Fact Sheet
NPDES Permit Number WA-002480-5

FACT SHEET

Public Comment Period Start Date: August 10, 2009
Public Comment Expiration Date: September 9, 2009

The United States Environmental Protection Agency (EPA)
Plans To Reissue A National Pollutant Discharge Elimination System (NPDES) Permit
And
Notice of State Certification

Tulalip Tribes of Washington
Wastewater Treatment Plant
3015 Mission Beach Road
Tulalip, Washington 98271

Technical Contact:
Kai Shum
email: Shum.Kai@epa.gov
Phone: 206-553-0060

EPA Proposes To Reissue NPDES Permit

EPA proposes to reissue the NPDES permit to 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

401 Certification for Facilities that Discharge to State Waters

EPA is requesting that the Washington State Department of Ecology (Ecology) certify the NPDES permit for this facility, under Section 401 of the Clean Water Act. Washington State Department of Ecology is considering the issuance of a Clean Water Act (CWA) Section 401 Certification that the subject discharge will comply with the applicable Washington State Water

Quality Standards. The NPDES permit will not be issued until the certification requirements of Section 401 have been met.

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 EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's Regional Director for the Office of Water and Watersheds will make a final decision regarding permit reissuance. 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 comments are received, EPA will address the comments and issue the permit. The permit will become effective 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

Documents are Available for Review.

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday (see address below). The draft permit, fact sheet, and other information can also be found by visiting the Region 10 website at "www.epa.gov/r10earth/water.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 900, OWW-130
Seattle, Washington 98101
(206) 553-2108 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permit are also available at:

EPA Washington Operations Office
300 Desmond Drive SE
Lacey, Washington 98503
(360)-407-7564 or (800) 917-0043

Washington Department of Ecology
Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Attn: Mike Dawda
(425) 649-7027

TABLE OF CONTENTS

LIST OF TABLES

ACRONYMS

AML	Average Monthly Limit
BOD_5	Biochemical oxygen demand, five-day
EC	Degrees Celsius
cfs	Cubic feet per second
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
I/I	Inflow and Infiltration
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ml	milliliters
ML	Minimum Level
:g/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit
N	Nitrogen
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
OWW	Office of Water and Watersheds
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
SBR	Sequencing Batch Reactor
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TSD	Technical Support document (EPA, 1991)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Services
UV	Ultraviolet radiation
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater treatment plant

I. APPLICANT

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

Tulalip Tribes of Washington
Wastewater Treatment Plant
NPDES Permit Number: WA-002480-5

Mailing Address:
3015 Mission Beach Road
Tulalip, Washington 98271

Physical Address:
3015 Mission Beach Road
Tulalip, WA 98271

Facility Contact:
Clifford Jones
Plant Operator and Field Supervisor
Wastewater Treatment Plant
3015 Mission Beach Road
Tulalip, WA 98271
Email: CliffJones@tulaliptribes-nsn.gov
Phone: (360) 716-4850

II. FACILITY INFORMATION

The wastewater treatment plant is located in the Tulalip Tribes Indian Reservation in Tulalip, Snohomish County, Washington. The wastewater treatment plant (WWTP) services a population of approximately 3,200 and has a design flow rate of 0.616 million gallons per day (mgd). The Tulalip Tribes own, operate, and maintain this wastewater treatment plant (WWTP) on Mission Beach Road that treats domestic wastewater to Secondary Treatment Standards. The map in Table A-2 shows the location of the treatment plant and discharge. The facility provides secondary treatment of wastewater prior to discharging it to Possession Sound, a marine water body. Refer to the process flow diagram in Appendix A-3 for a more detailed description of the wastewater treatment process. There are no industrial contributors to the wastewater collection and treatment system. Several commercial facilities discharge sewage to this WWTP; otherwise, all other users are residential. The WWTP collects sewage in a separate sanitary sewer collection system and treats the sewage through secondary treatment and ultraviolet (UV) disinfection. UV disinfection had replaced the previously used chlorine disinfection method in 2004.

The receiving water from the wastewater treatment plant is discharged into Possession Sound, which is located in the northern half of Puget Sound in western Washington. The Tulalip Utilities District #1 WWTP discharges its wastewater directly to Possession Sound via Outfall 001, a 12-inch marine outfall pipe. On page 7 of a letter from Washington

State Department of Health to U.S. EPA (Meriwether to Ragsdale) dated November 12, 1997, the 1974 schematics showed that the outfall is approximately 1600 feet offshore in 51 feet (MLLW) of water. The outfall is directed to the southwest with a true bearing of approximately 225 degrees. The terminus of the outfall is located at latitude 48º 02' 41" North, and longitude 122º 18' 41" West.

According to a letter from Plant Operator, Clifford Jones, dated December 11, 2007, the marine outfall had not been inspected since 1976, and he believed it would be timely for an outfall evaluation and to have possible repairs completed. The 12-inch marine outfall pipe is not equipped with a diffuser.

The previous NPDES Permit for this facility became effective on March 5, 2001, and expired on March 6, 2006. A recently updated permit application was received from the facility on October 19, 2007.

According to the facility, sludge accumulated at this plant is thickened to approximately 1.5% and then transported by a tanker truck to the LaConner Wastewater Treatment Plant, or the King County Wastewater Treatment Plant in Renton for further treatment. Analysis of sludge data sheets showed an average monthly amount of 38,918 gallons of sludge were transferred between January 2006 and May 2009.

In the previous permit, the following effluent discharge limitations were required as shown in Table 1.

Table 1: Final Effluent Limitations from the Previous Permit

Effluent Characteristics	Units	Monthly Average	Weekly Average	Maximum Daily Limit
Flow	Gpd	616,000	---	---
BOD_5	Mg/L (lbs/day)	30 (154)	45 (231)	---
Total Suspended Solids, TSS	mg/L (lbs/day)	30 (154)	45 (231)	---
Fecal Coliform Bacteria	number/100 mL	200	400	---
Chlorine, Total Residual	Mg/l (lbs/day)	0.006 (0.031)	---	0.017 (0.087)
pH	Shall not be less than 6.0, nor greater than 9.0			
Percent Removal for BOD_5	For any month, the monthly average effluent load shall not exceed 15% of the monthly average influent load.			
Percent Removal for TSS	For any month, the monthly average effluent load shall not exceed 15% of the monthly average influent load.			

The following table summarizes the monitoring requirements from the previous permit:

Table 2: Monitoring Requirements from the Previous Permit		
Parameter	**Minimum Sample Frequency**	**Sample Type**
Flow, mgd	Continuous	Recording
BOD_5, mg/l[1]	2/Week	24-hour Composite[2]
TSS, mg/l[1]	2/Week	24-hour Composite[2]
Dissolved Oxygen, mg/l	2/Week	Grab
Fecal Coliform Bacteria, colonies/100 ml	5/Week	Grab
Total Residual Chlorine, mg/l	Daily	Grab
Temperature, ^{o}C	Daily	Grab
pH, standard units	Daily	Grab
Metals[3]: Copper, Mercury and Silver	2/year	24-hour Composite

Notes:
1. Percent Removal Monitoring: The percent BOD_5 and TSS removal shall be reported on each monthly DMR form.
2. 24-hour composite samples shall consist of not fewer than eight discrete flow-proportional aliquots collected over a twenty-four hour period. Each aliquot shall be a grab sample of not less than 100 ml and shall be collected and stored in accordance with procedures prescribed in *Standard Methods for the Examination of Water and Wastewater,* 18th Edition.
3. Samples for metals shall be collected 2 times per year for five years after the effective date of the permit, once in summer and once in winter.

In its NPDES Permit Application dated February 5, 2007, the facility reported the following information:

- The facility has a design flow rate of 0.616 mgd.
- The facility is requesting to renew its NPDES permit for continuous discharge
- The annual average daily flow rate in 2006 was 0.22 mgd.
- The facility's collection system consists only of separate sanitary sewers. No contribution from a combined storm sewer was indicated.
- The facility does not land-apply treated wastewater.
- The facility does not discharge or transport treated or untreated wastewater to another treatment works.
- The facility has secondary treatment level
- The facility uses ultraviolet disinfection of effluent wastewater.

EPA evaluated 3-years of DMR data submitted from March 2006 to February 2009. The following is a summary of the submitted effluent data.

