Fact Sheet

The U.S. Environmental Protection Agency (EPA)
Proposes to Reissue a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA) to:

The Quinault Indian Nation
Moclips River Estates Wastewater Treatment Plant (WWTP)
715 Quinaielt
Taholah, Washington 98587

Public Comment Start Date: August 22, 2017
Public Comment Expiration Date: September 21, 2017

Technical Contact: Kai Shum
(206) 553-0060
800-424-4372, ext. 0060 (within Alaska, Idaho, Oregon and Washington)
Shum.Kai@epa.gov

The EPA Proposes To Reissue NPDES Permit
The EPA proposes to reissue the NPDES permit for the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:
- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

<u>EPA Region 10 Proposes Certification.</u>
EPA is certifying the NPDES permit for the Quinault Indian Nation, under Section 401 of the Clean Water Act.

Public Comment
Persons wishing to comment on, or request a Public Hearing for the draft permit for this facility may do so in writing by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to the EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, the EPA's regional Director for the Office of Water and Watersheds will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, the EPA will address the comments and issue the permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days pursuant to 40 CFR 124.19.

Documents are Available for Review
The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting the EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday at the address below. The draft permits, fact sheet, and other information can also be found by visiting the Region 10 NPDES website at "http://EPA.gov/r10earth/waterpermits.htm."

US EPA Region 10
Suite 900
1200 Sixth Avenue, OWW-191
Seattle, Washington 98101
(206) 553-0523 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

The Quinault Indian Nation
1214 Aalis Drive
Taholah, Washington 98587
Attention: Dave Hinchen, (360) 276-0074

Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
1B3	Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 1-day average flow.
4B3	Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 4-day average flow.
ACR	Acute-to-Chronic Ratio
AML	Average Monthly Limit
ASR	Alternative State Requirement
AWL	Average Weekly Limit
BAT	Best Available Technology economically achievable
BCT	Best Conventional pollutant control Technology
BOD_5	Biochemical oxygen demand, five-day
BOD_{5u}	Biochemical oxygen demand, ultimate
BMP	Best Management Practices
BPT	Best Practicable
°C	Degrees Celsius
C BOD_5	Carbonaceous Biochemical Oxygen Demand
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
COD	Chemical Oxygen Demand
CSO	Combined Sewer Overflow
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
Ecology	Washington State Department of Ecology
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency

ESA	Endangered Species Act
FR	Federal Register
Gpd	Gallons per day
HUC	Hydrologic Unit Code
IC	Inhibition Concentration
ICIS	Integrated Compliance Information System
I/I	Infiltration and Inflow
LA	Load Allocation
lbs/day	Pounds per day
LTA	Long Term Average
LTCP	Long Term Control Plan
mg/L	Milligrams per liter
Ml	Milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit or Method Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
N	Nitrogen
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
OWW	Office of Water and Watersheds
O&M	Operations and maintenance
POTW	Publicly owned treatment works
PSES	Pretreatment Standards for Existing Sources
PSNS	Pretreatment Standards for New Sources
QAP	Quality assurance plan
RP	Reasonable Potential

RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SIC	Standard Industrial Classification
SPCC	Spill Prevention and Control and Countermeasure
SS	Suspended Solids
SSO	Sanitary Sewer Overflow
s.u.	Standard Units
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRC	Total Residual Chlorine
TRE	Toxicity Reduction Evaluation
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater treatment plant

I. Background Information

A. General Information

This fact sheet provides information on the draft NPDES permit for the following entity:

Table 1. General Facility Information

NPDES Permit #:	WA0026603
Applicant:	The Quinault Indian Nation Moclips River Estates Wastewater Treatment Plant (WWTP) 715 Quinaielt Taholah, Washington 98587
Type of Ownership	Tribally Owned WWTP
Physical Address:	Quinault Indian Reservation Moclips River Estates Wastewater Treatment Plant 715 Quinaielt Taholah, Washington 98587
Mailing Address:	P.O. Box 189 Taholah, Washington 98587
Facility Contact:	Jim Figg, QIN Utilities Supervisor, (360) 276-8215, ext. 224 Dave Hinchen, QIN WWTP Supervisor, (360) 276-0074
Operator Name:	Dave Hinchen, QIN WWTP Supervisor, (360) 276-0074
Receiving Water	Moclips River within the Quinault Indian Reservation boundary
Facility Outfall	latitude 47.2461° N and longitude 124.1836° W

B. Permit History

The most recent NPDES permit for the Quinault Indian Nation Moclips River Estates Wastewater Treatment Plant ("facility") was issued on August 4, 2009, became effective on September 1, 2009, and expired on August 31, 2014. An NPDES application for permit issuance was submitted by the permittee, and received by the EPA on January 31, 2014. The EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6, the permit has been administratively extended and remains fully effective and enforceable.

C. Tribal Consultation

On June 28, 2017, as part of the EPA's government-to-government relationship with the Quinault Indian Nation (QIN), the EPA provided copies of the preliminary draft Permit and Fact Sheet to the QIN for review.

II. Facility Information

A. Service Area

The QIN owns, operates, and has maintenance responsibility for the facility which treats domestic sewage at the Moclips River Estates at the Qui-nai-elt Village in Taholah. The facility is located within, and discharges within, the boundaries of the Quinault Indian Reservation. According to the treatment plant operator, the facility began operation in 2005. The collection system has no combined sewers. The facility serves a resident population of approximately 250 in approximately 70 houses. There are no major industries discharging to the facility.

B. Treatment Process

The design flow of the facility is 0.035 mgd. The annual average daily flow rate of the facility was 0.017 mgd (in 2013). Based on the Operating Manual, the wastewater treatment plant (WWTP) process consists of a headworks, bioreactor compartments, clarifiers, clarifier skimming, microscreen filtration, and UV disinfection. The plant is also capable to perform ammonia nitrification. Effluent is treated by ultraviolet disinfection prior to discharge and discharged year-round to the Moclips River approximately one half mile south of the plant.

The facility has design removal rates of 95% for BOD_5/$CBOD_5$, and suspended solids. The plant is also designed to remove 50% of phosphorus, 75% of nitrogen, and 95% nitrification of ammonium (NH_4 + N) from its influent. Due to its operation of ultra-violet radiation for disinfection of wastewater, chlorine is not used at this facility.

QIN plans to handle its sludge through Stangland Construction Septic Company. Most of the sludge is transported to the Aberdeen WWTP. As an alternative, the facility could also transport the sludge to the Olympia WWTP, or to the QIN-owned WWTP located at Taholah, Washington.

A schematic of the wastewater treatment process and a map showing the location of the treatment facility and discharge are included in Appendix A. Because the design flow is less than 1 mgd, the facility is considered a minor facility.

C. Outfall Description

The outfall is an open ended pipe and is not equipped with a diffuser.

D. Effluent Characterization

To characterize the effluent, the EPA evaluated the facility's application form, discharge monitoring report (DMR) data, and additional data provided by the facility. The effluent quality is summarized in Table 2.

Table 2 Effluent Characterization

Parameter	Maximum	Minimum	Effluent Limit
BOD5 Average Monthly	29.4 mg/l	20.9 mg/l	30 mg/l
TSS Average Monthly	42 mg/l	15 mg/l	30 mg/l
pH	7.63 s.u.	6.4 s.u.	6.5 – 8.5 s.u.
Ammonia Average Monthly	2.2 mg/l	1.5 mg/l	9.5 mg/l
Temperature Daily Max	21.3 °C	11 °C	None
Fecal Coliform Instantaneous Max	3 colonies/100ml Geometric Mean	0 colonies/100ml Geometric Mean	100 colonies/100ml Geometric Mean

Source: DMRs from September 2011 to September 2016

E. Compliance History

From September 2011 to September 2016, 4 violations occurred with exceeding BOD_5 limits; 3 violations of exceeding TSS limits; and, 1 violation for exceeding pH limits. During this period, there had been a total of 75 reporting violations for untimely or unreported parameters.

Additional compliance information for this facility, including compliance with other environmental statutes, is available on Enforcement and Compliance History Online (ECHO). The ECHO web address for this facility is: https://echo.epa.gov/detailed-facility-report?fid=110010135923

The EPA conducted an inspection of the facility in August 2015. The inspection encompassed the wastewater treatment process, records review, operation and maintenance, and the collection system. Overall, the results of the inspection showed that the facility had areas for improvement in overall operation and maintenance.

The Washington Dept. of Health (WA DOH) conducted an inspection of the facility in May, 2011. The WA DOH identified concerns with the inoperative auto-dialer. An auto-dialer is an electronic device that can automatically dials pre-programmed telephone numbers to notify of system failures. The inspection also identified a problem with the transmittance monitor/intensity panel in the UV disinfection system. The permittee notified the EPA that the UV panel was fixed in 2013 and that they are working to repair the auto-dialer.

III. Receiving Water

In drafting permit conditions, the EPA must analyze the effect of the facility's discharge on the receiving water. The details of that analysis are provided later in this Fact Sheet. This section summarizes characteristics of the receiving water that impact that analysis.

A. Designated Beneficial Uses

The facility discharges to a segment of the Moclips River located within the Quinault Indian Reservation. The QIN does not currently have its own WQS. Until they establish their own regulations for water quality, Washington State's standards will be used as a reference, to protect downstream uses in Washington waters. The application of Washington State's WQS is particularly appropriate because the boundary of the reservation is approximately 90 meters downstream of the outfall.

The portion of the Moclips River that is not located within the Quinault Indian Reservation is located within the Washington State Department of Ecology (Ecology) "Queets/Quinault Water Resources Inventory Area (WRIR) #21". The state portion of the Moclips River is designated for:

- Salmonid spawning rearing, and migration;
- primary contact recreation; domestic industrial, and agricultural water supply;
- stock watering; wildlife habitat;
- harvesting;
- commerce and navigation;
- boating and aesthetic values.

Since the Moclips River is a tributary to extraordinary quality marine waters off the Pacific coast, this segment of the Moclips River should also be protected for Core summer Salmonid Habitat and Extraordinary Primary Contact recreation. In addition, the outfall is located directly upstream of shellfish harvesting that occurs near the mouth of the Moclips River and Ecology has information on bacteria levels that threaten shellfish harvesting in that area. The following two reports by Ecology reference the threat to shellfish harvesting in the area:

- "North Pacific Coast Beaches Fecal Coliform Bacteria Source Investigation Study", June 2016: https://fortress.wa.gov/ecy/publications/documents/1603021.pdf; and,
- "Bacteria Study Digs Up Concerns for Shellfish Harvest Areas along North Pacific coast Beaches", June 2016: https://fortress.wa.gov/ecy/publications/documents/1603024.pdf

B. Water Quality

The water quality for the receiving water is summarized in Table 3.

