							
Empire Sonde Wet Season: 10/01/2014 to 05/31/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	12.50	43.51	28.05	96.45	8.75	7.94	10.97
Median	12.38	44.95	29.04	95.80	8.75	7.96	2.60
Minimum	8.72	7.54	4.18	48.80	**6.14**	7.09	-0.70
Maximum	16.57	51.38	33.49	128.90	11.50	8.24	**954.20**
Count	23320	23320	23320	20692	17226	15819	23315
Empire Sonde Dry Season: 06/01/2015 to 09/30/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	13.15	48.79	31.82	100.53	8.66	8.11	5.07
Median	13.12	49.33	32.24	98.90	8.50	8.13	3.10
Minimum	8.41	41.68	26.78	52.70	**4.96**	7.61	-0.40
Maximum	**18.30**	51.77	33.80	158.40	14.21	**8.71**	**718.50**
Count	6182	6182	6182	6182	6182	6182	4199

* Values in bold represent exceedances in maximum single values but are generally considered to be possible anomalies attributable to seasonal extremes (temp) or localized conditions (turbidity). ** Estuary habitat tends to have tidal (salinity/ temp) and open water characteristics (high temp/ low DO) that are not comparable to mainstem and side channel water quality parameters.

Data Summary (cont.)

Lower Siuslaw Surface Water Quality Monitoring Data for Water Year 2015
(Oct 2014 to Sept 2015)*

North Fork Discrete Data Summary**							
North Fork Grabs Wet Season: 10/01/2014 to 05/31/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	11.72	6.89	3.97	96.42	10.43	6.95	4.72
Median	9.96	5.18	2.86	93.20	10.62	7.02	5.72
Minimum	9.31	0.05	0.02	92.80	9.54	6.62	3.01
Maximum	16.37	18.25	10.86	101.70	10.80	7.23	5.87
Count	5	5	5	5	5	5	5
North Fork Grabs Dry Season: 06/01/2015 to 09/30/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	**19.92**	26.27	16.12	79.23	6.78	7.13	2.59
Median	**21.19**	26.14	16.06	74.10	6.14	7.04	2.93
Minimum	17.37	25.24	15.42	72.50	6.05	6.98	1.77
Maximum	**21.21**	27.42	16.89	91.10	8.15	7.38	3.08
Count	3	3	3	3	3	3	3
North Fork Continuous Data Summary **							
North Fork Sonde Wet Season: 10/01/2014 to 05/31/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	11.80	10.15	6.12	93.67	9.84	7.17	6.60
Median	11.19	4.40	2.35	95.00	10.29	7.13	4.20
Minimum	4.41	0.04	0.02	60.00	5.48	**6.17**	-0.50
Maximum	**19.74**	47.34	30.67	131.10	12.60	8.25	**988.10**
Count	23322	23322	23322	23322	23322	23322	23223
North Fork Sonde Dry Season: 06/01/2015 to 09/30/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	**18.44**	30.53	19.11	81.71	6.85	7.45	4.53
Median	**18.66**	31.56	19.71	80.70	6.75	7.45	3.00
Minimum	10.64	1.96	1.00	22.10	1.95	6.77	0.00
Maximum	**23.28**	48.41	31.57	158.40	13.48	8.27	**920.60**
Count	11705	11705	11705	11705	11705	11705	8736

* Values in bold represent exceedances in maximum single values but are generally considered to be possible anomalies attributable to seasonal extremes (temp) or localized conditions (turbidity). ** Estuary habitat tends to have tidal (salinity/ temp) and open water characteristics (high temp/ low DO) that are not comparable to mainstem and side channel water quality parameters.

Data Summary (cont.)

Lower Siuslaw Surface Water Quality Monitoring Data for Water Year 2015
(Oct 2015 to Sept 2015)*

Cox Island Discrete Data Summary**							
Cox Island Grabs Wet Season: 10/01/2014 to 05/31/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	14.97	11.16	6.50	99.08	10.56	7.31	5.07
Median	11.29	13.48	7.78	98.90	10.53	7.36	4.71
Minimum	9.24	0.05	0.02	92.60	9.83	7.16	2.75
Maximum	15.28	18.97	11.24	109.20	11.47	7.40	9.29
Count	5	5	5	5	5	5	5
Cox Island Grabs Dry Season: 06/01/2015 to 09/30/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	**20.34**	25.60	15.78	79.87	6.80	7.27	3.05
Median	**21.48**	25.68	15.79	77.00	**6.38**	7.18	2.49
Minimum	17.97	22.36	13.56	76.00	**6.24**	7.13	2.40
Maximum	**21.57**	28.75	17.99	86.60	7.78	7.49	4.27
Count	3	3	3	3	3	3	3
Cox Island Continuous Data Summary **							
Cox Island Sonde Wet Season: 10/01/2014 to 05/31/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	11.66	10.31	6.20	93.99	9.91	7.42	7.44
Median	11.09	5.19	2.81	95.50	10.24	7.39	4.30
Minimum	4.26	0.04	0.02	68.00	**5.97**	6.53	0.00
Maximum	**19.25**	47.59	30.89	130.40	12.51	8.65	**954.60**
Count	23322	23322	23322	23322	23322	23322	21423
Cox Island Sonde Dry Season: 06/01/2015 to 09/30/2015	**Temp (°C)**	**SpCond (ms/cm)**	**Salinity (ppt)**	**Dissolved Oxygen (%)**	**Dissolved Oxygen (mg/l)**	**pH**	**Turbidity (NTU)**
Mean	**18.23**	29.67	18.52	84.66	7.17	7.43	7.49
Median	**18.57**	30.01	18.65	82.20	6.94	7.38	3.90
Minimum	10.31	4.10	2.18	32.60	**2.74**	6.86	0.50
Maximum	**22.43**	50.28	32.83	155.50	13.52	8.64	**643.50**
Count	11705	11705	11705	11703	11703	11705	9797

* Values in bold represent exceedances in maximum single values but are generally considered to be possible anomalies attributable to seasonal extremes (temp) or localized conditions (turbidity). ** Estuary habitat tends to have tidal (salinity/ temp) and open water characteristics (high temp/ low DO) that are not comparable to mainstem and side channel water quality parameters.