- pH: maximum 9.02 s.u., minimum 3.32 s.u.
- Maximum daily value for flow rate: 0.594 mgd
- Average daily value for flow rate: 0.303 mgd
- Temperature of effluent: Maximum daily reading of 24ºC
- BOD5: Monthly average range is 2 mg/l to 6 mg/l

  BOD5: Weekly average range is 1 mg/l to 21 mg/l

  BOD5: Monthly percent reduction range is 93% to 99%. Average = 97%
- TSS: Monthly average range is 3 mg/l to 68 mg/l

  TSS: Weekly average range is 5 mg/l to 88 mg/l

  TSS: Monthly percent reduction range is 73% to 97%. Average = 91%
- Fecal Coliform:

  Maximum monthly geometric mean is 47.9 organisms/100 ml;

  Average monthly geometric mean is 7.53 organisms/100 ml

Inflow and Infiltration (I/I) rate from the wastewater collection system is estimated to be 17,500 gallons per day.

On June 9, 2009, EPA performed a site visit as part of issuing the proposed NPDES permit. EPA met with representatives from Tulalip Tribes, and observed the basic operation of the wastewater treatment plant. The plant serves a current population of approximately 3,200. The Tribe does not currently have finalized plans to increase effluent flows, or to undertake plant changes within the next 5 years. However, the Tulalip Tribes are making plans to alter plant specifications, which may include plans for increasing effluent flow rates after this proposed permitting cycle has expired.

On June 24, 2009, EPA provided copies of the preliminary draft Permit and Fact Sheet to Washington State Department of Ecology, Washington State Department of Health and the Tulalip Tribes for review. EPA had also initiated government-to-government consultations with the Tulalip Tribes pursuant to the reissuance of this proposed NPDES permit.

III. RECEIVING WATER

The Tulalip WWTP discharges into Possession Sound, which is within Puget Sound, from Outfall 001. The marine outfall pipe is approximately 1600 feet in length from shoreline, and the 12-inch outfall pipe ends at approximately 51 feet below the surface (MLLW).

A. Water Quality Standards

Section 301(b)(1)(c) of the CWA requires the development of limitations in permits necessary to meet water quality standards. Federal regulations in 40 CFR

122.4(d) prohibit the issuance of an NPDES permit which does not ensure compliance with the water quality standards of all affected States.

A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (such as cold water biota, contact recreation, etc.) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary, by the State, to support the beneficial uses as well as to maintain and protect various levels of water quality and uses.

The receiving water in Possession Sound is between 47º 57'N and 48º 27' 20" N, is classified as Excellent Marine according to the State of Washington's Water Quality Standards (found at WAC 173-201A-612, Table 612, as amended in November, 2006). Waters classified as "Excellent" have a general description of: "excellent quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc) rearing and spawning." This segment of water is also listed for Shellfish Harvest, Primary Contact Recreation, Wildlife Habitat, Harvesting, Commerce and Navigation, Boating, and Aesthetics.

WAC 173-201A-400(7)(b)(i) defines the mixing zone for estuarine receiving waters. The mixing zone is determined by adding 200 feet to the depth of water over the discharge port as measured during Mean Lower Low Water (MLLW). Based on 1974 design drawings, the sewage treatment plant outfall ends approximately 1600 feet offshore at a depth of 51 feet mean lower low water (MLLW). Therefore, the chronic mixing zone is 251 feet. WAC 173-201A-400(8)(b) indicates that the maximum size of the mixing zone where acute criteria may be exceeded is 10% of the mixing zone defined in WAC 173-201A-400(7)(b). In the case of the Tulalip facility, the acute mixing zone is therefore 25.1 feet.

B. Water Quality Limited Segment

Any waterbody for which the water quality does not, and/or is not expected to meet, applicable water quality standards is defined as a "water quality limited segment." On May 12, 2009, EPA consulted with Mr. Ken Koch [(360) 407-6782], Water Quality Assessment Coordinator at Washington State Department of Ecology concerning the possibility of listing the area of discharge on the 2009 EPA-approved 303(d) list. Consultation with Mr. Koch indicated that the area of discharge is not a listed segment on the 303(d) list, and the area of discharge does not have any Total Maximum Daily Load (TMDL) designations.

IV. EFFLUENT LIMITATIONS

A. Basis for Permit Effluent Limits

In general, the CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent 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 water quality standards of a waterbody are being met and they may be more stringent than technology-based effluent limits. The basis for the proposed effluent limits described in the draft permit is provided in Appendix B.

B. Proposed Effluent Limitations

The following summarizes the proposed effluent limitations that are in the draft permit.

1. Removal Requirements for BOD_5 and TSS: The monthly average effluent concentration must not exceed 15 percent of the monthly average influent concentration for of BOD_5 and TSS. Percent removal of BOD_5 and TSS must be reported on the Discharge Monitoring Reports (DMRs). For each parameter, 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. Influent and effluent samples must be taken over approximately the same time period.

2. There must be no discharge of any floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.

3. Table 4 below presents the proposed range for pH, the concentrations and loading effluent limits for average monthly, and average weekly effluent limits for BOD_5, TSS, and fecal coliform, and the percent removal requirements for BOD_5, and TSS.

Table 3: Monthly, Weekly and Daily Maximum Effluent Limitations

Parameters	Average Monthly Limit	Average Weekly Limit	Percent Removal	Maximum Daily Limit
BOD_5 Concentration	30 mg/L	45 mg/L	85% (Min.)[3]	---
BOD_5 Mass-Based Limits[1]	154 lbs/day	231 lbs/day		---
TSS Concentration	30 mg/L	45 mg/L	85% (Min.)[3]	---
TSS Mass-Based Limits[1]	154 lbs/day	231 lbs/day		---
Fecal coliform Bacteria (organisms/100 ml)	200[2]	400[2]	---	---
pH (in s.u.)	6.0 to 9.0			

Table 3: Monthly, Weekly and Daily Maximum Effluent Limitations				
Parameters	**Average Monthly Limit**	**Average Weekly Limit**	**Percent Removal**	**Maximum Daily Limit**

Notes:
1. 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).
2. For fecal coliform bacteria, the permittee must report the geometric mean fecal coliform concentration. 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. "Geometric mean" means either the nth root of a product of n factors, or the antilogarithm of the arithmetic mean of the logarithms of the individual sample values.
3. Percent removal is calculated using the following equation: ((monthly average influent concentration – monthly average effluent concentration) / monthly average influent concentration) x 100

As described in Section II above, the Tulalip WWTP eliminated its chlorination disinfection system in 2004 and replaced it with UV disinfection. Therefore, chlorine requirements have been eliminated from the draft permit.

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 data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring, for reporting results on DMRs or on the application for renewal, as appropriate, to the U.S. Environmental Protection Agency (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 can be used for averaging if they are conducted using EPA approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits (MDLs) are less than the effluent limits.

Table 4 summarizes the effluent monitoring requirements for the permittee in the draft permit. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR. Sampling frequency for flow rate, BOD_5, TSS, fecal coliform, pH and temperature parameters are proposed for retention from the previous permit. Ammonia has been added for monitoring due to potential toxicity concerns to water quality. Monitoring of alkalinity has been added for more precise site-specific modeling purposes to calculate pH mix in marine water. "NPDES Application Form 2A Effluent Testing Data" has been added to Table 4 to highlight this requirement to perform the monitoring because it is required on the permit application form, and to obtain data from an annually spaced frequency.

Table 4: Effluent Monitoring Requirements

Parameter	Unit	Sample Location	Sample Frequency	Sample Type
Flow	MGD	Effluent	Continuous	Recording
BOD_5	Mg/L	Influent and Effluent	2/week	24-hour composite
	Lbs/day	Influent and Effluent	2/week	Calculation[2]
	% Removal	--	–	Calculation[3]
TSS	Mg/L	Influent and Effluent	2/week	24-hour composite
	Lbs/day	Influent and Effluent	2/week	Calculation[2]
	% Removal	--	–	Calculation[3]
Fecal coliform[4]	#/100 ml	Effluent	5/week	Grab
Temperature[7]	ºC	Effluent	Daily	Grab
Total Ammonia as N[6]	mg/L	Effluent	1/quarter	24-hour composite
pH	s.u.	Effluent	Daily	Grab
Alkalinity	mg/L as $CaCO_3$	Effluent	1/year	Grab
NPDES Application Form 2A Effluent Testing Data[5]	Mg/L	Effluent	3/5 years[5]	See footnote 5

Notes:

1. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.
2. Maximum daily loading is calculated by multiplying the concentration in mg/L by the average daily flow in mgd and a conversion factor of 8.34.
3. Percent removal is calculated using the following equation: ((monthly average influent concentration – monthly average effluent concentration) / monthly average influent concentration) x 100
4. Geometric Mean Criterion: "Geometric Mean" means the n^{th} root of a product of n factors, or the antilogarithm of the arithmetic mean of the logarithms of the individual sample values.
5. For Effluent Testing Data, in accordance with instructions in NPDES Application Form 2A, Part B.6, and where each test is conducted in a separate permit year during the permitted discharge period for the first three years of the permit cycle.
6. The maximum ML for Total Ammonia is 0.05 mg/l
7. Preferably temperature to be measured during the warmest period of the day.