Table 3. Receiving Water Quality Data

Parameter	Units	Percentile	Value	Source
Temperature	°C	95^{th}	16.54	Facility
pH	Standard units	5^{th} – 95^{th}	6.10 – 7.68	Facility
Ammonia	mg/L	maximum	0.40	Facility
Phosphorus	mg/l	average	0.02	Facility
E.coli Bacteria	cfu/100 ml	maximum	4	Facility
Source: Based on Facility provided surface water monitoring results sampled downstream from outfall, from 3/29/11 to 3/30/17.				

C. Water Quality Limited Waters

Ecology prepared a draft report, "North Ocean Beaches Fecal Coliform Bacteria Source Investigation Study, Data Summary", dated June 2016. The report indicated that water quality criteria for shellfish harvesting were not met at the mouth of the Moclips River during dry season (June to September) with a Fecal Coliform count of 72 cfu/100ml (Geometric Mean, Table 7, page 29). On page 45 of the report, Ecology stated:

"Data shown in Table 12 represent summary statistics for E. coli samples collected by the QIN. Sampling locations are shown in Figure 10. All of the data was collected between June and December 2014. The summary statistics calculated for this data set are similar to what was found in the E. coli data from this study except at ESC02. This sampling location is above the Moclips Estates WWTP outfall. The data show that the geometric mean and estimated 90th percentile more than double between ESC02 and ESC16 (below WWTP outfall). With no other known anthropogenic source between the two locations, the likely source of increase in E. coli bacteria in the Moclips River is the Moclips Estates WWTP."

Table 12. Summary statistics for Quinault Indian Nation *E. coli* bacteria sampling locations that are within the north coast beaches study area (cfu/100 mL).

Site	Site Description	n	Min	Max	Geometric Mean	Estimated 90th Percentile
ESC02	Moclips River Aloha Mainline	5	4	127	11.9	66.2
ESC16	Moclips River downstream of WWTP	6	7	205	29.4	143.8
ESC01	Moclips River near mouth	5	9	194	26.8	136.9

Page 48 of Ecology's report stated: "*The WWTP for Moclips Estates is potentially causing the exceedance of Washington State freshwater bacteria criteria near the mouth of the Moclips River. Further sampling is needed to determine if the WWTP is the cause.*"

D. Low Flow Conditions

Critical low flows for the receiving water are summarized in Table 4. Critical Flows in Receiving Water.

Table 4. Critical Flows in Receiving Water

Flows	Annual Flow (cfs)
1Q7	4.1
7Q8	4.2
30Q5	7.5
1B3	4.08
4B3	4.46
Harmonic Mean	42
Source: USGS Gauge No. 12039220, Moclips River at Moclips, WA. Data based on all available data from 11/20/74 to 9/30/1981.	

Low flows are defined in Appendix D, Part C.

IV. Effluent Limitations and Monitoring

Table 5 below presents the existing effluent limits and monitoring requirements in the 2009 Permit. Table 6, below, presents the proposed effluent limits and monitoring requirements in the draft permit.

Table 5. Existing Permit - Effluent Limits and Monitoring Requirements

Parameter	Effluent Limitations				Monitoring Requirements		
	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Percent Removal[3]	Sample Location	Sample Frequency	Sample Type
Flow, mgd	Report	---	Report Maximum Daily Value	---	Effluent	Continuous	Rec.
Biochemical Oxygen Demand [2, 3] (BOD_5)	30 mg/l	45 mg/l	---	85% (min.)[3]	Influent and Effluent	1/month	Grab
	8.75 lbs/day[2]	13.13 lbs/day[2]	---				Cal-culation[2]
Total Suspended Solids[2, 3] (TSS)	30 mg/l	45 mg/l	---	85% (min.)[3]	Influent and Effluent	1/month	Grab
	8.75 lbs/day[2]	13.13 lbs/day[2]	---				Cal-culation[2]
Fecal Coliform Bacteria[1]	50 colonies/ 100 ml[1] (Geo-metric Mean)	---	100 colonies/ 100ml[1] (Instant-aneous Max)	---	Effluent	1/month	Grab
Total Ammonia[2,4] as N, mg/L	9.5 mg/l[4]	---	29.5 mg/l[4]	---	Effluent	1/month	Grab
	2.77 lbs/day[2]		8.61 lbs/day[2]				Cal-culation[2]
Temperature, ºC	Report	---	Report Max. Daily Value	---	Effluent	1/week	Grab
pH	Within the range of 6.5 to 8.5 standard units				Effluent	1/week	Grab

Footnotes

1. The Average Monthly Limit for Fecal Coliform Bacteria is based on the Geometric Mean in colonies/100ml. See Part VI for a definition of geometric mean. If any value used to calculate the geometric mean is less than 1, the permittee must round that value up to 1 for purposes of calculating the geometric mean. The Instantaneous Maximum Limit is 100 colonies/100 ml.

2. Loading is calculated by multiplying the concentration in mg/L by the average daily flow for the day of sampling in mgd and a conversion factor of 8.34. If the concentration is measured in µg/L, the conversion factor is 0.00834. For more information on calculating, averaging, and reporting loads and concentrations see the NPDES Self-Monitoring System User Guide (EPA 833-B-85-100, March 1985).

3. Percent removal is calculated using the following equation: ((influent - effluent) / influent) x 100

4. The maximum ML for Total Ammonia is 0.1 mg/l.

Table 6. Draft Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly	**Average Weekly**	**Maximum Daily**	**Sample Location**	**Sample Frequency**	**Sample Type**
Parameters with Effluent Limits							
Biochemical Oxygen Demand (BOD_5)	mg/l	30	45	--	Influent and Effluent	1/month	Grab
	lbs/day	8.75	13.13	--			Calculation[1]
BOD_5 Percent Removal	%	85 (minimum)	--	--	--	1/month	Calculation[2]
Total Suspended Solids (TSS)	mg/l	30	45	--	Influent and Effluent	1/month	Grab
	lbs/day	8.75	13.13	--			Calculation[1]
TSS Percent Removal	%	85 (minimum)	--	--	--	1/month	Calculation[2]
Fecal Coliform[3]	Colonies/ 100 ml	14	--	43 (instant. max)[4]	Effluent	1/week	Grab
pH	std units	Between 6.5 – 8.5			Effluent	1/week	Grab
Total Ammonia (as N)	mg /l	9.5	--	29.5[4]	Effluent	1/month	Grab
	lbs/day	2.77	--	8.61			Calculation[1]
Floating, Suspended, or Submerged Matter	--	See Paragraph I.B.2 of the permit				1/month	Visual Observation
Report Parameters							
Flow	mgd	Report	--	Report	Effluent	continuous	Meter
Temperature	ºC	--	Report	Report	Effluent	1/week	Grab

Notes

1. Loading (in lbs/day) is calculated by multiplying the concentration (in mg/L) by the corresponding flow (in mgd) for the day of sampling and a conversion factor of 8.34. For more information on calculating, averaging, and reporting loads and concentrations see the *NPDES Self-Monitoring System User Guide* (EPA 833-B-85-100, March 1985).
2. Percent Removal. The monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month using the following equation:
   (average monthly influent concentration – average monthly effluent concentration) ÷ average monthly influent concentration x 100. Influent and effluent samples must be taken over approximately the same time period.
3. The Average Monthly Limit for Fecal Coliform Bacteria is based on the Geometric Mean in colonies/100ml. See Part VI for a definition of geometric mean. If any value used to calculate the geometric mean is less than 1, the permittee must round that value up to 1 for purposes of calculating the geometric mean. The Instantaneous Maximum Limit is 43 colonies/100 ml.
4. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Paragraph I.B.3 and Part III.G of the permit.

<u>Changes in Draft Permit from Existing Permit</u>

- Effluent limits for Fecal Coliform Bacteria: Effluent limits for fecal coliform bacteria has been changed to provide protection to waters downstream where shellfish harvesting is an existing use. The proposed effluent limits are:
  Average Monthly Limit: 14 colonies/100 ml (Geometric Mean); and,
  Instantaneous Maximum Limit: 43 colonies/100 ml.

  The existing permit required the following Fecal Coliform effluent limits:
  Average Monthly Limit: 50 colonies/100 ml (Geometric Mean); and,
  Instantaneous Maximum Limit: 100 colonies/100 ml.

- Monitoring frequency for Fecal Coliform Bacteria: Monitoring frequency for fecal coliform bacteria has been changed to 1/week from 1/month.

- Monitoring frequency for Floating, Suspended, or Submerged Matter: Monitoring frequency for floating, suspended, or submerged matter has been added to 1/month.

- Reporting for Temperature: Reporting for temperature has been changed to Average Weekly from Average Monthly. Maximum Daily temperature must still be reported and is unchanged.

A. Basis for Effluent Limits

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the WQS applicable to a waterbody are being met and may be more stringent than technology-based effluent limits.

B. Pollutants of Concern

Pollutants of concern are those that either have technology-based limits or may need water quality-based limits. The EPA identifies pollutants of concern for the discharge based on those which:

- Have a technology-based limit
- Have an assigned wasteload allocation (WLA) from a TMDL
- Had an effluent limit in the previous permit
- Are present in the effluent monitoring. Monitoring data are reported in the application and DMR and any special studies
- Are expected to be in the discharge based on the nature of the discharge

The wastewater treatment process for this facility includes both primary and secondary treatment, as well as UV disinfection. Pollutants expected in the discharge from a facility with this type of treatment, include but are not limited to: five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), fecal coliform bacteria, pH, ammonia, temperature, phosphorus, and dissolved oxygen (DO).

Based on this analysis, pollutants of concern are as follows:

- BOD_5
- DO
- TSS
- Fecal Coliform bacteria
- pH
- Temperature
- Ammonia / Nitrogen
- Phosphorus

Chlorine is not used for disinfection at the Facility, therefore chlorine is not a pollutant of concern.

C. Technology-Based Effluent Limits

Federal Secondary Treatment Effluent Limits

The CWA requires POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as “secondary treatment,” which POTWs were required to meet by July 1, 1977. The EPA has developed and promulgated “secondary treatment” effluent limitations, which are found in 40 CFR 133.102. These technology-based effluent limits apply to certain municipal WWTPs and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table . For additional information and background refer to Part 5.1 *Technology Based Effluent Limits for POTWs* in the Permit Writers Manual.