Bacteria Data

Coos - BLM *E. coli*		Coos - Empire Dock *E. coli*		Siuslaw – North Fork *E. coli*		Siuslaw – Cox Island *E. coli*	
Sample Date	MPN/100 ml	Sample Date	MPN/100 ml	Sample Date	MPN/100 ml	Sample Date	MPN/100 ml
10/28/14	21	10/28/14	20	11/12/14	26	11/12/14	20
12/03/14	41	12/03/14	30	12/18/14	36	12/18/14	41
1/6/15	10	1/6/15	10	2/11/15	36	2/11/15	63
2/24/15	15	2/24/15	<10	3/30/15	<10	3/30/15	20
4/7/15	10	4/7/15	10	5/7/15	10	5/7/15	10
5/26/15	<10	5/26/15	<10	6/17/15	81	6/17/15	53
6/25/15	<10	6/25/15	<10	8/20/15	57	8/20/15	<10
8/4/15	10	8/4/15	10				
9/17/15	10	9/17/15	N/A				

Coos - BLM Enterococci		Coos - Empire Dock Enterococci		Siuslaw - North Frk Enterococci		Siuslaw – Cox Island Entercocci	
Sample Date	MPN/100 ml	Sample Date	MPN/100 ml	Sample Date	MPN/100 ml	Sample Date	MPN/100 ml
10/28/14	20	10/28/14	<10	11/12/14	<10	11/12/14	<10
12/03/14	10	12/03/14	20	12/18/14	10	12/18/14	10
1/6/15	<10	1/6/15	<10	2/11/15	10	2/11/15	20
2/24/15	<10	2/24/15	<10	3/30/15	<10	3/30/15	<10
4/7/15	10	4/7/15	10	5/7/15	<10	5/7/15	<10
5/26/15	<10	5/26/15	<10	6/17/15	10	6/17/15	10
6/25/15	<10	6/25/15	<10	8/20/15	10	8/20/15	<10
8/4/15	<10	8/4/15	<10				
9/17/15	<10	9/17/15	N/A				

Sixes River *E. coli*	
Sample Date	MPN/100 ml
6/11/15	15
9/28/15	31

No single sample exceeded criteria (Enterococci 158 MPN/100 ml of marine water: *E.coli* 406 MPN/100 ml of water)

Nutrient Data – Total Nitrogen (TN), Total Phosphorous (TP) and Chlorophyll

Station			Total Phosphorus	Total Nitrogen	Chlorophyll	Phaeopigment	Chl A
	Date	Time	[TP] (ug/L)	[TN] (ug/L)	(ug/L)	(ug/L)	(ug/L)
BLM	6/25/15		34.30	168.18	5.226	2.797	
North Fork	6/17/15		25.91	165.41	6.841	3.596	
Sixes River	6/11/15		9.36	231.67			1.028

Bold values exceeded criteria ([TP] > 50 ug/L, [TN] > 300 ug/L)

Macroinvertebrate Data

Benthic Invertebrate Index of Biological Integrity-BIBI (modified Karr 1998)

OR: Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians. Analysis by ABA, Inc., Corvallis, OR.

Sampling method: D-frame net, riffle/run habitat, 8 square feet composite, 500 micron mesh.

Subsampling: 500 organism minimum or entire sample. Level 3 PNW standard taxonomic effort.

Abundances adjusted to a full sample and square meter basis.

	Site	Sixes River		Sixes River		Sixes River		Sixes River		Sixes River		Sixes River		Sixes River		Sixes River		Sixes River	
	Date	8/17/2007		6/24/2008		10/2/2008		7/28/2009		8/13/2010		9/16/2011		9/6/2012		9/29/2014		9/28/2015	
	METRIC	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score
D	Total number of taxa	44	5	34	3	51	5	46	5	45	5	45	5	46	5	50	5	49	5
D	Number Ephemeroptera taxa	8	3	9	5	12	5	9	5	9	5	11	5	10	5	9	5	7	3
D	Number Plecoptera taxa	4	3	3	1	3	1	3	1	3	1	4	3	3	1	7	3	4	3
D	Number Trichoptera taxa	8	3	7	3	6	3	6	3	7	3	6	3	7	3	6	3	10	5
D	Number of long-lived taxa	5	5	2	1	4	3	4	3	3	3	3	3	3	3	4	3	5	5
D	Number of intolerant taxa	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	0	0
I	% Tolerant taxa	31	3	39.17	3	31.9	3	26.38	3	29.86	3	23.3	3	23.79	3	35.7	3	29.34	3
D	% Predator	7.57	1	2.34	1	6.03	1	4.09	1	4.42	1	4.69	1	3.77	1	4	1	9.34	1
D	Number of clinger taxa	27	5	20	3	28	5	28	5	26	5	27	5	26	5	28	5	23	5
I	% Dominance (3 taxa)	32.17	5	52.14	3	32.82	5	39.47	5	29.51	5	34.95	5	45.63	5	41.5	5	49.49	5
	TOTAL SCORE		34		24		32		32		32		34		32		34		35
	BIOLOGICAL CONDITION CATEGORY																		
	Maximum score of 50.									Each metric scored: 1=low, 3=moderate, 5=high									
	OTHER COMMUNITY COMPOSITION METRICS THAT ARE INDICATIVE OF BIOLOGICAL CONDITION																		
	Total abundance (m2)	1848		1950		2631		2631		1523		3325		2385		1972		1732	
D	EPT taxa richness	20		19		21		18		19		21		20		22		21	
D	Predator richness	6		7		6		8		8		6		9		7		9	
D	Scraper richness	8		8		7		7		6		6		5		6		6	
D	Shredder richness	3		2		2		2		2		3		2		5		3	
D	%Intolerant taxa	0.15		0.14		9.2		0.1		0.18		0.32		0.9		1.28		0	
I	*% Baetis tricaudatus*	10.33		25.79		13.5		4.19		10.07		8.25		10.54		5.1		0.58	
I	%Collector	54		54.48		55.32		51.94		62.9		63.75		79.28		72.9		36.35	
I	%Parasite	7.57		2.34		6.03		4.09		4.42		4.69		3.77		3.6		25.3	
I	%Oligochaeta	0.15		0.28		0.2		0.51		7.24		0		0		0.7		0.58	
I	Number tolerant taxa	11		7		22		12		13		13		14		19		17	
I	%Simuliidae	0.44		0.14		1.94		1.43		3.36		5.5		4.97		1.5		0.15	
I	%Chironomidae	12.95		3.59		24.34		12.99		23.14		15.53		35.24		11.5		19.42	

L,M & H comparisons with a Pacific Northwest montane stream with high biological integrity.

I= Metric value generally increases with declining biological integrity.