From the previous permit, several parameters have been proposed to be deleted from monitoring. These parameters are metals (copper, silver, and mercury), chlorine, and dissolved oxygen. Available metals monitoring data for copper, silver and mercury indicate no reasonable potential to exceed water quality criteria (see discussion on Appendix B, item 4(e)). Chlorine has been proposed for deletion from monitoring because the facility has switched from using chlorine for disinfection to using ultra-violet radiation. Dissolved oxygen has been proposed for deletion because BOD_5 continues to be monitored, and past dissolved oxygen data is available.

C. Outfall Evaluation

The dilution ratio calculations are based upon the integrity of the outfall pipe. The Permittee shall inspect the submerged portion of the outfall line to document its integrity and continued function. The inspection shall evaluate the structural condition of the submerged portion of the outfall pipe, determine whether portions of the outfall are covered by sediments, and determine whether the outfall pipe is flowing freely. If conditions allow for a photographic verification, it shall be included in the report. A brief report of this inspection shall be submitted to EPA.

VI. SLUDGE (BIOSOLIDS) REQUIREMENTS

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

Until future issuance of a sludge-only permit, sludge management and disposal activities at the 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 permittee must comply with them whether or not a permit has been issued.

VII. OTHER PERMIT CONDITIONS

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The permittee is required to develop and implement a Quality Assurance Plan within 180 days of the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan shall be retained on site and made available to EPA upon request.

B. Operation and Maintenance Plan

The permit requires the permittee 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 the facility within 180 days of the effective date of the final permit. The plan shall be retained on site and made available to EPA upon request.

C. Additional Permit Provisions

Sections II, III, and IV of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, 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 (FWS) if their actions could beneficially or adversely affect any threatened or endangered species. Based on findings, EPA has determined that issuance of this permit is not likely to adversely affect any threatened or endangered species in the vicinity of the discharge.

On June 1, 2009, EPA wrote to NOAA and FWS to inquire about Endangered Species in the area of Possession Sound.

EPA located two lists from NOAA on the internet; these lists are entitled:

(1) "***Endangered Species Act Status of West Coast Salmon & Steelhead***"(updated Sept. 25, 2008) – this list shows that Chinook Salmon (O. tshawytscha) and Steelhead (O.mykiss) both are listed as "Threatened" in Puget Sound. Steelhead is also listed as an ESA Listing Action that is Under Review for Critical Habitat.
http://www.nwr.noaa.gov/ESA-Salmon-Listings/upload/snapshot-9-08.pdf

(2) "***ESA-Listed Marine Mammals***" – Under the jurisdiction of NOAA Fisheries Service that may occur in Puget Sound, lists the following:
Southern Resident Killer Whale (Endangered), Orcinus orca;
Humpback Whale (Endangered), Megaptera novaeangliae; and,
Stella Sea Lion (Threatened), Eumetopias jubatus.
http://www.nwr.noaa.gov/Marine-Mammals/ESA-MM-List.cfm

Of note, according to Shandra O'Haleck, the Humpback Whale and the Stella Sea Lion are considered to have "No Effect" because they are rarely found inside Puget Sound.

EPA also researched the U.S. Fish and Wildlife Service website and found the "Listed and Proposed Endangered and Threatened Species And Critical: Candidate Species; and Species of Concern in Snohomish County" list (revised November 1, 2007). The USFWS "Listed" the following species for Snohomish County:
Bull Trout (Salvelinus confluentus)
Canada Lynx (Lynx canadensis)
Gray Wolf (Canis lupus)
Grizzly Bear (Ursus arctos = U. a. horribilis)
Marbled Murrelet (Brachyramphus marmoratus)
Northern Spotted Owl (Strix occidentalis caurina)

The following species were "Designated" by USFWS in Snohomish County:
Critical habitat for Bull Trout
Critical habitat for the Marbled Murrelet
Critical habitat for the Northern Spotted Owl

As described in Section A of Appendix D, EPA has tentatively determined that there is no effect from this discharge to the listed species.

B. Essential Fish Habitat

Essential fish habitat (EFH) includes 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 EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. As detailed in Section B of Appendix D, EPA has tentatively determined that issuance of this permit has no effect on EFH at the vicinity of the discharge.

C. State Certification

Section 401 of the CWA requires EPA to seek Washington State certification before issuing a final permit. As part of its certification, Washington State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards.

D. Permit Expiration

The permit will expire five years from the effective date of the permit.

Appendix A - Facility Information

Table A-1: Summary of Tulalip Wastewater Treatment Plant	
NPDES ID Number:	WA-002480-5
Mailing Address:	3015 Mission Beach Road Tulalip, Washington 98271
Facility Background:	Wastewater treatment plant for domestic sewage with Secondary Treatment level
Collection System Information	
Service Area:	Tulalip Tribes Indian Reservation
Service Area Population:	Approximately 3,200
Collection System Type:	100% Separated Sanitary Sewer
Facility Information	
Treatment Train:	Secondary wastewater treatment plant with Ultra-Violet (UV) disinfection
Design Flow:	0.616 mgd
Months when Discharge Occurs:	Continuous
Outfall 001 Location:	48^0 02' 41" N, 122^0 18' 41" W
	Possession Sound (North) in Puget Sound, approx. 1600 ft. marine outfall pipe; 12-inch diameter pipe; at 51 feet below MLLW
Receiving Water Information	
Receiving Water:	Marine waters, "Possession Sound (North)" in Puget Sound, as classified by the Washington State Department of Ecology
Beneficial Uses:	Waters classified as "Excellent" have a general description of: "excellent quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc) rearing and spawning." This segment of water is also listed for Shellfish Harvest, Primary Contact Recreation, Wildlife Habitat, Harvesting, Commerce and Navigation, Boating, and Aesthetics.
Water Quality Limited Segment:	The area of discharge is not a listed segment on the 303(d) list, and the area of discharge does not have any Total Maximum Daily Load (TMDL) designations.
Basis for BOD_5/TSS Limits:	The facility can meet secondary treatment requirements for BOD_5 and TSS.