Table 7. Secondary Treatment Effluent Limits

Parameter	30-day average	7-day average
BOD_5	30 mg/L	45 mg/L
TSS	30 mg/L	45 mg/L
Removal for BOD_5 and TSS (concentration)	85% (minimum)	---
pH	within the limits of 6.0 - 9.0 s.u.	
Source: 40 CFR 133.102		

Mass-Based Limits

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, except under certain conditions. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day and are calculated as follows:

Mass based limit (lb/day) = concentration limit (mg/L) × design flow (mgd) × 8.34[1]

Since the design flow for this facility is 0.035 mgd, the technology based mass limits for BOD_5 and TSS are calculated as follows:

Average Monthly Limit = 30 mg/L × 0.035 mgd × 8.34 = 8.75 lbs/day

Average Weekly Limit = 45 mg/L × 0.035 mgd × 8.34 = 13.13 lbs/day

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet WQS. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. The NPDES regulation 40 CFR 122.44(d)(1) implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality. Effluent limits must also meet the applicable water quality requirements of affected States other than the State in which the discharge originates, which may include downstream States (40 CFR 122.4(d), 122.44(d)(4), see also CWA Section 401(a)(2)).

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that WQS are met, and must be consistent with any available wasteload allocation for the discharge in an approved TMDL. If there are no approved TMDLs that specify wasteload allocations for this discharge; all of the water quality-based effluent limits are calculated directly from the applicable WQS.

Reasonable Potential Analysis and Need for Water Quality-Based Effluent Limits

The EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (*TSD*) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit.

In some cases, a dilution allowance or mixing zone is permitted. A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and within which certain water quality criteria may be exceeded (EPA, 2014). While the criteria may be exceeded within the mixing zone, the use and size of the mixing zone must be limited such

---

[1] 8.34 is a conversion factor with units $(lb \times L)/(mg \times gallon \times 10^6)$

that the waterbody as a whole will not be impaired, all designated uses are maintained and acutely toxic conditions are prevented.

The EPA also calculated dilution factors for year round critical low flow conditions. (See Table). As an example, the dilution factor in the chronic scenario using 25% of the critical low flow (4B3), and is calculated as follows: (4.46 cfs x 0.25) / 0.054 cfs = 20.64.

The reasonable potential analysis and water quality-based effluent limit calculations were based on mixing zones shown in Table .

Table 8. Mixing zones

Ammonia Criteria	Critical Low Flow (cfs)	Mixing Zone	Dilution Factor
Acute Aquatic Life[1]	1B3 = 4.08 cfs	2.5%	1.89
Chronic Aquatic Life[2]	4B3 = 4.46 cfs	25%	20.64
Notes: 1. WAC 173-201A-400-8(a)(ii) 2. WAC 173-201A-400-7(a)(ii)			

The equations used to conduct the reasonable potential analysis and calculate the water quality-based effluent limits are provided in Appendix D.

Reasonable Potential and Water Quality-Based Effluent Limits

The reasonable potential and water quality-based effluent limit for specific parameters are summarized below. The calculations are provided in Appendix D.

Ammonia

Ammonia criteria are based on a formula which relies on the pH and temperature of the receiving water, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria become more stringent as pH and temperature increase. The ammonia criteria calculations are below.

Freshwater Un-ionized Ammonia Criteria Calculation
Based on Chapter 173-201A WAC, amended November 20, 2006

INPUT	
1. Receiving Water Temperature (deg C):	16.54
2. Receiving Water pH:	7.68
3. Is salmonid habitat an existing or designated use?	Yes
4. Are non-salmonid early life stages present or absent?	Present
OUTPUT	
Using mixed temp and pH at mixing zone boundaries?	no
Ratio	13.906
FT	1.400
FPH	1.220
pKa	9.514
Unionized Fraction	0.014
Unionized ammonia NH3 criteria (mg/L as NH_3)	
Acute:	0.175
Chronic:	0.034
RESULTS	
Total ammonia nitrogen criteria (mg/L as N):	
Acute:	9.975
Chronic:	1.917

Reasonable potential calculations are shown in Appendix D. The reasonable potential calculation showed that the discharge would not have the reasonable potential to cause or contribute to a violation of the water quality criteria for ammonia. However, the Facility already has effluent limits for ammonia. Therefore, the draft permit contains the same water-quality based ammonia effluent limits to comply with anti-backsliding requirements. The draft permit requires that the permittee monitor the receiving water for ammonia, pH and temperature in order to determine the applicable ammonia criteria for the next permit reissuance.

pH

According to Washington State WQS at WAC 173-201A-200, Table 200(1)(g): for Core Summer Salmonid Habitat, Aquatic Life pH Criteria in Fresh Water, requires that pH values of the river to be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units. Mixing zones are generally not granted for pH, therefore the most stringent water quality criterion must be met before the effluent is discharged to the receiving water.

Dissolved Oxygen (DO)

Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The BOD_5 of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water.

Discharges from the Quinault Indian Nation Moclips River Estates WWTP are not expected to have an appreciable effect on the dissolved oxygen concentration in the Moclips River. However, BOD_5 limitations have been included in the permit to control the discharge of oxygen demanding constituents into the Moclips River, and effluent limits for DO are not necessary. The proposed effluent limitations for BOD_5 are consistent with the previous permit and are consistent with Secondary Treatment requirements specified in 40 CFR 133.

Phosphorus

The facility's downstream river monitoring results for TP show that the average concentration of TP is 0.02 mg/l from 3/29/11 to 3/30/17. The maximum TP concentration during that period was 0.1 mg/l. The Moclips River is not impaired for TP, therefore, there is no applicable WLA. The WQS do not have a numeric standard, and there is no indication that the narrative standard is exceeded in the Moclips River; accordingly, TP limits are not necessary.

Fecal Coliform

The facility is upstream of potential shellfish harvesting near the mouth of the Moclips River where exceedances of the bacteria standard have been identified by Ecology. The Washington WQS state that for the protection of shellfish harvesting, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 ml, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 ml.

For the protection of downstream shellfish harvesting, EPA is proposing to implement Washington's WQS. EPA has a policy of not granting mixing zones for bacteria (see EPA memorandum from Ephraim King, Nov. 12, 2008).

The memorandum states, "*….mixing zones that allow for elevated levels of bacteria in rivers and streams designated for primary contact recreation are inconsistent with the designated use and should not be permitted because these could result in a significant health risk.*"

Accordingly, it is not appropriate for EPA to grant mixing zones for bacteria standards in the protection of Shellfish harvesting. Therefore, EPA is proposing end-of-pipe effluent limits using geometric mean criterion, an Average Monthly Limit of 14 colonies/100ml; and, a Maximum Daily Limit of 43 colonies/100ml.

The facility would likely have no trouble meeting the new more stringent proposed effluent limits because the highest fecal coliform data during the last permit cycle was 3 colonies/100ml, which is far below the proposed effluent limits of an Average Monthly Limit of 14 colonies/100ml; and, a Maximum Daily Limit of 43 colonies/100ml.

Regulations at 40 CFR 122.45(d)(2) require that effluent limitations for continuous discharges from POTWs be expressed as average monthly and average weekly limits, unless impracticable.

Additionally, the terms "average monthly limit" and "average weekly limit" are defined in 40 CFR 122.2 as being arithmetic (as opposed to geometric) averages. It is impracticable to properly implement a 30-day geometric mean criterion in a permit using monthly and weekly arithmetic average limits. The geometric mean of a given data set is equal to the arithmetic mean of that data set if and only if all of the values in that data set are equal. Otherwise, the geometric mean is always less than the arithmetic mean. In order to ensure that the effluent limits are "derived from and comply with" the geometric mean water quality criterion, as required by 40 CFR 122.44(d)(1)(vii)(A), it is necessary to express the effluent limits as a monthly geometric mean and an instantaneous maximum limit.

D. Antibacksliding

Section 402(o) of the Clean Water Act and federal regulations at 40 CFR §122.44 (l) generally prohibit the renewal, reissuance or modification of an existing NPDES permit that contains effluent limits, permit conditions or standards that are less stringent than those established in the previous permit (i.e., anti-backsliding) but provides limited exceptions. For explanation of the antibacksliding exceptions refer to Chapter 7 of the Permit Writers Manual *Final Effluent Limitations and Anti-backsliding*.

An anti-backsliding analysis was done for the draft permit. All effluent limits in the draft permit are as stringent, or more stringent than the existing permit. Therefore, the draft permit complies with antibacksliding requirements.

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The permit also requires the permittee to perform effluent monitoring required by the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to the EPA.

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using the EPA-approved test methods (generally found in 40 CFR 136) or as specified in the permit.

Monitoring Changes from the Previous Permit

C. Surface Water Monitoring

In general, surface water monitoring may be required for pollutants of concern to assess the assimilative capacity of the receiving water for the pollutant. In addition, surface water monitoring may be required for pollutants for which the water quality criteria are dependent and to collect data for TMDL development if the facility discharges to an impaired water body. Table 9 presents the surface water monitoring in the existing permit, and Table 10 presents the proposed surface water monitoring requirements for the draft permit. Surface water monitoring results must be submitted with the DMR.

Table 9. Surface Water Monitoring Requirements in Existing Permit

Existing Surface Water Monitoring Requirements				
Parameter	Units	Upstream Sampling Frequency	Downstream Sampling Frequency	Method Detection Limit (MDL)
Total Ammonia as N	mg/L	Quarterly	Quarterly	0.05 mg/l
Temperature	°C	Quarterly	Quarterly	---
pH	standard units	Quarterly	Quarterly	---

Table 10. Surface water Monitoring Requirements in Draft Permit

Draft Surface Water Monitoring Requirements			
Parameter	Units	Upstream Sampling Frequency	Method Detection Limit (MDL)
Total Ammonia as N	mg/L	Quarterly	0.05 mg/l
Temperature	°C	Quarterly	---
pH	standard units	Quarterly	---
Notes: 1. For quarterly monitoring frequency, quarters are defined as: January 1 to Mach 31; April 1 to June 30; July 1 to September 30; and, October 1 to December 31. 2. Grab sampling for all surface water monitoring parameters.			

The difference in surface water monitoring requirements between the existing permit and the proposed permit is the deletion of downstream sampling. Downstream sampling is not needed because downstream concentrations can be projected based on ambient water quality upstream in the river and the effluent concentrations. However, surface water monitoring must be conducted on the same day as effluent monitoring.