D= Metric value generally decreases with declining biological integrity.

L= Low biological integrity.	BIBI scores between 0-24.
M= Moderate biological integrity.	BIBI scores between 25-39.
H= High biological integrity.	BIBI scores >40.

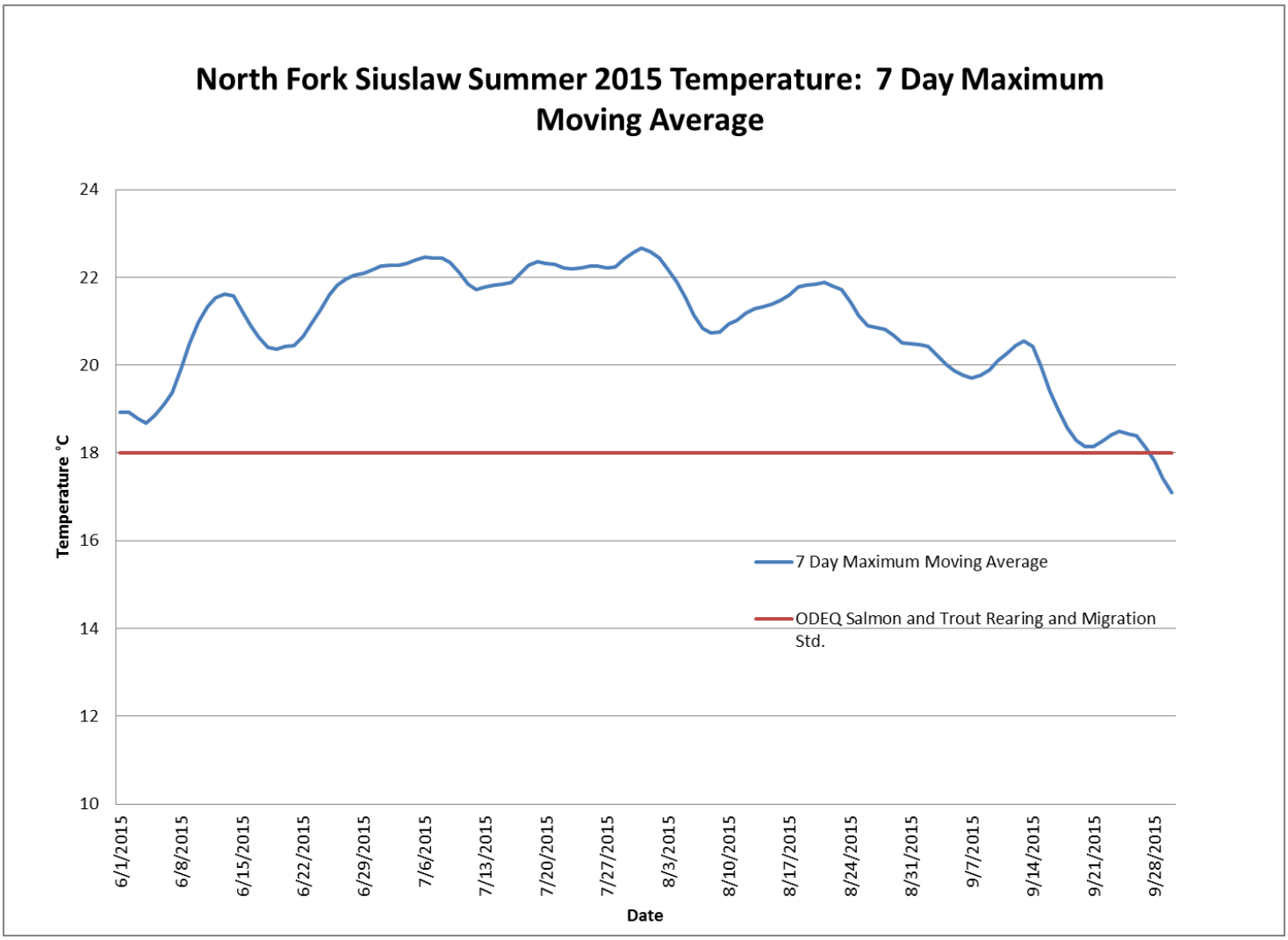
B. Comparison of Data to Benchmark Criteria of Parameters of Concern

Temperature

BLM and Empire Dock Sites – Lower Coos Bay:
Although the 2015 summer and early fall 7 day maximum average for temperature at Coos Bay BLM and Empire Dock stations exceeded the ODEQ summer/early fall water temperature standard for salmon and trout rearing and migration (18°C), continuous data collected at these sites do not indicate consistently high temperatures and are likely anomalies attributable to seasonal variability and/or localized site conditions.