Table A-2: Outfall Location Map

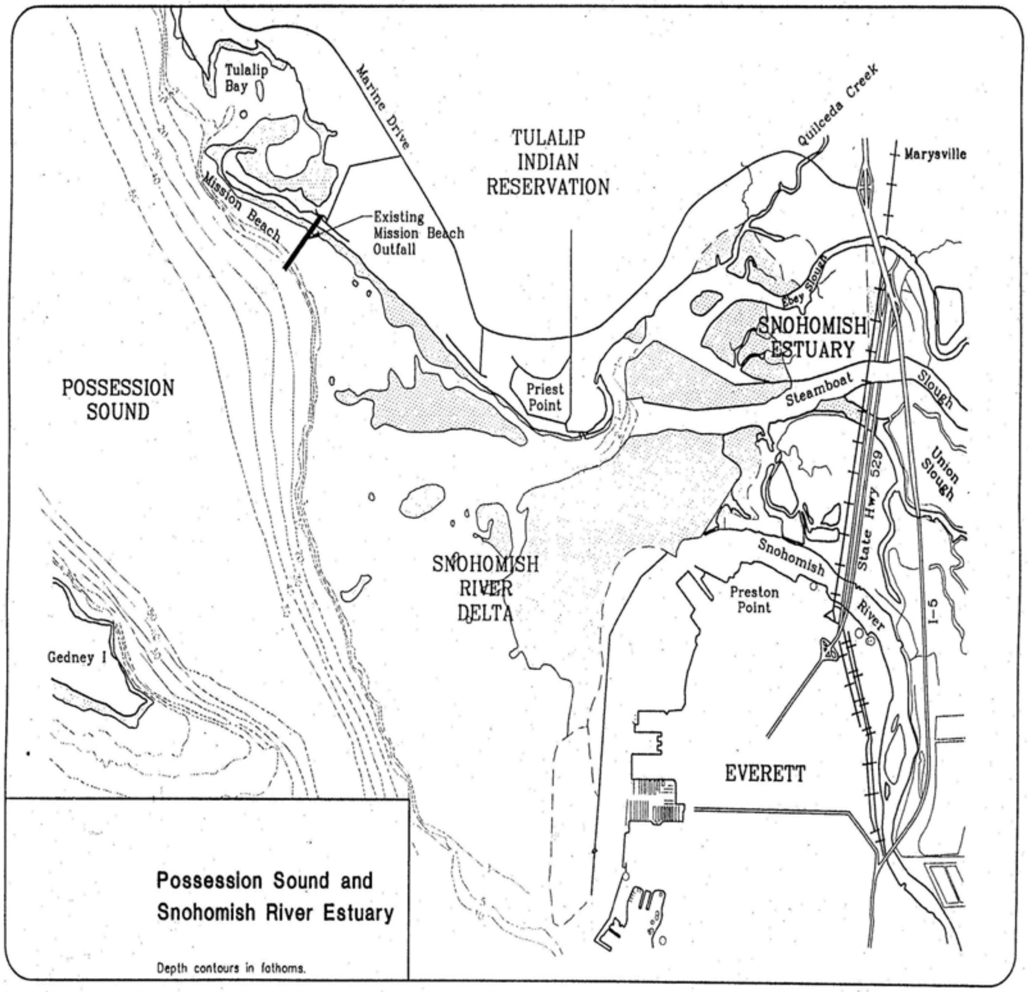
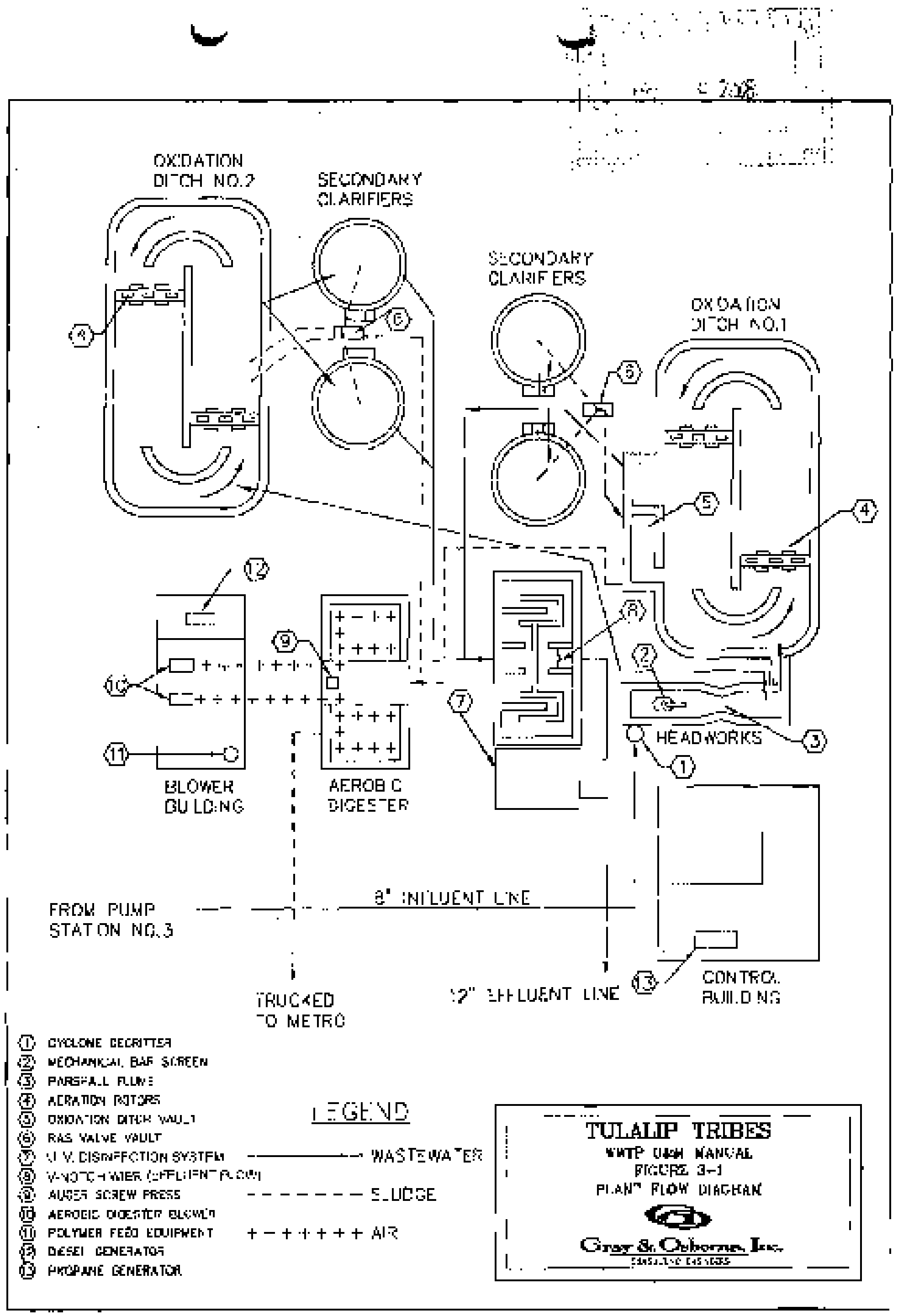


Table A-3 - Process Flow Diagram

Tulalip Utilities Wastewater Treatment Facility



Appendix B - Basis for Effluent Limitations

The Clean Water Act (CWA) requires Publicly Owned Treatment Works (POTW) to meet effluent limits based on available wastewater treatment technology. These types of effluent limits are called secondary treatment effluent limits. EPA may find, by analyzing the effect of an effluent discharge on the receiving water, that secondary treatment effluent limits are not sufficiently stringent to meet water quality standards. In such cases, EPA is required to develop more stringent water quality-based effluent limits, which are designed to ensure that the water quality standards of the receiving water are met.

Secondary treatment effluent limits may not limit every parameter that is in an effluent. For example, secondary treatment effluent limits for POTWs have only been developed for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH, yet effluent from a POTW may contain other pollutants, such as bacteria, chlorine, ammonia, or metals, depending on the type of treatment system used and the service area of the POTW (i.e., industrial facilities as well as residential areas discharge into the POTW). When technology based effluent limits do not exist for a particular pollutant expected to be in the effluent, EPA must determine if the pollutant may cause or contribute to an exceedance of the water quality standards for the water body. If a pollutant causes or contributes to an exceedance of a water quality standard, water quality-based effluent limits for the pollutant must be incorporated into the permit.

The following discussion explains in more detail the derivation of technology based effluent limits, and water quality based effluent limits. Part A discusses technology based effluent limits, and Part B discusses water quality based effluent limits.

A. Technology Based Effluent Limits

1. BOD_5, TSS and pH

<u>Secondary Treatment</u>:
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," that all POTWs were required to meet by July 1, 1977. EPA developed "secondary treatment" regulations, which are specified in 40 CFR 133. These technology-based effluent limits apply to all municipal wastewater treatment plants, and identify the minimum level of effluent quality attainable by secondary treatment in terms of BOD_5, TSS, and pH.

Table B-1 below illustrates the technology based effluent limits for "Secondary Treatment" effluent limits:

Table B-1: Secondary Treatment Effluent Limits (40 CFR 133.102)			
Parameter	**Average Monthly Limit**	**Average Weekly Limit**	**Range**
BOD_5	30 mg/L	45 mg/L	---
TSS	30 mg/L	45 mg/L	---
Removal Rates for BOD_5 and TSS	85% (minimum)	---	---
pH	---	---	6.0 - 9.0 s.u.

Effluent monitoring data from the facility from March 2006 to February 2009 were evaluated to determine compliance with secondary treatment limits. The data for BOD_5 and TSS are summarized in Table B-2. This analysis confirms that the facility has usually met secondary treatment standards for BOD_5 and TSS. The 95^{th} percentile values for average weekly and average monthly effluent BOD_5 and TSS are below the limits for secondary effluent. The 5^{th} percentile value for percent removal for BOD_5 is above the minimum of 85%. The 5^{th} percentile value for percent removal for TSS is slightly below the minimum standard of 85%.