D. Electronic Submission of Discharge Monitoring Reports

The draft permit requires that the permittee submit DMR data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application.

The EPA currently conducts free training on the use of NetDMR. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: https://netdmr.com. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

VI. Sludge (Biosolids) Requirements

The EPA Region 10 separates wastewater and sludge permitting. The EPA has authority under the CWA to issue separate sludge-only permits for the purposes of regulating biosolids. The EPA may issue a sludge-only permit to each facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at each facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State's biosolids program. The Part 503 regulations are self-implementing, which means that facilities must comply with them whether or not a permit has been issued.

VII. Other Permit Conditions

A. Compliance Schedules

Compliance schedules are authorized by federal NPDES regulations at 40 CFR 122.47. Compliance schedules allow a discharger to phase in, over time, compliance with water quality-based effluent limitations when limitations are in the permit for the first time. The draft permit contains more stringent effluent limits for fecal coliform, however, the facility has the ability to meet the proposed effluent limits for fecal coliform, therefore, no compliance schedules are included in the draft permit.

B. Quality Assurance Plan

The facility is required to update the Quality Assurance Plan within 180 days of the effective date of the final permit. The Quality Assurance Plan must include of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan must be retained on site and be made available to the EPA upon request.

C. Operation and Maintenance Plan

The permit requires the facility to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop and implement an operation and maintenance plan for their facility within 180 days of the effective date of the final permit. The plan must be retained on site and made available to the EPA upon request.

D. Shellfish Protection Reporting

The permit requires the permittee to develop and implement an emergency response and public notification plan that identifies measures to protect public health from overflows that may endanger health and unanticipated bypasses or upsets that exceed any effluent limitation in the permit. The permit identifies specific public health entities that must receive immediate notification under the plan for protection of shellfish.

E. Sanitary Sewer Overflows and Proper Operation and Maintenance of the Collection System

SSOs are not authorized under this permit. The permit contains language to address SSO reporting and public notice and operation and maintenance of the collection system. The permit requires that the permittee identify SSO occurrences and their causes. In addition, the permit establishes reporting, record keeping and third party notification of SSOs. Finally, the permit requires proper operation and maintenance of the collection system.

The following specific permit conditions apply:

Immediate Reporting – The permittee is required to notify the EPA of an SSO within 24 hours of the time the permittee becomes aware of the overflow. (See 40 CFR 122.41(l)(6))

Written Reports – The permittee is required to provide the EPA a written report within five days of the time it became aware of any overflow that is subject to the immediate reporting provision. (See 40 CFR 122.41(l)(6)(i)).

Third Party Notice – The permit requires that the permittee establish a process to notify specified third parties of SSOs that may endanger health due to a likelihood of human exposure; or unanticipated bypass and upset that exceeds any effluent limitation in the permit or that may endanger health due to a likelihood of human exposure. The permittee is required to develop, in consultation with appropriate authorities at the local, county, tribal and/or state level, a plan that describes how, under various overflow (and unanticipated bypass and upset) scenarios, the public, as well as other entities, would be notified of overflows that may endanger health. The plan should identify all overflows that would be reported and to whom, and the specific information that would be reported. The plan should include a description of lines of communication and the identities of responsible officials. (See 40 CFR 122.41(l)(6)).

Record Keeping – The permittee is required to keep records of SSOs. The permittee must retain the reports submitted to the EPA and other appropriate reports that could include work orders associated with investigation of system problems related to a SSO, that describes the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO. (See 40 CFR 122.41(j)).

Proper Operation and Maintenance – The permit requires proper operation and maintenance of the collection system. (See 40 CFR 122.41(d) and (e)). SSOs may be indicative of improper operation and maintenance of the collection system. The permittee may consider the development and implementation of a capacity, management, operation and maintenance (CMOM) program.

The permittee may refer to the Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (EPA 305-B-05-002). This guide identifies some of the criteria used by the EPA inspectors to evaluate a collection system's management, operation and maintenance program activities. Owners/operators can review their own systems against the checklist (Chapter 3) to reduce the occurrence of sewer overflows and improve or maintain compliance.

F. Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* directs each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities." EPA is striving to enhance the ability of overburdened communities to participate fully and meaningfully in the permitting process for EPA-issued permits, including NPDES permits. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. As part of an agency-wide effort, EPA Region 10 will consider prioritizing enhanced public involvement opportunities for EPA-issued permits that may involve activities with significant public health or environmental impacts on already overburdened communities. For more information, please visit http://www.epa.gov/compliance/ej/plan-ej/.

As part of the permit development process, EPA Region 10 conducted an "EJSCREEN" to determine whether a permit action could affect overburdened communities. EJSCREEN is a nationally consistent geospatial tool that contains demographic and environmental data for the United States at the census block group level. As a pre-decisional tool, EJSCREEN is used to highlight permit candidates for additional review where enhanced outreach may be warranted. The EPA also encourages permittees to review (and to consider adopting, where appropriate) Promising Practices for Permit Applicants Seeking EPA-Issued Permits: Ways To Engage Neighboring Communities (see https://www.federalregister.gov/articles/2013/05/09/2013-10945/epa-activities-to-promote-environmental-justice-in-the-permit-application-process#h-13). Examples of promising practices include: thinking ahead about community's characteristics and the effects of the permit on the community, engaging the right community leaders, providing progress or status reports, inviting members of the community for tours of the facility, providing informational materials translated into different languages, setting up a hotline for community members to voice concerns or request information, follow up, etc.

EPA's EJSCREEN tool identified the Quinault Indian Reservation as a potentially overburdened community because the WWTP discharges from within the boundaries of the Quinault Indian Reservation. During the screening process, EPA considered specific case-by-case circumstances, and EPA concluded that there is no indication that the issuance of this permit would trigger significant environmental justice concerns. Separate from the environmental justice screening effort, EPA also conducted tribal coordination with the Quinault Indian Reservation. As part of the permit development process, the EPA Region 10 conducted a screening analysis to determine whether this permit action could affect overburdened communities. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. The EPA used a nationally consistent geospatial tool that contains demographic and environmental data for the United States at the Census block group level. This tool is used to identify permits for which enhanced outreach may be warranted.

Standard Permit Provisions

Sections III, IV and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VIII. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. Additional information on endangered species in the vicinity is shown in Appendix E. A review of the threatened and endangered species located in the vicinity of discharge finds that there is no effect to listed species.

B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires the EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH). A review of the Essential Fish Habitat documents shows that there is no effect to EFH.

The EFH regulations define an adverse effect as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species’ fecundity), site specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. The EPA has prepared an EFH assessment which appears in E.

The EPA has determined that issuance of this permit will have no effect on EFH in the vicinity of the discharge. The EPA has provided NOAA Fisheries with copies of the draft permit and fact sheet during the public notice period. Any comments received from NOAA Fisheries regarding EFH will be considered prior to reissuance of this permit.

C. CWA and 401 Certification

Section 401 of the Clean Water Act requires EPA to certify before issuing a final permit. Since the discharge is from a facility located within the boundaries of the Quinault Indian Reservation, the provisions of Section 401 of the Clean Water Act requiring state certification of the permit do not apply. EPA will certify in accordance with Section 401 of the Clean Water Act.

D. Permit Expiration

The permit will expire five years from the effective date.

IX. References

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control.* US Environmental Protection Agency, Office of Water, EPA/505/2-90-001.

Water Pollution Control Federation. Subcommittee on Chlorination of Wastewater. *Chlorination of Wastewater.* Water Pollution Control Federation. Washington, D.C. 1976.

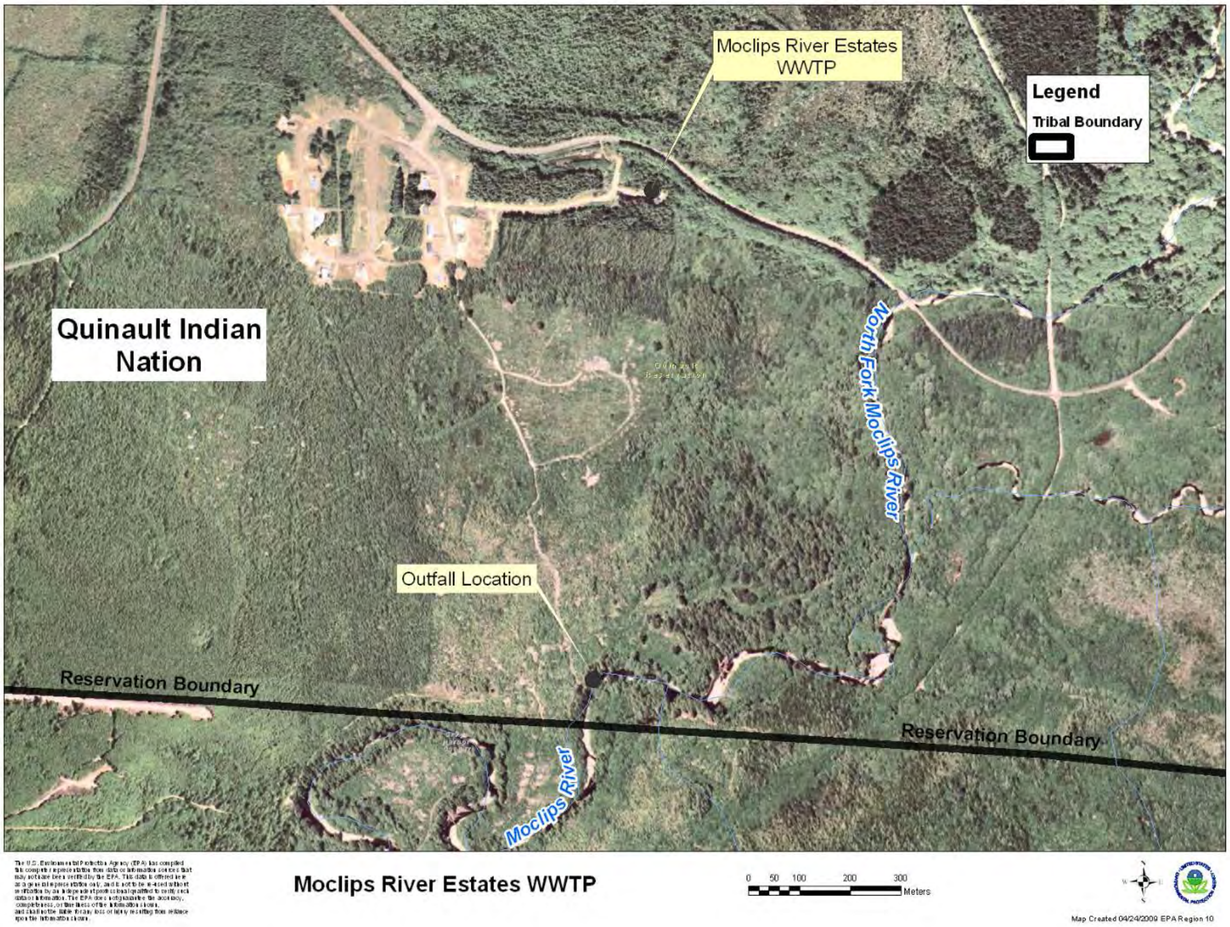
EPA. 2010. *NPDES Permit Writers' Manual.* Environmental Protection Agency, Office of Wastewater Management, EPA-833-K-10-001.