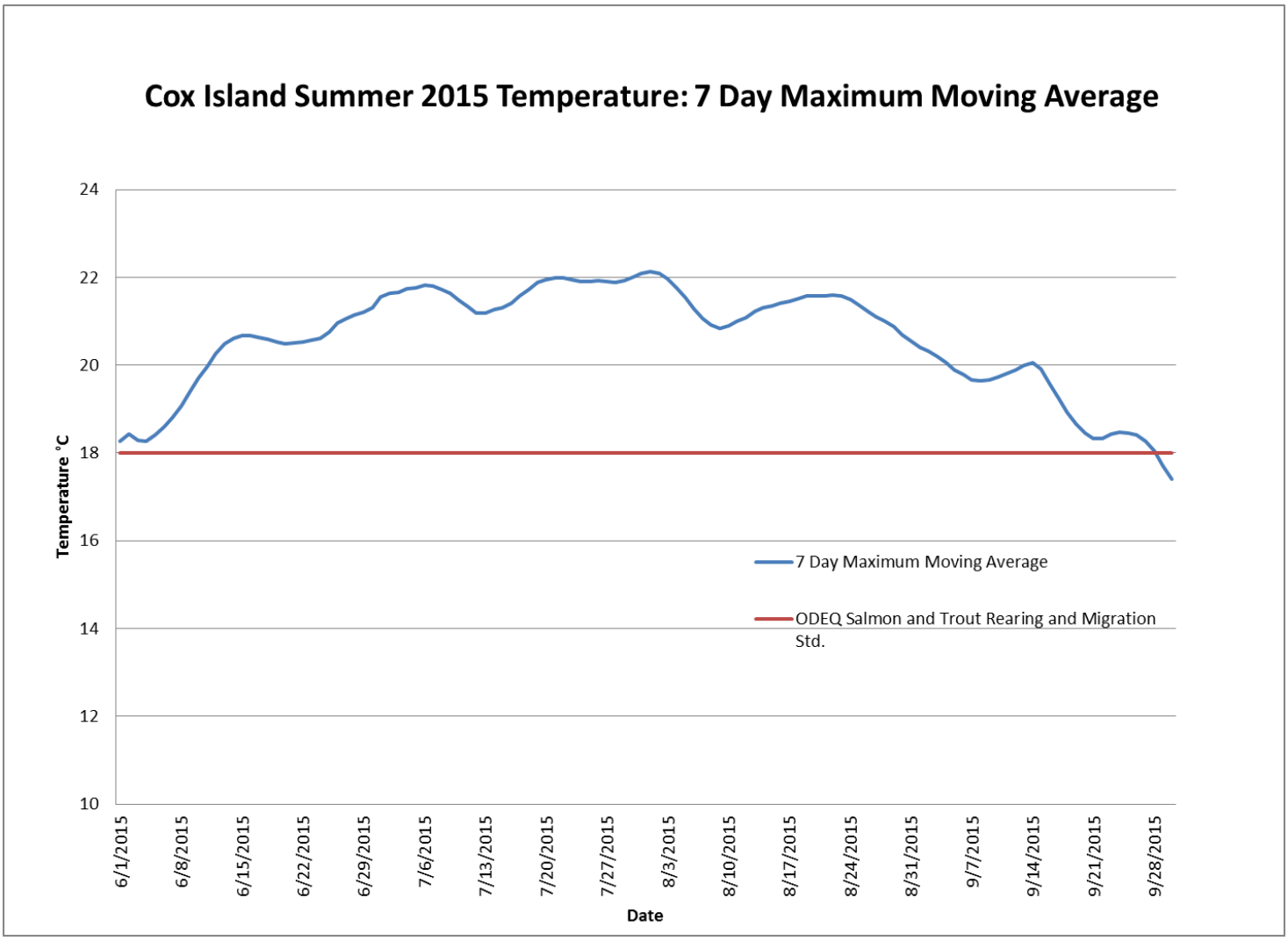
North Fork Siuslaw– Lower Siuslaw Estuary:

The maximum temperature measured at the North Fork Siuslaw Sonde Station was 23.28 °C. The 2015 summer and early fall 7 day maximum average for temperature at this site exceeded the ODEQ summer/early fall water temperature standard for salmon and trout rearing and migration (18°C), the designated fish use for the section of the North Fork Siuslaw River monitored at the Tribes' North Fork Siuslaw Sonde Station.



Cox Island– Lower Siuslaw Estuary:

The maximum temperature measured at the Cox Island Sonde Station was 22.43 °C. The 2015 summer and early fall 7 day maximum average for temperature at this site exceeded the ODEQ summer/early fall water temperature standard for salmon and trout rearing and migration (18°C), the designated fish use for the section of the Siuslaw River monitored at the Tribes' Cox Island Sonde Station.