Table B-2: Analysis of Effluent Discharged						
Mo. Yr.	BOD Mo. Ave mg/l	BOD Wk. Ave mg/l	BOD (%) Percent Removal	TSS Mo. Ave mg/l	TSS Wk. Ave mg/l	TSS (%) Percent Removal
Feb.09	5	7	97	9	13	95
Dec.08	4	4	96	3	7	97
Nov.08	4	4	97	6	16	96
Oct.08	4	4	98	5	8	97
Sept.08	4	4	97	8	16	95
Aug.08	4	4	98	6	16	97
Jul.08	4	4	97	4	7	96
Jun.08	4	4	97	6	10	95
May. 08	4	7	97	5	10	94
April.08	5	8	97	6	8	96
Mar.08	5	5	96	9	18	91
Feb.08	5	7	97	12	19	93
Jan.08	4	5	95	11	19	88
Nov.07	4	5	97	8	18	94
Oct.07	2	4	98	7	12	94
Sept.07	2	3	98	14	23	73
Aug.07	2	4	98	8	13	87
Jul.07	3	4	98	10	16	93
Jun.07	5	21	96	14	25	86
May.07	2	4	98	11	24	89
April.07	3	6	94	11	25	97
Mar.07	6	8	93	14	18	94

Table B-2: Analysis of Effluent Discharged						
Mo. Yr.	**BOD Mo. Ave mg/l**	**BOD Wk. Ave mg/l**	**BOD (%) Percent Removal**	**TSS Mo. Ave mg/l**	**TSS Wk. Ave mg/l**	**TSS (%) Percent Removal**
Feb.07	NA	NA	NA	17	21	83
Jan.07	NA	NA	NA	19	23	83
Dec.06	NA	NA	NA	12	16	84
Nov.06	5	6	97	7	5	96
Oct.06	4	6	95	10	12	90
Sept.06	2	3	97	14	32	82
Aug.06	4	5	98	12	18	97
Jul.06	2	1	99	NA	NA	NA
Jun.06	3	4	96	NA	NA	NA
May.06	5	8	95	15	24	85
April.06	5	8	97	68	88	91
Mar.06	3	4	97	11	27	91
Statistical Calculations	**95th percentile = 5 mg/l**	**95th percentile = 8 mg/l**	**5th percentile = 94.5%**	**95th percentile = 17.9 mg/l**	**95th percentile = 29.25 mg/l**	**5th percentile = 82.6%**
Secondary Treatment Standards	**30 mg/l**	**45 mg/l**	**85% minimum**	**30 mg/l**	**45 mg/l**	**85% minimum**

For pH, the minimum pH recorded at the WWTP during the same 3-year period was 3.32 s.u., and the maximum pH recorded was 9.02 s.u. There was considerable variability at the lower pH range, with the low-end pH average value of 6.29 s.u. For the overall average, the pH range from the WWTP during this period was: 6.29 s.u. to 7.28 s.u. This indicates that on an overall average, the WWTP can meet secondary treatment standards for pH in the range of 6.0 s.u. to 9.0 s.u.

2. Mass-Based Limits

The federal regulation at 40 CFR § 122.45 (f) require BOD_5 and TSS limitations to be expressed as mass based limits using the design flow of the facility. The mass based limits are expressed in lbs/day and are calculated as follows:

Mass based limit (lbs/day) = concentration limit (mg/L) x design flow (mgd) x 8.34

For BOD_5 and TSS:
Average Monthly Limit = 30 mg/L x 0.616 mgd x 8.34 = 154 lbs/day
Average Weekly Limit = 45 mg/L x 0.616 mgd x 8.34 = 231 lbs/day

B. Water Quality-Based Effluent Limits

The following discussion is divided into four sections. Section 1 discusses the statutory basis for including water quality based effluent limits in NPDES permits; Section 2 discusses the procedures used to determine if water quality based effluent limits are needed in an NPDES permit; Section 3 discusses the procedures used to develop water quality based effluent limits; and Section 4 discusses the specific water quality based limits.

The Tulalip WWTP has only technology-based limits for BOD, TSS, and bacteria. A reasonable potential analysis was conducted for ammonia. The maximum concentration of ammonia recorded on August 6, 2008 at 0.35 mg/l. Using the available 7 point data set of ammonia concentrations, EPA evaluated reasonable potential to exceed WQS. The Coefficient of Variation, Cv was assumed to be the default value of 0.6 since there are less than 10 data points**.** These data were used in Visual Plumes modeling to determine the effluent limitation for the Suquamish plant. The modeling is discussed in Appendix C, which predicted a acute dilution factor of 48.49 for the acute mixing zone; and, the chronic dilution factor 67.1 for the chronic mixing zone.

Concerning water quality standards, pollutants in any effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants – their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

1. Statutory Basis for Water Quality-Based Limits

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to state waters must also comply with limitations imposed by the state 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 water quality standard, including state narrative criteria for water quality.

The regulations require that this evaluation be made 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 water quality standards are met, and must be consistent with any available wasteload allocation.

2. Reasonable Potential Analysis

When evaluating the effluent to determine if water quality-based effluent limits are needed based on chemical specific numeric criteria, a projection of the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern is made. The chemical specific concentration of the effluent and receiving water and, if appropriate, the dilution available from the receiving water are factors used to project the receiving water concentration. If the projected concentration of the receiving water exceeds the numeric criterion for a specific chemical, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is appropriate to allow a small area of receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body, and decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the receiving water is below the chemical specific numeric criterion necessary to protect the designated uses of the water body. Mixing zones must be authorized by the Washington Department of Ecology or EPA.

Assuming a mixing zone is granted by the State of Washington, reasonable potential calculations were computed for ammonia and copper. These calculations as shown in Appendix C indicate there is no reasonable potential to exceed Washington State Water Quality Standards.

If a mixing zone is not granted, the water quality-based effluent limits will be recalculated such that the criteria are met before the effluent is discharged to the receiving water.

3. Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a water quality-based permit limit is to develop a wasteload allocation (WLA) for the pollutant that has reasonable potential to exceed water quality standards. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water.

In cases where a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the state/tribe does not authorize one, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not contribute to an exceedance of the criterion. The following discussion details the specific water quality-based effluent limits in the draft permit with the expectation that the Department of Ecology would certify the final permit.

4. Specific Water Quality-Based Effluent Limits

(a) pH

The Washington water quality criterion for Excellent Quality Marine Waters specifies a pH range of 7.0 to 8.5 standard units, with human-caused variation within the above range of less than 0.5 units (WAC 173-201A-210(1)(f)). In the previous permit, the technology based limit allowed the range of pH from 6.0 to 9.0. For reference, DMR data for the last three years (March 2006 to February 2009) indicate pH as 3.32 (minimum) to 9.02 (maximum). According to Washington Department of Ecology website which described pH data collected from Possession Sound – Gedney Island (Station PSS019) in 2005 show that (http://www.ecy.wa.gov/apps/eap/marinewq/mwdataset.asp?ec=no&scrolly=210&htmlcsvpref=csv&estuarycode=1&staID=115&theyear=2005&themonth=8)
pH in the receiving water was detected in the range from 7.7 to 8.4. Using a program for calculating pH, EPA analyzed if the technology limit of between 6.0 s.u. and 9.0 s.u. would exceed WQS at the edge of the mixing zone when the highest ambient pH is 8.4.

In Table B-3 below, for an effluent having a pH of 6.0 s.u., the resultant pH at the edge of the chronic mixing zone is 8.32; this is within the Excellent Quality Marine Waters standard for pH within the range of 7.0 to 8.5 s.u., and within the human caused variation standard of less than 0.5 s.u.

Table B-3: pH Mix Analysis for Effluent pH of 6.0 s.u.	
http://cdiac.esd.ornl.gov/oceans/co2rprt.html	Note: Source from WA Ecology Spreadsheet
INPUT	
1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	67.100
Depth at plume trapping level (m)	15.500
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	16.30
pH:	8.40
Salinity (psu):	25.97
Total alkalinity (meq/L)	2.30
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	24.00

pH:	6.00
Salinity (psu)	0.00
Total alkalinity (meq/L):	3.00
4. CLICK THE 'calculate" BUTTON TO UPDATE OUTPUT RESULTS >>>	calculate
OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	16.41
Salinity (psu)	25.58
Density (kg/m^3)	1018.50
Alkalinity (mmol/kg-SW):	2.27
Total Inorganic Carbon (mmol/kg-SW):	1.95
pH at Mixing Zone Boundary:	8.32

In Table B-4 below, for an effluent having a pH of 9.0 s.u., the resultant pH at the edge of the chronic mixing zone is 8.41; this is also within the Excellent Quality Marine Waters standard for pH within the range of 7.0 to 8.5 s.u., and within the human caused variation standard of less than 0.5 s.u.