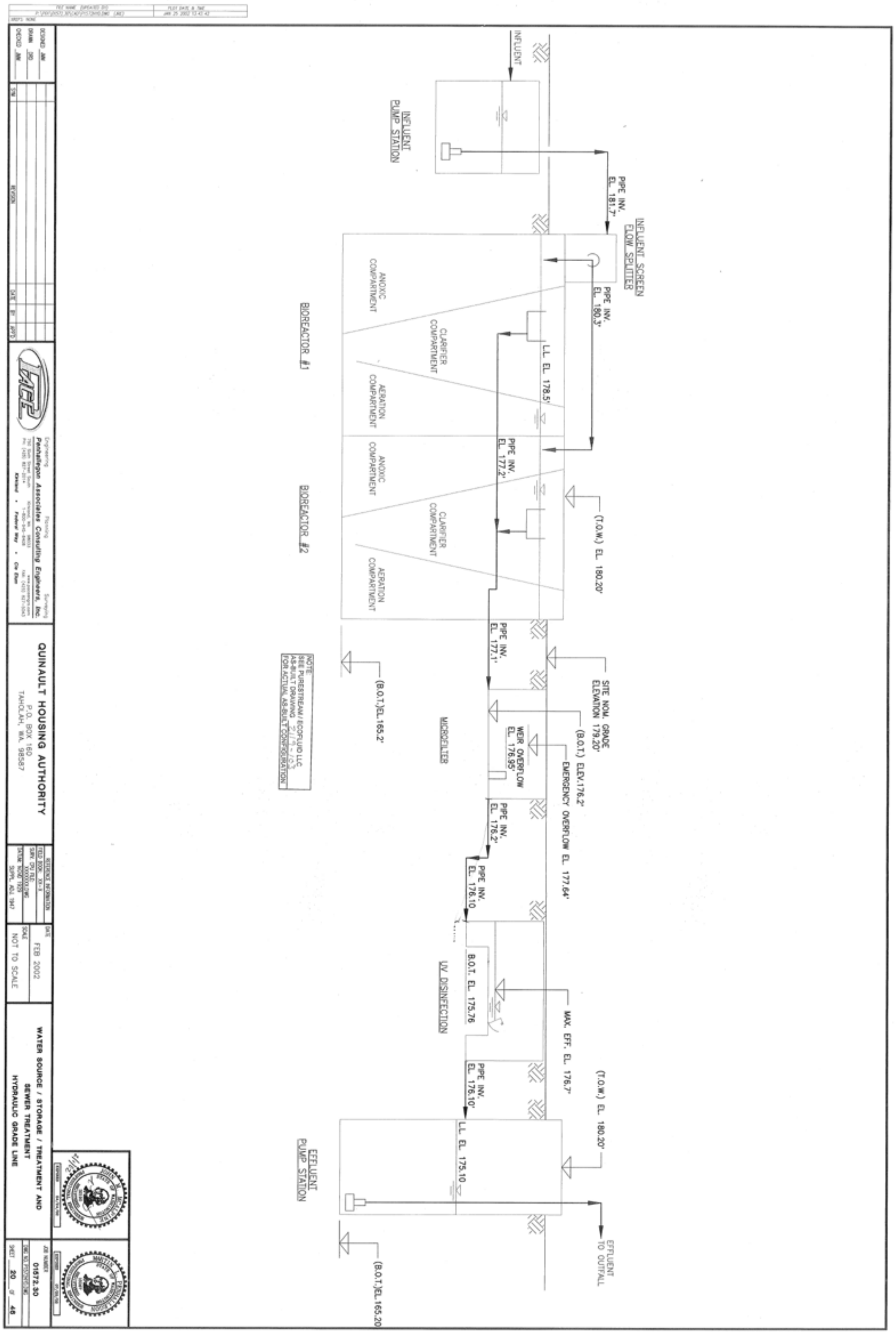
EPA, 2007. *EPA Model Pretreatment Ordinance*, Office of Wastewater Management/Permits Division, January 2007.

EPA, 2011. *Introduction to the National Pretreatment Program*, Office of Wastewater Management, EPA 833-B-11-011, June 2011.

Appendix A. Facility Information

Wasterwater treatment plant location map and schematic diagram:




INFLUENT
INFLUENT PUMP STATION
PIPE INV. EL. 181.7'
INFLUENT SCREEN FLOW SPLITTER
PIPE INV. EL. 180.3'
ANOXIC COMPARTMENT
CLARIFIER COMPARTMENT
AERATION COMPARTMENT
BIOREACTOR #1
L.L. EL. 178.5'
PIPE INV. EL. 177.2'
BIOREACTOR #2
(T.O.W.) EL. 180.20'
PIPE INV. EL. 177.1'
SITE NOM. GRADE ELEVATION 179.20'
(B.O.T.)EL.165.2'
MICROFILTER
WEIR OVERFLOW EL. 176.95'
(B.O.T.) ELEV.176.2'
EMERGENCY OVERFLOW EL. 177.64'
PIPE INV. EL. 176.2'
PIPE INV. EL. 176.10
B.O.T. EL. 175.76
UV DISINFECTION
MAX. EFF. EL. 176.7'
PIPE INV. EL. 176.10'
L.L. EL. 175.10
EFFLUENT PUMP STATION
EFFLUENT TO OUTFALL
(B.O.T.)EL.165.20
QUINAULT HOUSING AUTHORITY
P.O. BOX 160
TAHOLAH, WA. 98587
FEB 2002
NOT TO SCALE
WATER SOURCE / STORAGE / TREATMENT AND SEWER TREATMENT
HYDRAULIC GRADE LINE

Appendix B. Water Quality Data

A. Treatment Plant Effluent Data

Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		2.1	mg/L	09/30/2011
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		1.6	mg/L	11/30/2011
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		1.8	mg/L	12/31/2011
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		2.1	mg/L	01/31/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		2.1	mg/L	03/31/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		1.9	mg/L	04/30/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		2.2	mg/L	05/31/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		2.1	mg/L	07/31/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		1.8	mg/L	08/31/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		1.5	mg/L	09/30/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX		1.7	mg/L	10/31/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	11/30/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	12/31/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.9	mg/L	01/31/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	02/28/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	03/31/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	04/30/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	05/31/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.9	mg/L	06/30/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	07/31/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	2.	mg/L	08/31/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	09/30/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	10/31/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	2.	mg/L	11/30/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.9	mg/L	12/31/2013
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	01/31/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	02/28/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	03/31/2014

Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.9	mg/L	04/30/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	05/31/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.9	mg/L	06/30/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	2.1	mg/L	07/31/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	2.2	mg/L	08/31/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	2.	mg/L	09/30/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.9	mg/L	10/31/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	11/30/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	12/31/2014
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	01/31/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	02/28/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.9	mg/L	03/31/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	04/30/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	05/31/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	2.1	mg/L	06/30/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.9	mg/L	07/31/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	08/31/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	09/30/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	10/31/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	11/30/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	12/31/2015
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	01/31/2016
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	02/29/2016
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.9	mg/L	03/31/2016
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	04/30/2016
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	05/31/2016
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.5	mg/L	06/30/2016
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.7	mg/L	07/31/2016
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX	=	1.8	mg/L	08/31/2016
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX			mg/L	10/31/2011

Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX			mg/L	02/29/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX			mg/L	06/30/2012
Nitrogen, ammonia total [as N]	Effluent Gross	DAILY MX			mg/L	09/30/2016
		DAILY MX	**95th Percentile**	**2.1**	**mg/L**	
			n	57		
			SD	0.154404832		
			Mean	1.83859649122807		
		CV =	SD/Mean =	0.083979727		
		Max		**2.2**	**mg/L**	

Temperature, water deg. centigrade	Effluent Gross	DAILY MX		19.6	deg C	09/30/2011
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		18.4	deg C	10/31/2011
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		15.5	deg C	11/30/2011
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		13.5	deg C	12/31/2011
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		12.5	deg C	01/31/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		12.7	deg C	03/31/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		15.1	deg C	04/30/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		17.4	deg C	05/31/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		19.4	deg C	07/31/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		21.1	deg C	08/31/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		20.9	deg C	09/30/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX		17.8	deg C	10/31/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	16.4	deg C	11/30/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	11.6	deg C	12/31/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	13.6	deg C	01/31/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	13.5	deg C	02/28/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	13.1	deg C	03/31/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	14.4	deg C	04/30/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	16.9	deg C	05/31/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	18.9	deg C	06/30/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	19.8	deg C	07/31/2013

Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	20.	deg C	08/31/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	20.4	deg C	09/30/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	18.3	deg C	10/31/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	15.5	deg C	11/30/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	14.6	deg C	12/31/2013
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	14.	deg C	01/31/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	12.8	deg C	02/28/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	13.2	deg C	03/31/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	16.4	deg C	04/30/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	17.7	deg C	05/31/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	18.7	deg C	06/30/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	21.1	deg C	07/31/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	18.1	deg C	08/31/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	20.9	deg C	09/30/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	19.1	deg C	10/31/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	16.4	deg C	11/30/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	14.8	deg C	12/31/2014
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	14.5	deg C	01/31/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	14.8	deg C	02/28/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	15.7	deg C	03/31/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	16.7	deg C	04/30/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	18.2	deg C	05/31/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	20.1	deg C	06/30/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	21.3	deg C	07/31/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	20.9	deg C	08/31/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	20.8	deg C	09/30/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	18.2	deg C	10/31/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	17.	deg C	11/30/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	14.1	deg C	12/31/2015
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	13.1	deg C	01/31/2016

Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	11.	deg C	02/29/2016
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	14.3	deg C	03/31/2016
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	16.2	deg C	04/30/2016
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	17.3	deg C	05/31/2016
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	19.1	deg C	06/30/2016
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	20.1	deg C	07/31/2016
Temperature, water deg. centigrade	Effluent Gross	DAILY MX	=	19.8	deg C	08/31/2016
Temperature, water deg. centigrade	Effluent Gross	DAILY MX			deg C	02/29/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX			deg C	06/30/2012
Temperature, water deg. centigrade	Effluent Gross	DAILY MX			deg C	09/30/2016
			Max	21.3		
			Min	11.		
			95th percentile	20.93		

B. Receiving Water Data

Receiving water data was received from the Facility from downstream of the outfall.