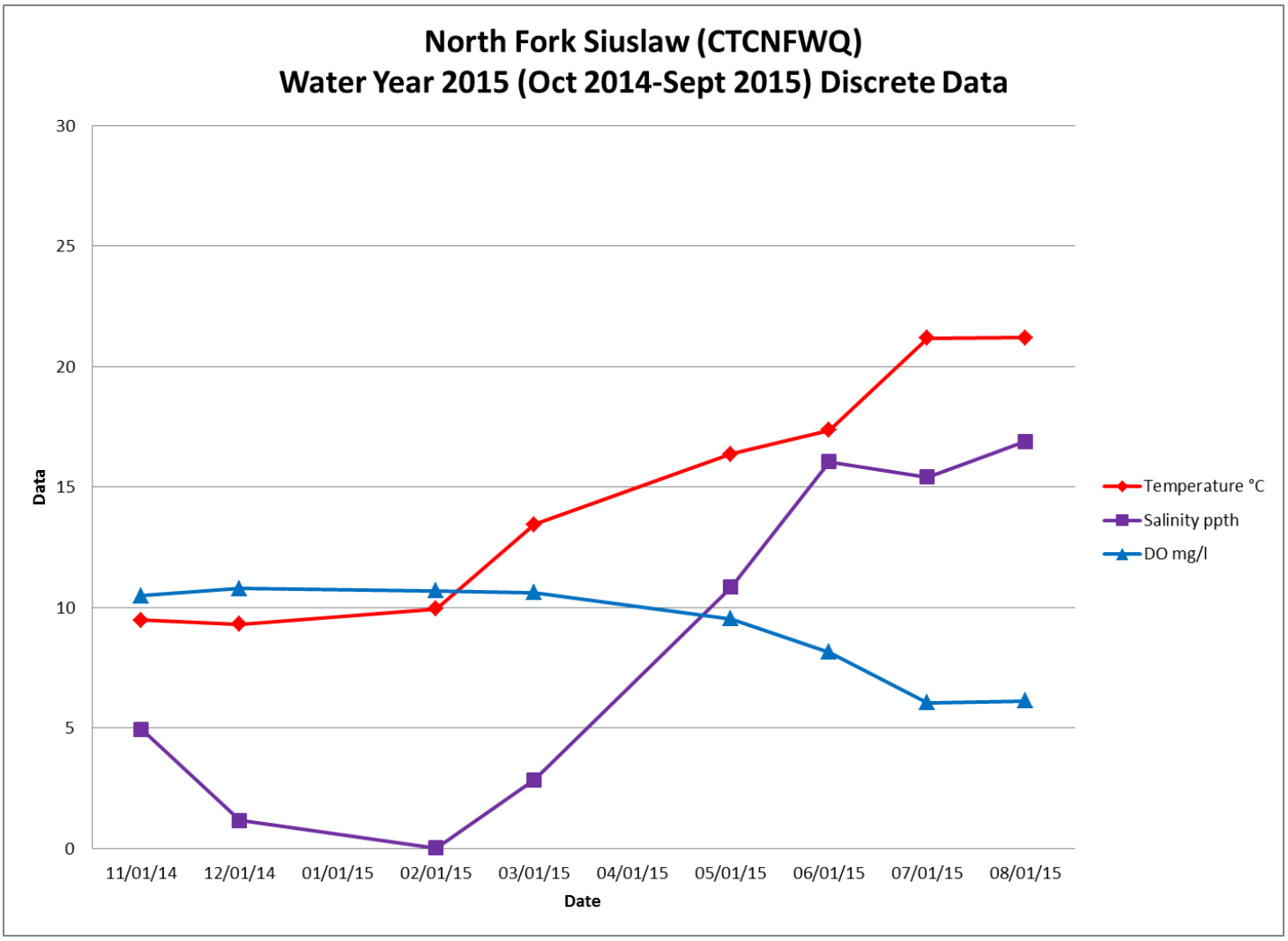
Sixes River – Freshwater

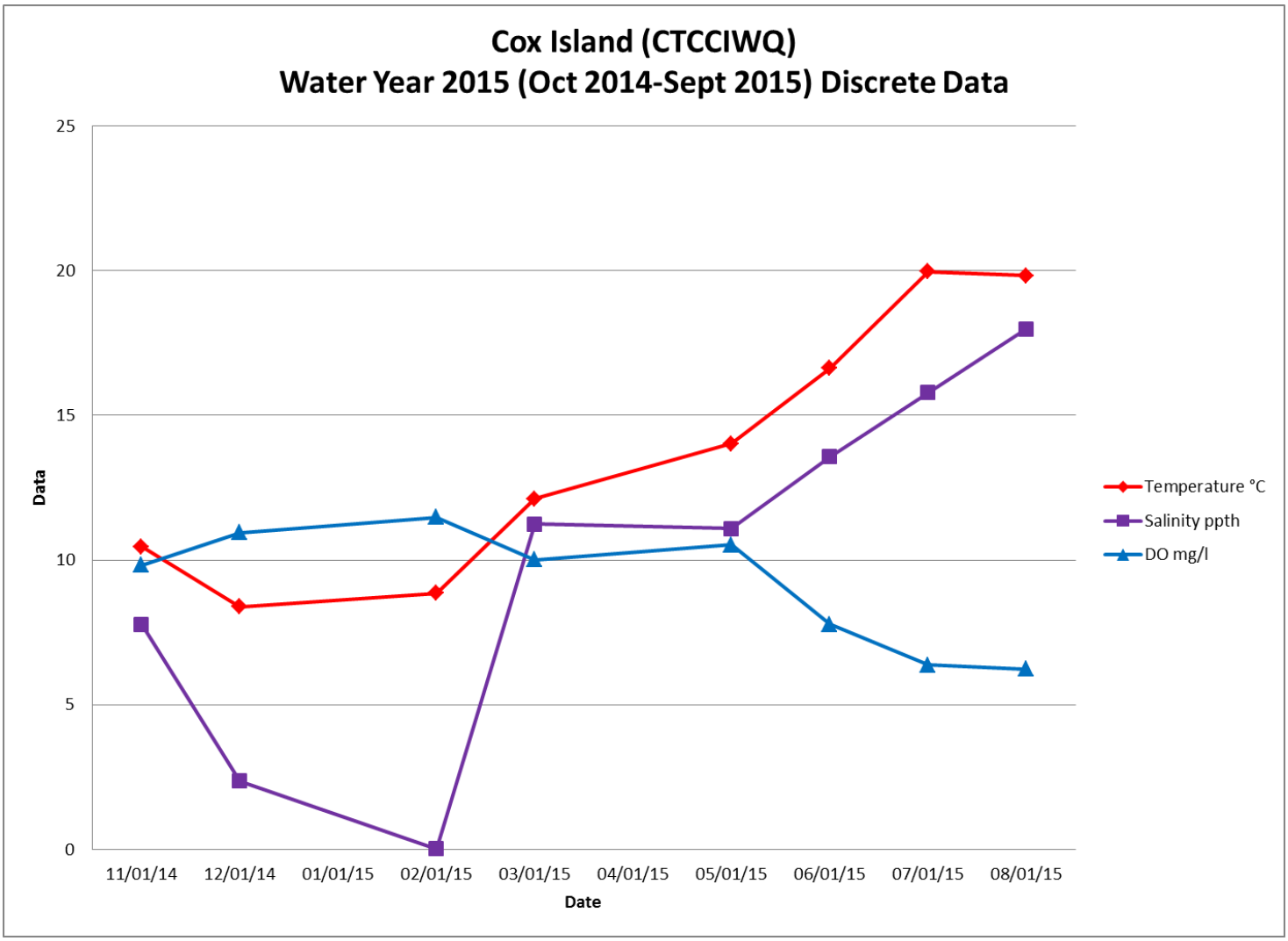
All summer temperature data from the Sixes River site was lost when the deployed temperature sensor was not be recovered.