Table B-4: pH Mix Analysis for Effluent pH of 9.0 s.u.

http://cdiac.esd.ornl.gov/oceans/co2rprt.html	Note: Source from WA Ecology Spreadsheet
INPUT	
1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	67.100
Depth at plume trapping level (m)	15.500
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	16.30
pH:	8.40
Salinity (psu):	25.97
Total alkalinity (meq/L)	2.30
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	24.00
pH:	9.00
Salinity (psu)	0.00

Total alkalinity (meq/L):	3.00
4. CLICK THE 'calculate" BUTTON TO UPDATE OUTPUT RESULTS >>>	calculate
OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	16.41
Salinity (psu)	25.58
Density (kg/m^3)	1018.50
Alkalinity (mmol/kg-SW):	2.27
Total Inorganic Carbon (mmol/kg-SW):	1.90
pH at Mixing Zone Boundary:	8.41

These two analyses show that the technology standard of pH between 6.0 s.u to 9.0 s.u. would NOT cause a reasonable potential to exceed Excellent Quality Marine Waters standard. Therefore the technology standard of effluent between 6.0 s.u. to 9.0 s.u is proposed to be retain in this permit cycle.

(b) Ammonia

Analysis of the ammonia data from the facility were based on 7 samples (see Michael Hoyles Trip Report dated September 19, 2008), and with the maximum daily discharge of 0.35 mg/L reported in August 6, 2008. A reasonable potential analysis was conducted to determine if ammonia had the potential to exceed these criteria. Analyses show no reasonable potential to exceed Washington Water Quality Standards.

EPA obtained the following ammonia sampling data as detailed in Michael Hoyles' Trip Report dated September 19, 2008:
3/21/08 0.11 mg/l
4/11/08 0.065 mg/l
5/9/08 0.096 mg/l
6/4/08 0.087 mg/l
7/7/08 0.19 mg/l
8/6/08 0.35 mg/l; and
9/3/08 0.076 mg/l

In Washington State water quality standards, the criteria concentrations based on total ammonia for marine water can be found in EPA guidance, Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989, EPA440/5-88-004. April, 1989. This document can be located from: http://www.epa.gov/waterscience/pc/ambientwqc/ammoniasalt1989.pdf. Using data collected by Washington Department of Ecology's monitoring station located in Possession Sound – Gedney Island (PSS-019), EPA selected data measured in the month of August since it is typically the warmest month of the year to determine the acute and chronic water quality criteria for ammonia. Data from the month of August was used to evaluate critical conditions because typically August is one of the warmest months, and therefore calculations would most likely demonstrate worst case scenarios. Using Ecology's data for 2005, the following values of the receiving water: pH of 8.4, temperature of 16.3 degrees C, and salinity of 26 g/kg. EPA used these values with Ecology's spreadsheet, using data (pH of 8.4, temperature of 16.3 degrees C, and salinity of 26 g/kg), and the calculated values from the spreadsheet, Table B-4, are: acute criteria of 3.118 mg/l, and chronic criteria of 0.468 mg/l. These criteria values were used to determine reasonable potential to exceed Washington State Water Quality Standards. Using the EPA modified spreadsheet from Ecology that accounts for 99% confidence level and 99% probability basis, no reasonable potential to exceed water quality criteria was determined (See Table C-3).

Table B-5: Calculation of Seawater Fraction of Un-ionized Ammonia Note: Source from WA Ecology Spreadsheet	
from Hampson (1977). Un-ionized ammonia criteria for	
salt water are from WAC 173-201A and EPA 440/5-88-004.	
INPUT	
1. Temperature (deg C):	16.3
2. pH:	8.4
3. Salinity (g/Kg):	26.0
OUTPUT	
1. Unionized ammonia NH3 criteria (mgNH3/L)	
Acute:	0.233
Chronic:	0.035
2. Total ammonia nitrogen criteria (mgN/L)	
Acute:	3.118
Chronic:	0.468

(c) Temperature

In WAC 173-201A-210(1)(c), the Washington water quality standards limit ambient water temperature to 13.0 degrees C for marine water; when natural conditions exceed 13.0 degrees C, no temperature increases will be allowed which will raise the receiving water temperature by greater than 0.3 degrees C.

The highest ambient temperature of water from Ecology's monitoring station, PSS-019 (Possession Sound – Gedney Island) on August 23, 2005 is 16.30 degrees C. The highest temperature of the effluent as reported on the Facility's DMR for the last 3 years was 24 degrees C. Using the chronic dilution ratio of 67.1, the predicted maximum daily temperature inside the dilution zone is: ((67.1 X 16.30) + (1 X 24)) /68.2 = 16.38^{0}C.

Since the ambient temperature increase in the receiving water is predicted to be 0.08 degrees C (i.e., (16.38 – 16.30) = 0.08), this is significantly less than 0.3 degrees C, there is no potential to violate Washington State's Water Quality Standards for temperature; therefore, no effluent limit for temperature is warranted. Effluent temperature monitoring is proposed for the draft permit for comparison with past effluent, and to obtain data for potential future effluent modeling purposes.

(d) Fecal coliform bacteria

According to WAC 173-220-130(a)(i), "Fecal coliform levels shall not exceed a monthly geometric mean of 200 organisms per 100 ml with a maximum weekly geometric mean of 400 organisms per 100 ml."
This technology based limits for fecal coliform bacteria is in the previous permit.

Concerning the "Shellfish harvesting bacteria criteria", WAC 173-201A-210(2)(b) states: "To protect shellfish harvesting, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have 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".

Concerning Primary Contact Recreation, WAC 173-201A-210(3)(b) states: "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."

Therefore, to meet both shellfish harvesting and primary contact criteria, the facility has to meet the more stringent of the two criteria at the edges of the mixing zone.

Under critical conditions (with the dilution ratio of 67:1), mathematical calculation predicts no violation of the water quality criterion for fecal coliform. In the absence of background data in the vicinity of the effluent discharge, the ambient concentration of fecal coliform was assumed to be zero.

DMR data as expressed in geometric mean from March 2006 to February 2009 (34 months of data) is summarized as follows in organisms/100ml:

Monthly Geometric Mean: average value = 7.53; highest = 47.9
Weekly Geometric Average: average value = 8.63; highest = 34.6

EPA calculated the chronic dilution ratio of 67: 1 using the Visual Plumes modeling. Consistent with Ecology's methodology, the numbers of fecal coliform bacteria were then modeled by simple mixing analysis using the technology-based (weekly maximum effluent) limit of 400 organisms per 100 ml, and the dilution factor of 67.1. This calculation showed that the fecal coliform concentration at the edge of the mixing zone is 5.96 organisms/100 ml, well below the State's water quality standards of 14 organisms/100 ml. Therefore, the technology-based effluent limitation for fecal coliform bacteria (as expressed in geometric mean) was retained in the proposed permit: 200 organisms/100 ml for monthly average, and 400 organisms/100 ml for weekly average. Analyses of submitted DMR data also show that the WWTP will be able to meet the proposed effluent limits for fecal coliform.

(e) Metals - Copper, Silver and Mercury

On June 9, 2009, during the meeting with the Tulalip Tribes Utilities Authority, EPA obtained effluent monitoring data for copper, silver and mercury. Based on the data obtained, the facility conducted monitoring for copper, silver and mercury in its effluent on five separate occasions between April 2004 and February 2009.

For silver and mercury, all five samples showed "Non Detect" levels.

For copper, the effluent monitoring data is as follows:
0.020 mg/l (Report dated 5/20/04);
0.02 mg/l (Report dated 4/29/05);
0.029 mg/l (Report dated 6/29/06);
0.025 mg/l (Report dated 12/12/07); and
"Non Detect" (Report dated 2/18/09).

At Appendix C, reasonable potential calculations determined that there was No Reasonable Potential for copper to exceed Washington State's WQS.

Appendix C – Reasonable Potential Calculations

To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria or a given pollutant, EPA compares the maximum projected receiving water concentration to the criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential to exceed Water Quality Standards (WQS), and a water quality-based effluent limit must be included in the permit. This section discusses how the maximum projected receiving water concentration is determined.