Moclips River Sampling

DATE	pH, s.u.	Temperature, °C	Ammonia, mg/l	Phosphorus, mg/l	E-Coli Bacteria, cfu/100 ml	Fecal Coliform Bacteria, cfu/100 ml
3/29/11	6.47	6.8	0.30	0	0	
6/28/11	6.32	13.6	0.20	0	0	
9/30/11	7.22	12.4	0.30	0	1	
12/28/11	6.93	8	0.20	0	1	
3/30/12	6.57	7.3	0.30	0	1	
6/6/12	7.96	11.9	0.40	0	0	
9/30/12	7.09	12.4	0.30	0	1	
12/28/12	6.16	6.3	0.20	0.1	0	
3/28/13	7.13	8.7	0.30	0.1	0	
6/19/13	7.62	13.5	0.20	0.1	0	
9/30/13	6.54	10.1	0.10	0.1	0	
12/18/13	6.98	7.8	0.20	0.1	0	
3/27/14	6.12	8.4	0.20	0	0	
6/3/14	7.69	13.4	0.10	0	4	
9/18/14	7.06	15.5	0.00	0	3	
12/31/14	7.41	5.2	0.00	0	0	
3/24/15	6.37	8.5	0.10	0	0	
6/30/15	7.19	17.3	0.20	0	0	
9/16/15	7.35	12.3	0.20	0	0	
12/21/15	6.67	6.7	0.00	0		0
3/29/16	6.1	7.8	0.20	0		0
6/23/16	7.21	14.3	0.10	0		0
9/28/16	7.35	16.8	0.10	0		1
12/21/16	5.73	5	0.20	0		0
3/30/17	7.31	8.1	0.20	0		0
Max	**7.96**	**17.30**	**0.40**	**0.10**	**4.00**	**1.00**
Min	**5.73**	**5**	**0**	**0**	**0**	**0**
95th %ile	**7.68**	**16.54**	**0.30**	**0.10**	**3.10**	
5th %ile	**6.10**					
Average				**0.02**		

Appendix C. Reasonable Potential and Water Quality-Based Effluent Limit Formulae

A. Reasonable Potential Analysis

The EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (EPA, 1991) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit.

Mass Balance

For discharges to flowing water bodies, the maximum projected receiving water concentration is determined using the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \text{Equation 1}$$

where,

C_d	=	Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)
C_e	=	Maximum projected effluent concentration
C_u	=	95th percentile measured receiving water upstream concentration
Q_d	=	Receiving water flow rate downstream of the effluent discharge = Q_e+Q_u
Q_e	=	Effluent flow rate (set equal to the design flow of the WWTP)
Q_u	=	Receiving water low flow rate upstream of the discharge (1Q10, 7Q10 or 30B3)

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times Q_u}{Q_e + Q_u} \qquad \text{Equation 2}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with 100% of the receiving stream.

If the mixing zone is based on less than complete mixing with the receiving water, the equation becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times (Q_u \times \%MZ)}{Q_e + (Q_u \times \%MZ)} \qquad \text{Equation 3}$$

Where:

% MZ = the percentage of the receiving water flow available for mixing.

If a mixing zone is not allowed, dilution is not considered when projecting the receiving water concentration and,

$$C_d = C_e \qquad \text{Equation 4}$$

A dilution factor (D) can be introduced to describe the allowable mixing. Where the dilution factor is expressed as:

$$D = \frac{Q_e + Q_u \times \%MZ}{Q_e}$$ Equation 5

After the dilution factor simplification, the mass balance equation becomes:

$$C_d = \frac{C_e - C_u}{D} + C_u$$ Equation 6

If the criterion is expressed as dissolved metal, the effluent concentrations are measured in total recoverable metal and must be converted to dissolved metal as follows:

$$C_d = \frac{CF \times C_e - C_u}{D} + C_u$$ Equation 7

Where C_e is expressed as total recoverable metal, C_u and C_d are expressed as dissolved metal, and CF is a conversion factor used to convert between dissolved and total recoverable metal.

The above equations for C_d are the forms of the mass balance equation which were used to determine reasonable potential and calculate wasteload allocations.

Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, the EPA's Technical Support Document for Water Quality-based Toxics Controls (TSD, 1991) recommends using the maximum projected effluent concentration (Ce) in the mass balance calculation (see equation 3, page C-5). To determine the maximum projected effluent concentration (Ce) the EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV for each pollutant parameter has been calculated, the reasonable potential multiplier (RPM) used to derive the maximum projected effluent concentration (Ce) can be calculated using the following equations:

First, the percentile represented by the highest reported concentration is calculated.

$p_n = (1 - \text{confidence level})^{1/n}$ Equation 8

where,

p_n = the percentile represented by the highest reported concentration
n = the number of samples
confidence level = 99% = 0.99

and

$$RPM = \frac{C_{99}}{C_{P_n}} = \frac{e^{Z_{99} \times \sigma - 0.5 \times \sigma^2}}{e^{Z_{P_n} \times \sigma - 0.5 \times \sigma^2}}$$ Equation 9

Where,

σ^2 = $\ln(CV^2 + 1)$
Z_{99} = 2.326 (z-score for the 99th percentile)
Z_{P_n} = z-score for the P_n percentile (inverse of the normal cumulative distribution function at a given percentile)

CV = coefficient of variation (standard deviation ÷ mean)

The maximum projected effluent concentration is determined by simply multiplying the maximum reported effluent concentration by the RPM:

$$C_e = (RPM)(MRC) \qquad \text{Equation 10}$$

where MRC = Maximum Reported Concentration

Maximum Projected Effluent Concentration at the Edge of the Mixing Zone

Once the maximum projected effluent concentration is calculated, the maximum projected effluent concentration at the edge of the acute and chronic mixing zones is calculated using the mass balance equations presented previously.

Reasonable Potential

The discharge has reasonable potential to cause or contribute to an exceedance of water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant.

B. WQBEL Calculations

Calculate the Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis. To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e. The calculated C_e is the acute or chronic WLA. Equation 6 is rearranged to solve for the WLA, becoming:

$$C_e = WLA = D \times (C_d - C_u) + C_u \qquad \text{Equation 11}$$

The next step is to compute the “long term average” concentrations which will be protective of the WLAs. This is done using the following equations from the EPA’s *Technical Support Document for Water Quality-based Toxics Control* (TSD):

$$LTA_a = WLA_a \times e^{(0.5\sigma^2 - z\,\sigma)} \qquad \text{Equation 12}$$

$$LTA_c = WLA_c \times e^{(0.5\sigma_4^2 - z\sigma_4)} \qquad \text{Equation 13}$$

where,

σ^2 = $\ln(CV^2 + 1)$
Z_{99} = 2.326 (z-score for the 99th percentile probability basis)
CV = coefficient of variation (standard deviation ÷ mean)
σ_4^2 = $\ln(CV^2/4 + 1)$

For ammonia, because the chronic criterion is based on a 30-day averaging period, the Chronic Long Term Average (LTAc) is calculated as follows:

$$LTA_c = WLA_c \times e^{(0.5\sigma_{30}^2 - z\sigma_{30})} \qquad \text{Equation 15}$$

where,

$\sigma_{30}^2 \quad = \quad \ln(CV^2/30 + 1)$

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below.

Derive the maximum daily and average monthly effluent limits

Using the TSD equations, the MDL and AML effluent limits are calculated as follows:

$$MDL = LTA \times e^{(z_m\sigma - 0.5\sigma^2)} \qquad \text{Equation 16}$$

$$AML = LTA \times e^{(z_a\sigma_n - 0.5\sigma_n^2)} \qquad \text{Equation 17}$$

where σ, and σ² are defined as they are for the LTA equations above, and,

σ_n^2 = $\ln(CV^2/n + 1$

z_a = 1.645 (z-score for the 95th percentile probability basis)

z_m = 2.326 (z-score for the 99th percentile probability basis)

n = number of sampling events required per month. With the exception of ammonia, if the AML is based on the LTA_c, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 4. For ammonia, In the case of ammonia, if the AML is based on the LTA_c, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 30.

C. Critical Low Flow Conditions

The low flow conditions of a water body are used to determine water quality-based effluent limits. Washington WQS require criteria be evaluated at critical low flows receiving water conditions which can be expressed as follows:

Acute aquatic life	1Q10 or 1B3
Chronic aquatic life	7Q10 or 4B3
Non-carcinogenic human health criteria	30Q5
Carcinogenic human health criteria	harmonic mean flow
1. The 1Q10 represents the lowest one day flow with an average recurrence frequency of once in 10 years. 2. The 1B3 is biologically based and indicates an allowable exceedence of once every 3 years. 3. The 7Q10 represents lowest average 7 consecutive day flow with an average recurrence frequency of once in 10 years. 4. The 4B3 is biologically based and indicates an allowable exceedance for 4 consecutive days once every 3 years. 5. The 30Q5 represents the lowest average 30 consecutive day flow with an average recurrence frequency of once in 5 years. 6. The harmonic mean is a long-term mean flow value calculated by dividing the number of daily flow measurements by the sum of the reciprocals of the flows.	

For purposes of determining if there is reasonable potential for excursion of WQS, EPA performed reasonable potential calculations for ammonia.

USGS gauge station # 12039220 recorded flow data at Moclips River near the town of Moclips from November 20, 1974 to September 30, 1981. Using this USGS flow data, and EPA's DFLOW program, it was used to calculate statistical low flows. DFLOW calculated the 4B3 low flow as 4.46 cfs, and the 1B3 calculation is 4.08 cfs.