Dissolved Oxygen

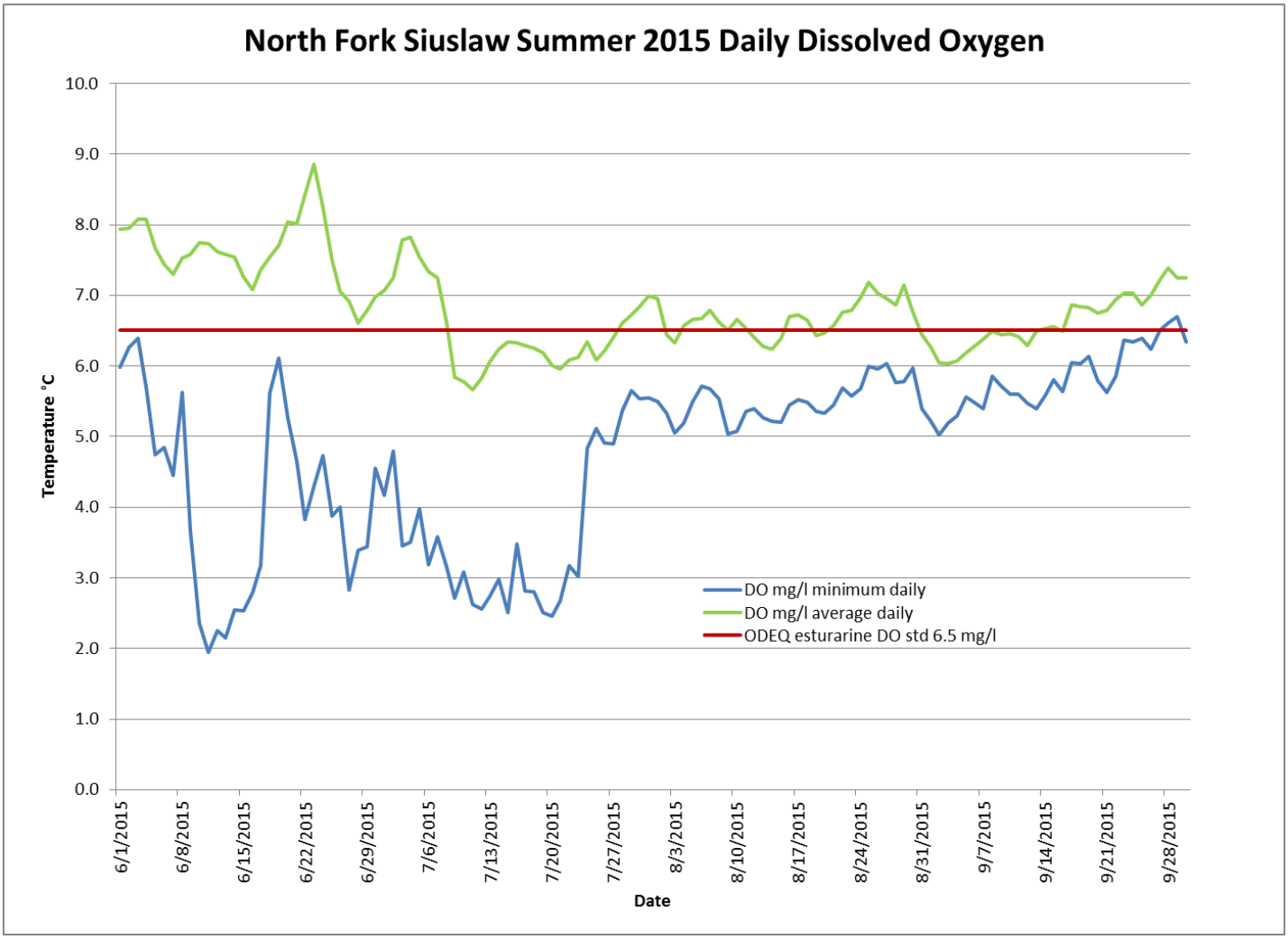
BLM and Empire Dock Sites – Lower Coos Bay:
Although minimum dissolved oxygen recorded at the Coos Bay BLM and Empire Dock stations failed to meet the ODEQ estuarine dissolved oxygen criteria of not less than 6.5 mg/l, continuous data collected at these sites do not indicate consistent low DO measurements and are likely anomalies attributable to seasonal variability and/or localized site conditions.

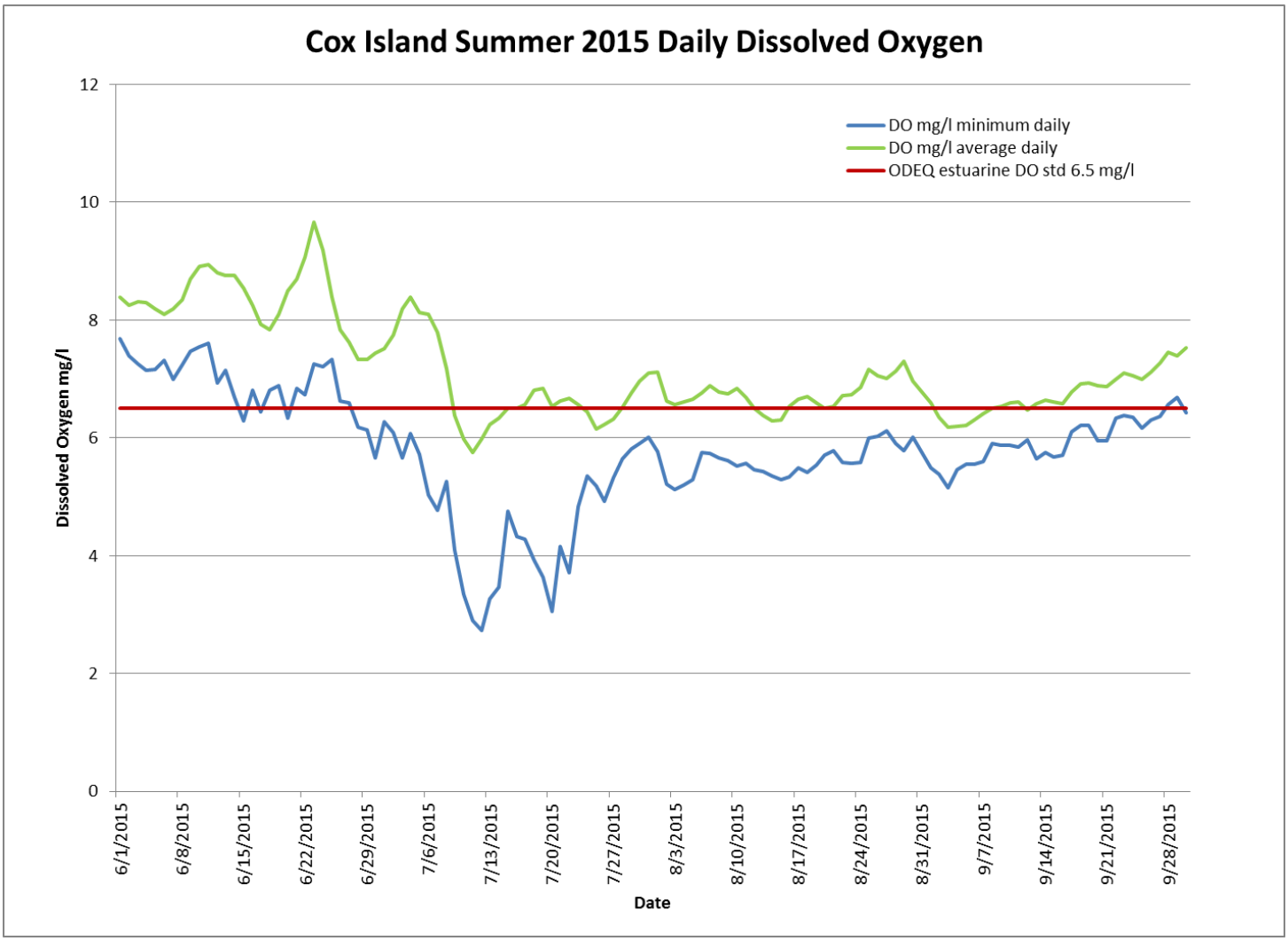
North Fork Siuslaw and Cox Island Sites – Lower Siuslaw Estuary:
Discrete and continuous dissolved oxygen data collected by the Tribes' Integrated Water Quality Monitoring Program at the North Fork and Cox Island stations indicate that the concentration of dissolved oxygen at these sites consistently declines every year beginning in late spring/early summer through fall. The following charts display dissolved ox ygen, temperature and salinity data collected by our program for Water Year 2015. These graphs show a relationship between increasing water temperature and declining dissolved oxygen levels.