A. Visual Plumes Modeling

EPA modeled the dilution at the edges of the acute and chronic mixing zones using site-specific conditions using a Visual Plumes model. Visual Plumes (4^{th} Edition) uses a series of dilution equations based on characteristics of the wastewater effluent and ambient receiving water to determine the physical dispersion of pollutants. For the purpose of the Tulalip WWTP NPDES permit, the UM3 (Three-Dimensional Updated Merge) model version of Visual Plumes was used. UM3 uses a Lagrangian approach which incorporates the presence of ambient current into the model. Effluent parameters for the model include design flow rate, temperature, salinity, and information on the diffuser, including the depth of the diffuser and the number of ports and their sizes, spacing, and angle-orientation. The ambient receiving water characteristics required by the model include temperature, current speed and current direction. The model enables users to model site-specific circumstances, and calculate the acute and chronic mixing zone dilution ratios.

A Brooks Farfield model approach was included in the estimation because the plume had reached the surface water before the chronic distance could be reached.

EPA evaluated the bathymetry shape which indicated that the depths towards Possession Sound are in the order of 300 feet, past the outfall at Ecology's monitoring station PSS-019 (Possession Sound – Gedney Island). By comparison, the outfall is located at 51 feet below surface, the depth used for modeling dilution factors. However, the sea-bed drops into greater depth past the outfall, increased mixing is expected. The salinity and temperature profile for the model was obtained from data collected at PSS-019, on August 23, 2005. August data was used because it is typically the warmest summer month, and 2005 data was used because it is the most recent year from this station with finalized data.

Washington Department of Ecology recommended that separate models be computed for the acute scenario and for the chronic scenario. On May 26, 2009, Ecology recommended using the flow rate of 0.594 mgd for modeling the acute scenario, which was the highest daily flow rate reported on DMRs for the last 3 years (March 2006 to February 2009). Ecology also recommended using 0.289 mgd for modeling the chronic scenario, which is the highest monthly average flow rate in the last 3 years. For modeling both scenarios, Ecology recommended using an effluent temperature of 16ºC because it is the temperature closest to when the critical flow rates were measured. Using the UM3 model and the 4/3 Power Law, the model predicted the following dilution factors in Tables C-1 and C-2.

Acute Mixing Zone dilution factor: 48.49
Chronic Mixing Zone dilution factor: 67.10
The analyses and computations of the above acute and chronic dilution factors have been reviewed by Ecology, and EPA believes the predicted dilution factors are conservative because assumptions made were conservative for determining if there is reasonable potential to exceed Washington Water Quality Standards.

Visual Plumes Input Parameters			
INPUT PARAMETERS	**Chronic**	**Acute**	**Rationale**
Ambient Parameters			
Outfall Depth (ft)	51	51	1974 design drawing, depth below MLLW, based on previous fact sheet
Depth at Discharge Point (ft)	51	51	1974 design drawings, based on previous fact sheet
Tidal Velocity for Run (m/s)	0.1	0.05	0.1 m/s = mean per DOH inspection report 0.05 ~10th %ile std. assump.(N.Glen, Ecology), based on previous fact sheet
Density and Temperature Profiles	Based on data collected from Washington State Department of Ecology's Monitoring Station, PSS-019 on August 23, 2005		
Discharge Parameters			
Vertical Angle of Discharge,	-45	-45	1974 design drawings, based on previous fact sheet
Port Diameter (inches)	12	12	1974 design drawings, based on previous fact sheet
Port Height Above Bottom (m)	0.5	0.5	Assumed allowing for scouring, F. Meriwether, based on previous fact sheet
Temperature of Discharge (ºC)	18.2	18.2	Summer average daily value, based on permit application
Mixing Zone (ft)	251	25.1	Washington State Water Quality Standards for marine discharges
Flow Rate (mgd)	0.289	0.594	Based on recommendations from Washington State Department of Ecology on May 26, 2009
Visual Plumes Output - Dilution Factors			
Acute	**48.49**		
Chronic	**67.10**		

B. Reasonable Potential Analysis

EPA used Ecology's Reasonable Potential Calculation spread sheet to determine reasonable potential to exceed the Washington State Water Quality Criteria. Modifications were made to the Ecology spread sheet to accommodate EPA's assumption of 99% probability basis. Ecology had used the recommendations in Chapter 3 of the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001, March 1991) (TSD) to construct its Reasonable Potential Calculation spreadsheet.

To perform the reasonable potential calculation, it is necessary to determine the Acute and Chronic Water Quality Criteria. Table C-3 shows the Reasonable Potential Calculation for ammonia since it is the only parameter that has the potential to exceed water quality standards since there are no industrial sources. The calculated values of the Washington State Water Quality Criteria for the Acute and Chronic scenario were inserted into the spreadsheet.

The calculations show that there is **No** Reasonable Potential for ammonia and copper to exceed Water Quality Standards; therefore no effluent calculation was performed for these two parameters.

Table C-1: Visual Plumes Output For Acute Scenario

/ Windows UM3. 5/26/2009 11:31:57 AM

Case 1; ambient file F:\KSHUM\TulalipWWTP\TulalipVP.acute.052609.001.db; Diffuser table record 1: ---------------------------------

Depth (m)	Amb-cur (m/s)	Amb-dir (deg)	Amb-sal (psu)	Amb-tem (C)	Amb-pol (kg/kg)	Decay (s-1)	Far-spd (m/s)	Far-dir (deg)	Disprsn (m0.67/s2)
0.0	0.05	225.0	25.97	16.3	0.0	0.0	0.05	225.0	0.0003
1.5	0.05	225.0	25.97	16.3	0.0	0.0	0.05	225.0	0.0003
2.0	0.05	225.0	26.08	16.16	0.0	0.0	0.05	225.0	0.0003
3.0	0.05	225.0	26.06	16.12	0.0	0.0	0.05	225.0	0.0003
4.0	0.05	225.0	26.06	16.09	0.0	0.0	0.05	225.0	0.0003
5.0	0.05	225.0	26.1	16.03	0.0	0.0	0.05	225.0	0.0003
6.0	0.05	225.0	26.67	15.03	0.0	0.0	0.05	225.0	0.0003
7.0	0.05	225.0	26.86	14.24	0.0	0.0	0.05	225.0	0.0003
8.0	0.05	225.0	26.76	14.03	0.0	0.0	0.05	225.0	0.0003
10.0	0.05	225.0	26.85	13.56	0.0	0.0	0.05	225.0	0.0003
12.0	0.05	225.0	27.44	12.71	0.0	0.0	0.05	225.0	0.0003
14.0	0.05	225.0	27.52	12.56	0.0	0.0	0.05	225.0	0.0003
15.0	0.05	225.0	27.49	12.45	0.0	0.0	0.05	225.0	0.0003
15.5	0.05	225.0	27.48	12.41	0.0	0.0	0.05	225.0	0.0003

P-dia (in)	P-elev (m)	V-angle (deg)	H-angle (deg)	Ports ()	AcuteMZ (ft)	ChrncMZ (ft)	P-depth (ft)	Ttl-flo (MGD)	Eff-sal (psu)	Temp (C)	Polutnt (ppm)
12.0	0.5	-45.0	225.0	1.0	25.1	251.0	51.0	0.594	0.0	16.0	100.0

Froude number: 2.596

Step	Depth (ft)	Amb-cur (m/s)	P-dia (in)	Polutnt (ppm)	4/3Eddy (ppm)	Dilutn ()	x-posn (ft)	y-posn (ft)	
0	51.0	0.05	9.372	100.0	100.0	1.0	0.0	0.0;	Potential for more dilution
55	51.87	0.05	19.14	54.12	54.12	1.829	-0.975	-0.975;	bottom hit,
70	51.92	0.05	20.62	50.62	50.62	1.955	-1.16	-1.16;	begin overlap,
81	51.93	0.05	21.42	48.66	48.66	2.033	-1.289	-1.289;	local maximum rise or fall,
100	51.89	0.05	22.35	45.91	45.91	2.153	-1.51	-1.51;	
117	51.81	0.05	22.89	43.48	43.48	2.272	-1.717	-1.717;	end overlap,
200	48.2	0.05	31.98	18.21	18.21	5.397	-3.706	-3.706;	
300	29.56	0.05	114.8	2.513	2.513	38.98	-8.535	-8.535;	axial vel 0.0121
311	26.48	0.05	139.2	2.021	2.021	48.46	-9.559	-9.559;	trap level,