Appendix D. Reasonable Potential and Water Quality-Based Effluent Limit Calculations

Ammonia

EPA calculated the reasonable potential for the Facility to exceed the State's WQS based on site specific and Facility specific factors. Because chlorine is not used at the facility, the only parameters that a reasonable potential analysis was conducted is for ammonia, and temperature. To determine the reasonable potential for ammonia to exceed the State's WQS, it is first necessary to determine the ammonia criteria. Since EPA is using Washington WQS, EPA used Ecology's spreadsheet to calculate the Ammonia Criteria, the Acute Criteria is 9.975 mg/l; and the Chronic Criteria is 1.917 mg/l.

Using the site specific ammonia criteria, Acute and Chronic dilution factors based on USGS flow data, and DMR data obtained during the last permit cycle, the spreadsheet below calculated the reasonable potential to exceed state WQS. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. The calculation below shows that there is NO reasonable potential to exceed the State's WQS; therefore, there are no new effluent limits for Total Ammonia, and the existing effluent limits are retained.

Reasonable Potential Analysis (RPA) Calculations

Facility Name	Moclips River Estate WWTP
Facility Flow (mgd)	0.035
Facility Flow (cfs)	0.05

Critical River Flows		Annual Crit. Flows
Aquatic Life - Acute Criteria - Criterion Max. Concentration (CMC)	1B3	4.08
Aquatic Life - Chronic Criteria - Criterion Continuous Concentration (CCC)	7Q10 or 4B3	4.46
Ammonia	4B3	4.46
Human Health - Non-Carcinogen	30Q5	
Human Health - carcinogen	Harmonic Mean Flow	42

Receiving Water Data			Notes:	Annual Crit. Flows
			5th % at critical flows	
Hardness, as mg/L $CaCO_3$	= 100 mg/L			
Temperature, °C		Temperature, °C	95th percentile	16.54
pH, S.U.		pH, S.U.	95th percentile	7.68

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages
Effluent Data	Number of Samples in Data Set (n)		57
	Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)		0.08
	Effluent Concentration, µg/L (Max. or 95th Percentile) - (C_e)		2,200
	Calculated 50th % Effluent Conc. (when n>10), Human Health Only		
Receiving Water Data	90th Percentile Conc., µg/L - (C_u)		300
	Geometric Mean, µg/L, Human Health Criteria Only		
Applicable Water Quality Criteria	Aquatic Life Criteria, µg/L	Acute	9,975.
	Aquatic Life Criteria, µg/L	Chronic	1,917.
	Human Health Water and Organism, µg/L		--
	Human Health, Organism Only, µg/L		--
	Metals Criteria Translator, decimal (or default use Conversion Factor)	Acute	
		Chronic	
	Carcinogen (Y/N), Human Health Criteria Only		--
Percent River Flow Default Value = 25%	Aquatic Life - Acute	1B3	2.5%
	Aquatic Life - Chronic	7Q10 or 4B3	--
	Ammonia	4B3	25%
	Human Health - Non-Carcinogen	30Q5	--
	Human Health - carcinogen	Harmonic Mean	--
Calculated Dilution Factors (DF) (or enter Modeled DFs)	Aquatic Life - Acute	1B3	1.89
	Aquatic Life - Chronic	4B3	20.64
	Ammonia	4B3	20.64
	Human Health - Non-Carcinogen	30Q5	--
	Human Health - carcinogen	Harmonic Mean	--

Aquatic Life Reasonable Potential Analysis

σ	$\sigma^2=\ln(CV^2+1)$		0.080
P_n	=(1-confidence level)^1/n, where confidence level =	99%	0.922
Multiplier (TSD p. 57)	$=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)-0.5\sigma^2]$, where	99%	1.07
Statistically projected critical discharge concentration (C_e)			2364.92
Predicted max. conc.(ug/L) at Edge-of-Mixing Zone		Acute	1392.55
(note: for metals, concentration as dissolved using conversion factor as translator)		Chronic	400.04
Reasonable Potential to exceed Aquatic Life Criteria			NO

Temperature

Washington State temperature standards (WAC 173-201A-200-210 and 600-612) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Protections against acute effects

Consistent with Ecology's methodology, EPA evaluates each criterion independently to determine reasonable potential and derive permit limits.

- Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures. Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

The WQS limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology has not yet completed a TMDL, consistent with Ecology's policy which allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- Temperature Acute Effects

Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C 2-seconds after discharge.

General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Data Collection Required: The proposed permit requires the facility to monitor effluent and receiving water temperatures.

Annual summer maximum and incremental warming criteria: The EPA calculated the reasonable potential for the discharge to exceed the annual summer maximum, and the incremental warming criteria at the edge of the chronic mixing zone during critical condition(s). No reasonable potential exists to exceed the temperature criterion where:

$(\text{Criterion} + 0.3) > (\text{Criterion} + (T_{effluent95} - \text{Criterion})/DF)$

In this case, the temperature Criterion for Core Summer Salmonid Habitat is 16° C, and the 95th percentile of the facility's effluent is 20.93° C. Therefore using the equation above:

$(16 + 0.3) > (16 + (20.93 - 16)/20.64)$
$(16 + 0.3) > (16 + 0.24)$: This is true

Therefore, there is no reasonable potential to violate temperature requirements. Accordingly, the proposed permit does not include a temperature limit.

Appendix E. ESA and EFH Assessment

A. Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to request a consultation with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) regarding potential effects an action may have on listed endangered species.

On May 25, 2017, EPA researched the website for NMFS and concluded that there is one NOAA listed species in the vicinity of the discharge. This website is found at:
http://www.westcoast.fisheries.noaa.gov/protected_species/species_list/species_lists.html

The species lists available are: ESA-Listed Marine Mammals; ESA-Listed Other Marine Fishes; and, ESA-Listed Marine Turtles. EPA located 1 species that may be impacted. The species is:

NOAA Fisheries Designated Critical Habitat: Green Sturgeon *(Acipenser medirostris)*

On May 24, 2017, EPA researched the "IPaC" website by USFWS at http://ecos.fws.gov. The following 6 listed species have the potential to be present near the vicinity of the discharge:

Birds

Marbled Murrelet (*Brachyramphus marcoratus*) - Threatened

Short-tailed Albatross (*Phoebastria / Diomedia*) - Endangered

Streaked Horned Lark (*Eremophila alpestris strigata*) - Threatened

Yellow-billed Cuckoo (*Coccyzus americanus*) - Threatened

Fishes

Bull Trout (Salvelinus confluentus) – Threatened

Dolly Varden (Salvelinus malma) – PSAT (Proposed Similarity of Appearance Threatened)

Critical Habitat

Bull Trout (Salvelinus confluentus) – Final designated

Screening and Analysis

Based on initial screening that the discharge is located in the Moclips River, EPA concluded that bird species will not be affected since these are non-terrestrial species.

EPA also considered that the facility is a minor discharger with dilution in the river; in addition, the facility has UV-disinfection, and secondary treatment; accordingly, EPA concludes that there is no effect to the Green Sturgeon, Bull Trout and Dolly Varden.

The following is the description of all the listed species that EPA had considered pursuant to Section 7 of the Endangered Species Act.

Green Sturgeon *(Acipenser medirostris)*

The following information concerning the Green Sturgeon is from NOAA's website: http://www.fisheries.noaa.gov/pr/species/fish/green-sturgeon.html

Green Sturgeon are long-lived, slow-growing fish, and are the most marine-oriented of the sturgeon species. Mature males range from 4.5-6.5 feet (1.4-2 m) in **"fork length"** and do not mature until they are at least 15 years old (Van Eenennaam, 2002), while mature females range from 5-7 feet (1.6-2.2 m) fork length and do not mature until they are at least 17 years old. They can weigh up to 350 pounds (160 kg). Maximum ages of adult green sturgeon are likely to range from 60-70 years (Moyle, 2002).

Although they are members of the class of bony fishes, the skeleton of sturgeons is composed mostly of cartilage. Sturgeon don't have scales, but they have five rows of characteristic bony plates on their body called **"scutes"**. The backbone of the sturgeon curves upward into the caudal fin, forming their shark-like tail. On the ventral, or underside, of their flattened snouts are sensory barbels and a siphon-shaped, toothless mouth.

Green sturgeon are believed to spend the majority of their lives in nearshore oceanic waters, bays, and estuaries. Younger green sturgeon reside in fresh water, with adults returning to freshwater to spawn when they are about 15 years of age and more than 4 feet (1.3 m) in size. Spawning is believed to occur every 2-5 years (Moyle, 2002). Adults typically migrate into fresh water beginning in late February, and spawning occurs from March-July, with peak activity from April-June (Moyle et al., 1995). Females produce 60,000-140,000 eggs (Moyle et al., 1992). Juvenile green sturgeon spend a few years in fresh and estuarine waters before they leave for saltwater. They then disperse widely in the ocean.

The only feeding data we have on adult green sturgeon shows that they are eating **"benthic"** invertebrates including shrimp, mollusks, amphipods, and even small fish (Moyle et al., 1992).

Habitat

Green sturgeon utilize both freshwater and saltwater habitat. Green sturgeon spawn in deep pools or "holes" in large, turbulent, freshwater river mainstems (Moyle et al., 1992). Specific spawning habitat preferences are unclear, but eggs likely are broadcast over large cobble substrates, but range from clean sand to bedrock substrates as well (Moyle et al., 1995). It is likely that cold, clean water is important for proper embryonic development.

Adults live in oceanic waters, bays, and estuaries when not spawning. Green sturgeon are known to forage in estuaries and bays ranging from San Francisco Bay to British Columbia.

Critical Habitat

In October 2009, NMFS **designated critical habitat for the Southern DPS**.

Distribution

This species is found along the west coast of Mexico, the United States, and Canada. Green sturgeon are the most broadly distributed, wide-ranging, and most marine-oriented species of the sturgeon family. The green sturgeon ranges from Mexico to at least Alaska in marine waters, and is observed in bays and estuaries up and down the west coast of North America (Moyle et al., 1995).

The actual historical and current distribution of where this species spawns is unclear as green sturgeon make non-spawning movements into coastal lagoons and bays in the late summer to fall, and because their original spawning distribution may have been reduced due to harvest and other anthropogenic effects.

Green sturgeon are believed to spawn in the Rogue River, Klamath River Basin, and the Sacramento River. Spawning appears to rarely occur in the Umpqua River. Green sturgeon in the South Fork of the Trinity River were thought extirpated (Moyle, 2002), but juveniles captured at Willow Creek on the Trinity River (Scheiff et al., 2001) suggest that the fish could be coming from either the South Fork or the Trinity River (Adams et al., in press). Green sturgeon appear to occasionally occupy the Eel River.