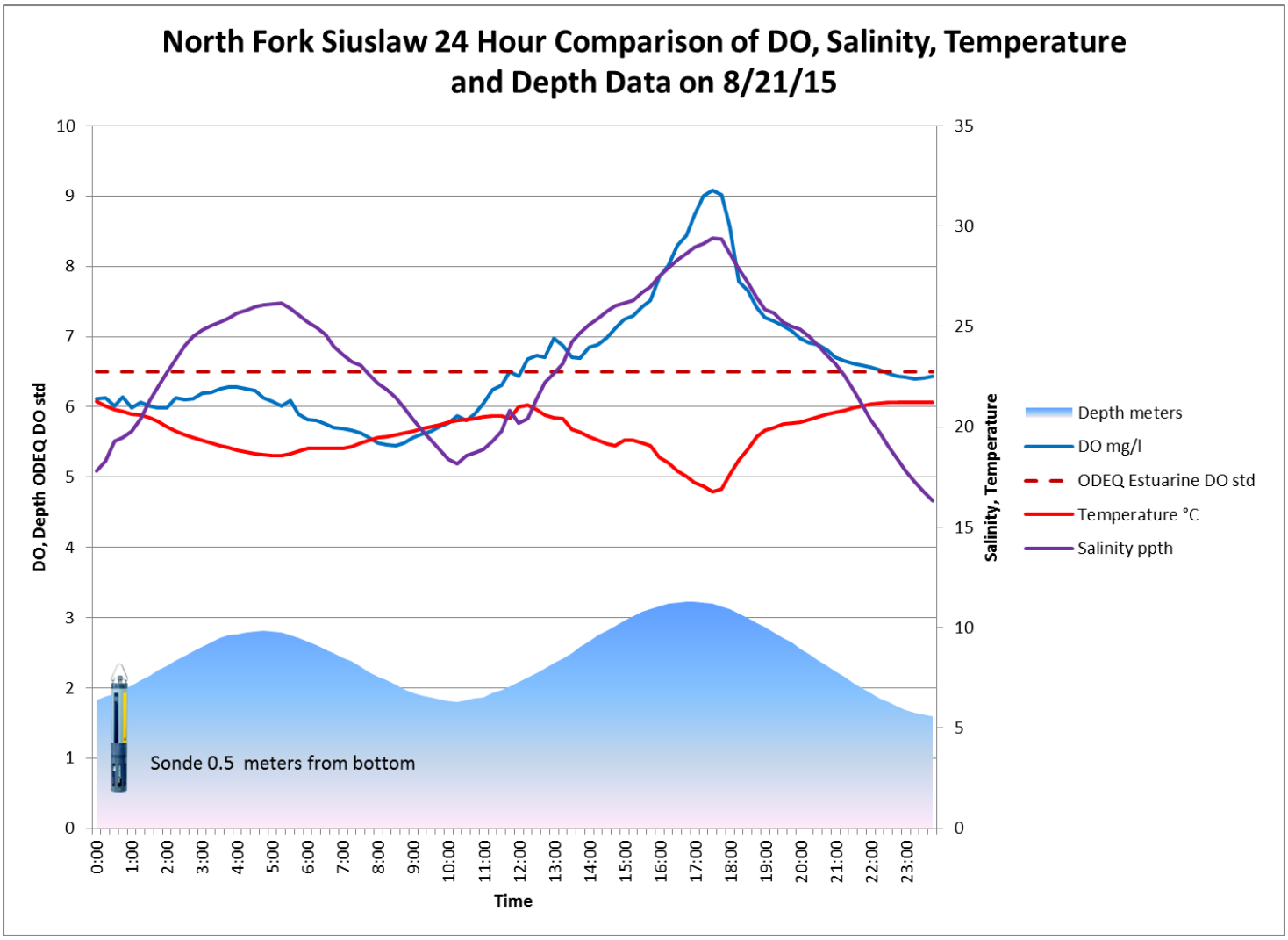

Cox Island (CTCCIWQ)
Water Year 2015 (Oct 2014-Sept 2015) Discrete Data
25
20
15
10
5
0
Data
11/01/14
12/01/14
01/01/15
02/01/15
03/01/15
04/01/15
05/01/15
06/01/15
07/01/15
08/01/15
Date
Temperature °C
Salinity ppth
DO mg/l