Population Trends

No good data on current population sizes exists and data on population trends is lacking. Tagging experiments have been conducted irregularly since 1954, though regular tagging did not occur until 1990. Over 500 green sturgeon have been captured and over 200 have been tagged.

Threats

The principal factor in the decline of the Southern DPS is the reduction of the spawning area to a limited section of the Sacramento.

Other Factors include insufficient freshwater flow rates in spawning areas; contaminants (e.g., pesticides); bycatch of green sturgeon in fisheries; potential poaching (e.g., for caviar); entrainment by water projects; influence of exotic species; small population size; impassable barriers; and, elevated water temperatures.

Other threats to the Southern DPS include:

- insufficient freshwater flow rates in spawning areas,
- contaminants (e.g., pesticides)
- bycatch of green sturgeon in fisheries
- potential poaching (e.g., for caviar)
- entrainment by water projects
- influence of exotic species
- small population size
- impassable barriers
- elevated water temperatures

Coastal Bull Trout and Dolly Varden Trout

Status

The Dolly Varden trout has similarity of appearance with the Bull Trout. The coastal/Puget Sound (PS) bull trout distinct population segment (DPS) encompasses all Pacific coast drainages within Washington, including Puget Sound and Olympic Peninsula (50 FR Part 17). The Bull Trout ESU has been designated as threatened on June 10, 1998 (63 FR 31693).

Geographic Range and Spatial Distribution

The coastal/Puget Sound bull trout DPS encompasses all the Pacific coast drainages north of the Columbia River in Washington including those flowing into Puget Sound. This population is comprised of 34 populations which are segregated from other subpopulations by the Pacific Ocean and the Cascade Mountains. Within this area, bull trout often occur with Dolly Varden. Because these species are virtually indistinguishable, USFWS currently manages them together as "native char". The Puget Sound DPS is significant because it is thought to contain the only anadromous forms of bull trout in the coterminous United States (64 FR 58910).

The coastal bull trout subpopulations occur in five river basins: Chehalis River, Grays Harbor, Coastal Plains, Quinault River, Queets River, Hoh River, and Quillayute River. While most of the northwest coast subpopulations occur within Olympic National Park with relatively undisturbed habitats, subpopulations in the southwestern coastal area are in relatively low abundance.

Critical Habitat

Critical habitat was designated for Puget Sound bull trout on September 26, 2005 (70 FR 56213). The critical habitat designation for Puget Sound bull trout includes a total of 388 miles of streams in the Olympic Peninsula and 646 miles of streams in Puget Sound as well as 419 shoreline miles in the Olympic Peninsula marine areas and 566 shoreline miles in the Puget Sound marine areas.

Historical Information

Historical reports for the Puget Sound bull trout population demonstrate that bull trout were once more abundant and widely distributed throughout Puget Sound and the Olympic Peninsula (Suckley and Cooper 1860, Norgore and Anderson 1921, King County Department of Natural Resources 2000). Bull trout are now rarely observed in the Nisqually River and Chehalis River systems, which may have supported spawning populations in the past (USFWS 2002c, 2004). In the Puyallup River system the amphidromous life history forms currently exist in low numbers, as does the migratory form in the South Fork Skokomish River (USFWS 2002c, 2004). Until the dams were removed, in the Elwha River and parts of the Nooksack River, amphidromous bull trout are unable to access historic spawning habitat resulting from manmade barriers (USFWS 2002c, 2004).

Historically, sport fishing regulations were liberal for bull trout. However, recent decline of fish abundance has led to more restrictive regulations (WDFW 2003).

Life History

Small bull trout eat terrestrial and aquatic insects but shift to preying on other fish as they grow larger. Large bull trout are primarily fish predators. Bull trout evolved with whitefish, sculpins and other trout and use all of them as food sources. Adult bull trout are usually small, but can grow to 36 inches in length and up to 32 pounds. Bull trout reach sexual maturity at between four and seven years of age and are known to live as long as 12 years. They spawn in the fall after temperatures drop below 9ºC, in streams with abundant cold, unpolluted water, clean gravel and cobble substrate, and gentle stream slopes. Many spawning areas are associated with cold water springs or areas where stream flow is influenced by groundwater. Bull trout eggs require a long incubation period compared to other salmon and trout, hatching in late winter or early spring. Fry may remain in the stream gravels for up to three weeks before emerging (USFWS 2002a).

Bull trout may be either resident or migratory. Resident fish live their whole life near areas where they were spawned. Migratory fish are usually spawned in small headwater streams, and then migrate to larger streams, rivers, lakes, reservoirs or salt water where they grow to maturity. Smaller resident fish remain near the areas where they were spawned while larger, migratory, fish will move considerable distances to spawn when habitat conditions allow. For instance, bull trout in Montana's Flathead Lake have been known to migrate up to 250 km to spawn (USFWS 2002a).

Habitat and Hydrology

Bull trout are seldom found in waters where temperatures are warmer than 15°C to 18°C. Besides very cold water, bull trout require stable stream channels, clean spawning gravel, complex and diverse cover, and unblocked migration routes (USFWS 2002a).

Hatchery Influence

No information was found on the influence of hatcheries on bull trout.

Population Trends and Risks

The Coastal-Puget Sound bull trout are vulnerable to many of the same threats that have reduced bull trout in the Columbia River and Klamath River Basins including hybridization and competition with non-native brook trout, brown trout and lake trout, degradation of spawning and rearing habitat, and isolation of local populations due to dams and diversions (67 FR 71240). Due to their need for very cold waters and long incubation time, bull trout are more sensitive to increased water temperatures, poor water quality and degraded stream habitat than many other salmonids.

In many areas, continued survival of the species is threatened by a combination of factors rather than one major problem. For example, past and continuing land management activities have degraded stream habitat, especially along larger river systems and streams located in valley bottoms. Degraded conditions have severely reduced or eliminated migratory bull trout as water temperature, stream flow and other water quality parameters fall below the range of conditions which these fish can tolerate. In many watersheds, remaining bull trout are smaller, resident fish isolated in headwater streams. Brook trout, introduced throughout much of the range of bull trout, easily hybridize with them, producing sterile offspring. Brook trout also reproduce earlier and at a higher rate than bull trout so bull trout populations are often supplanted by these non-natives. Dams and other in-stream structures also affect bull trout by blocking migration routes, altering water temperatures and killing fish as they pass through and over dams or are trapped in irrigation and other diversion structures (USFWS 2002a).

Analysis of Potential Impacts to Listed Species

In consideration of all factors pertaining to the listed species, it is predicted that there will be no impact to any of these species. The discharge does not contribute to the factors responsible for the decline of the species as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects. Both of these species are highly mobile. In addition, the discharge is from a minor facility, and the effluent is treated to Federal Secondary Treatment Standards, is disinfected, as well as meeting State WQS; therefore, no measurable impacts are predicted to listed species. **No effect** is predicted on the Green Sturgeon, Bull Trout or the Dolly Varden trout, from the discharge.

Other considerations

Issuance of an NPDES permit for the facility will not result in loss of habitat and will not result in habitat destruction. In addition, the Washington State WQS, and the Federal Secondary Treatment Standards for wastewater treatment plants have been used in permit evaluation, where the more stringent effluent limitations have been applied in the proposed permit. EPA also proposed that the facility conduct effluent monitoring.

EPA also considered the size of the facility for evaluation of potential impacts. The existing treatment plant has a design flow rate of 0.035 mgd. For purposes of comparison based on the design flow rate criteria, EPA generally considers wastewater treatment plants having 1.0 mgd or greater to be major facilities. This facility is obviously much smaller than having a designed flow rate of 1.0 mgd, and is not considered a major facility.

As shown above, the evaluation of each listed species has resulted in no measurable impact. In consideration of this conclusion, EPA has tentatively determined that issuance of the NPDES permit is protective and there is **no effect** on listed species in the vicinity of the discharge.

B. Essential Fish Habitat

Pursuant to the requirements for Essential Fish Habitat (EFH) assessments, this appendix contains the following information:

- Listing of EFH Species in the Facility Area
- Description of the Facility and Discharge Location
- The EPA's Evaluation of Potential Effects to EFH

Listing of EFH Species in the Facility Area

According to NOAA Fisheries, the receiving water is listed for the Bull Trout and Dolly Varden.

Description of the Facility and Discharge Location

The activities and sources of wastewater at the Moclips River wastewater treatment facility are described in detail in this fact sheet.

The EPA's Evaluation of Potential Effects to EFH

Water quality is an important component of aquatic life habitat. NPDES permits are developed to protect water quality in accordance with state WQS. The standards protect the beneficial uses of the waterbody, including all life stages of aquatic life. The development of permit limits for an NPDES discharger includes the basic elements of ecological risk analysis. The underlying technical process leading to NPDES permit requirements incorporates the following elements of risk analysis:

Effluent Characterization

Characterization of the effluent was accomplished using a variety of sources, including:

- Permit application monitoring
- Permit compliance monitoring

Identification of Pollutants of Concern and Threshold Concentrations

The pollutants of concern include pollutants with aquatic life criteria in the Washington State WQS. No other pollutants of concern were identified by NMFS.

Exposure and Wasteload Allocation

Analysis of the transport of pollutants near the discharge point with respect to the following:

- Mixing zone policies in the Washington State WQS
- Dilution analysis
- Consideration of multiple sources and background concentrations

Monitoring Programs

Development of monitoring requirements, including:

- Compliance monitoring of the effluent
- Ambient monitoring

Protection of Aquatic Life in NPDES Permitting

The EPA's approach to aquatic life protection is outlined in detail in the *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001, March 1991). The EPA and states evaluate toxicological information from a wide range of species and life stages in establishing water quality criteria for the protection of aquatic life.

The NPDES program evaluates a wide range of chemical constituents (as well as whole effluent toxicity testing results) to identify pollutants of concern with respect to the criteria values. When a facility discharges a pollutant at a level that has a "reasonable potential" to exceed, or to contribute to an exceedance of, the water quality criteria, permit limits are established to prevent exceedances of the criteria in the receiving water (outside any authorized mixing zone).

Effects Determination

Since the proposed permit has been developed to protect aquatic life species in the receiving water in accordance with the Washington State WQS, the EPA has determined that issuance of this permit has no effect to any EFH in the vicinity of the discharge. The EPA will provide NMFS with copies of the draft permit and fact sheet during the public notice period. Any recommendations received from NMFS regarding EFH will be considered prior to reissuance of this permit.