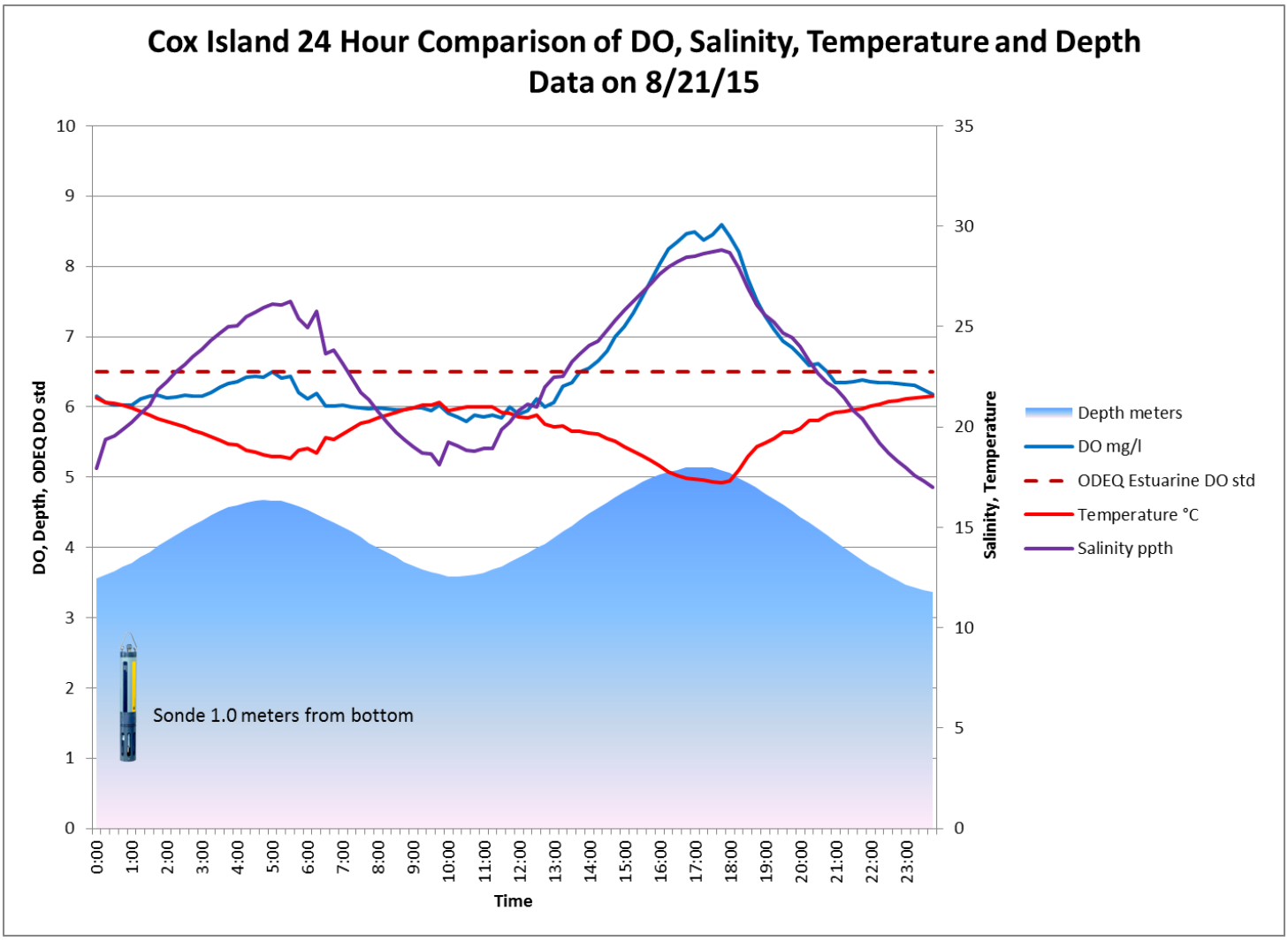
Analysis of historic continuous dissolved oxygen readings indicate that dissolved oxygen levels at the Siuslaw River estuary sites typically fail to meet the ODEQ estuarine dissolved oxygen criteria daily during the summer and early fall. This pattern has been observed since the Tribes began continuously monitoring water quality at these sites in 2006.




Cox Island Summer 2015 Daily Dissolved Oxygen
DO mg/l minimum daily
DO mg/l average daily
ODEQ estuarine DO std 6.5 mg/l
Dissolved Oxygen mg/l
0
2
4
6
8
10
12
6/1/2015
6/8/2015
6/15/2015
6/22/2015
6/29/2015
7/6/2015
7/13/2015
7/20/2015
7/27/2015
8/3/2015
8/10/2015
8/17/2015
8/24/2015
8/31/2015
9/7/2015
9/14/2015
9/21/2015
9/28/2015
Date

The following charts show the tidal influence in the Siuslaw estuary on select water quality measurements over a 24 hour period on selected days in 2015. The influx of marine water during incoming tides is associated with decreasing temperatures and increases in salinity and dissolved oxygen.




Cox Island 24 Hour Comparison of DO, Salinity, Temperature and Depth Data on 8/21/15
DO, Depth, ODEQ DO std
Salinity, Temperature
Time
Depth meters
DO mg/l
ODEQ Estuarine DO std
Temperature °C
Salinity ppth
Sonde 1.0 meters from bottom
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00

C. **Summary of the Extent to Waters Meet Designated Uses or Tribal Goals**

Designated Use	North Fork Siuslaw	Lower Coos Bay	Sixes River
Salmon and Trout Rearing and Migration	Not Fully Supported	Not Enough Data to Determine	Not Fully Supported
Commercial and Recreational Shellfish Harvesting	Not Enough Data to Determine	Not Fully Supported	------
Water Contact: Recreational Activity	Not Enough Data to Determine	Not Enough Data to Determine	Not Enough Data to Determine
Aesthetics	Not Enough Data to Determine	Not Enough Data to Determine	Not Enough Data to Determine

D. Description of Why Waters are Potentially Not Meeting Designated Uses or Goals

North Fork Siuslaw

Temperature and Dissolved Oxygen – Salmon and Trout Rearing and Migration
The North Fork Siuslaw has high summer and early fall temperatures accompanied by regular minimum dissolved oxygen readings. The riparian habitat upstream of the site is highly disturbed and lacking in shade producing canopy. The lack of shade provided in the upstream riparian corridor likely contributes to the high summer and early fall temperatures recorded at the North Fork Siuslaw Sonde site. Elevated temperature likely contributes to the low dissolved oxygen levels recorded at the site. Mechanisms for lower summer DO, related to increasing temperature, include lower mg/l at saturation, increasing salinity, lower turbulence and increased biological demands.

Sixes River

Temperature – Salmon and Trout Rearing and Migration
Historically, the Sixes River site has had predictively high summer and early fall temperatures. Although located in a completely different watershed, riparian conditions at this site are similar to those found upstream of the North Fork Siuslaw Sonde site discussed above. Lack of shade provided in the upstream riparian corridor likely contributes to the high summer and early fall temperatures recorded at the Tribes' Sixes River monitoring site.

IV. Discussion of Issues of Tribal Concern

Data Gaps

Dissolved Oxygen

In order to better understand the cause of low summer dissolved oxygen levels recorded at the North Fork and Cox Island Siuslaw sonde site, the Tribes are planning to collect diel nutrient and Chlorophyll samples in the lower Siuslaw estuary. The expected result of these sampling events is a better understanding of whether the summertime low dissolved oxygen levels recorded at the North Fork and Cox Island sonde site are potentially associated with algae production that may be caused by nutrient loading.

Conclusion

Data collected by our program in the 2015 water year appears to indicate trends are occurring at our sites similar to those observed by our program in previous years. Daily impairments to water quality (e.g. temperature and dissolved oxygen) continue to occur during the Dry Season at the Tribes' North Fork Siuslaw site.

V. Water Quality Data Submission

Water Quality all data (continuous- datalogger/sonde, discrete-grabs, and bacteria) for WY2015 has been formatted for submission. Continuous data will not be uploaded due to the size of data sets. The Tribes will provide the raw QC'd data by request. The discrete-grab data will be uploaded to WQX. Nutrient, Chlorophyll, and bacteria data for WY2015 will be uploaded via WQX by June 2016.