4/3 Power Law. Farfield dispersion based on wastefield width of 3.53 m

conc (ppm)	dilutn	width (m)	distnce (m)	time (hrs)	(kg/kg)	(s-1)	(m/s)	(m0.67/s2)	
1.97094	**48.49**	3.901	7.4	0.0182	0.0	0.0	0.05	3.00E-4	Shows the Acute Dilution Factor is 48.49
0.52234	50.14	4.769	14.8	0.0593	0.0	0.0	0.05	3.00E-4	
0.18091	53.97	5.693	22.2	0.1	0.0	0.0	0.05	3.00E-4	
9.63E-2	58.27	6.671	29.6	0.142	0.0	0.0	0.05	3.00E-4	
6.18E-2	62.56	7.698	37.0	0.183	0.0	0.0	0.05	3.00E-4	
4.38E-2	66.69	8.774	44.4	0.224	0.0	0.0	0.05	3.00E-4	
3.30E-2	70.64	9.895	51.8	0.265	0.0	0.0	0.05	3.00E-4	
2.60E-2	74.43	11.06	59.2	0.306	0.0	0.0	0.05	3.00E-4	
2.11E-2	78.05	12.27	66.6	0.347	0.0	0.0	0.05	3.00E-4	
1.75E-2	81.53	13.52	74.0	0.388	0.0	0.0	0.05	3.00E-4	
1.47E-2	84.88	14.81	81.4	0.429	0.0	0.0	0.05	3.00E-4	

count: 11; 11:32:02 AM. amb fills: 2

Table C-2: Visual Plumes Output for Chronic Scenario

```
/ Windows UM3. 5/26/2009 12:02:45 PM
Case 1; ambient file F:\KSHUM\TulalipWWTP\vp.chronic.052609.001.db; Diffuser table record 1: ------------------------------------
               Amb-cur    Amb-dir    Amb-sal    Amb-tem    Amb-pol      Decay    Far-spd    Far-dir    Disprsn
Depth              m/s        deg        psu          C      kg/kg        s-1        m/s        deg   m0.67/s2
m                 0.05      225.0      25.97       16.3        0.0        0.0        0.1      225.0     0.0003
0.0               0.05      225.0      25.97       16.3        0.0        0.0        0.1      225.0     0.0003
1.5               0.05      225.0      26.08      16.16        0.0        0.0        0.1      225.0     0.0003
2.0               0.05      225.0      26.06      16.12        0.0        0.0        0.1      225.0     0.0003
3.0               0.05      225.0      26.06      16.09        0.0        0.0        0.1      225.0     0.0003
4.0               0.05      225.0       26.1      16.03        0.0        0.0        0.1      225.0     0.0003
5.0               0.05      225.0      26.67      15.03        0.0        0.0        0.1      225.0     0.0003
6.0               0.05      225.0      26.86      14.24        0.0        0.0        0.1      225.0     0.0003
7.0               0.05      225.0      26.76      14.03        0.0        0.0        0.1      225.0     0.0003
8.0               0.05      225.0      26.85      13.56        0.0        0.0        0.1      225.0     0.0003
10.0              0.05      225.0      27.44      12.71        0.0        0.0        0.1      225.0     0.0003
12.0              0.05      225.0      27.52      12.56        0.0        0.0        0.1      225.0     0.0003
14.0              0.05      225.0      27.49      12.45        0.0        0.0        0.1      225.0     0.0003
15.0              0.05      225.0      27.48      12.41        0.0        0.0        0.1      225.0     0.0003
P-dia     P-elev V-angle H-angle   Ports AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
(in)         (m)   (deg)   (deg)      ()    (ft)    (ft)    (ft)   (MGD)   (psu)     (C)   (ppm)
15.5         0.5   -45.0   225.0     1.0    25.1   251.0    51.0   0.289     0.0    16.0   100.0
12.0
Froude number:      1.263
Step   Depth    Amb-cur    P-dia  Polutnt  4/3Eddy   Dilutn   x-posn   y-posn
        (ft)     (m/s)     (in)    (ppm)    (ppm)       ()     (ft)     (ft)
0       51.0      0.05    9.372    100.0    100.0      1.0      0.0      0.0;
Potential for more dilution
20     51.16      0.05    11.52    86.69    86.69     1.15   -0.141   -0.141; begin overlap,
77     51.27      0.05    13.77    78.03    78.03    1.275   -0.394   -0.394; local maximum rise or fall,
100    51.26      0.05    13.79    76.71    76.71    1.297   -0.487   -0.487;
144    51.09      0.05    13.27    70.74    70.74    1.405   -0.707   -0.707; end overlap,
200    49.51      0.05    16.29     35.6     35.6     2.77   -1.402   -1.402;
300    40.04      0.05    51.89    4.914    4.914    19.94   -3.621   -3.621;
343    32.46      0.05    96.25    2.097    2.097     46.7   -5.658   -5.658; axial vel 0.00765 trap level,
4/3 Power Law.  Farfield dispersion based on wastefield width of       2.44 m
conc      dilutn   width distnce    time
(ppm)                (m)     (m)    (hrs) (kg/kg)   (s-1)   (m/s)(m0.67/s2)
2.0887     46.72   2.689     7.4  0.0138     0.0     0.0     0.1 3.00E-4
1.01263    47.34   3.068    14.8  0.0343     0.0     0.0     0.1 3.00E-4
0.39238    49.19   3.463    22.2  0.0549     0.0     0.0     0.1 3.00E-4
0.2077     51.62   3.874    29.6  0.0754     0.0     0.0     0.1 3.00E-4
0.13212    54.25     4.3    37.0   0.096     0.0     0.0     0.1 3.00E-4
9.34E-2    56.92    4.74    44.4   0.117     0.0     0.0     0.1 3.00E-4
7.04E-2    59.56   5.195    51.8   0.137     0.0     0.0     0.1 3.00E-4
5.55E-2    62.14   5.663    59.2   0.158     0.0     0.0     0.1 3.00E-4
4.52E-2    64.65   6.144    66.6   0.178     0.0     0.0     0.1 3.00E-4
3.76E-2     67.1            74.0   0.199     0.0     0.0     0.1 3.00E-4  Shows the Chronic Dilution Factor is 67.1
3.19E-2    69.47   6.639 6.145    81.4   0.219     0.0     0.0     0.1 3.00E-4
count: 11

;12:02:50 PM. amb fills: 2
```

Table C-3: Reasonable Potential Calculations for Ammonia and Copper

	State of Washington Water Quality Standard				Maximum concentration at edge of.....			Calculations								
	Metal Criteria Translator as decimal			Chronic	Acute Mixing Zone	Chronic Mixing Zone	**LIMIT REQ'D?**	Effluent percent-ile value		Max effluent conc. measured (metals as total recoverable)	Coeff Varia -tion		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	*Acute*	*Chronic*	*ug/L*	*ug/L*	*ug/L*	*Ug/L*			*Pn*	*ug/L*	*CV*	*s*	n			
Ammonia in marine water		Acute	3118	468	25.57	18.48	**NO**	0.99	0.518	350	0.60	0.55	7	3.54	48.49	67.10
Copper in Marine Water	0.83	0.83	4.80	3.10	2.08	1.50	**NO**	0.99	0.398	29	0.60	0.55	5	4.19	48.49	67.10

Note: Spreadsheet is modified and based from the "Reasonable Potential Calculation" spreadsheet from the Washington Department of Ecology (http://www.ecy.wa.gov/programs/eap/pwspread/tsdcalc0707.xls). The table accommodates EPA's policy of using the statistical probability basis of 99^{th} percentile in lieu of Ecology's policy of 95^{th} percentile.

APPENDIX D - Endangered Species Act and Essential Fish Habitat

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.

In the interest of consultation with the services for issuance of this permit, EPA sent two letters dated June 1, 2009, to the U.S. Fish and Wildlife Service and from the National Marine Fisheries Service (NOAA), which requested species lists in the vicinity of the discharge.

EPA conducted a web search of NOAA's National Marine Fisheries Service, and located two lists that are entitled:

(1) "***Endangered Species Act Status of West Coast Salmon & Steelhead***" (updated Sept. 25, 2008) – this list shows that Chinook Salmon (O. tshawytscha) and Steelhead (O.mykiss) both are listed as "Threatened" in Puget Sound. Steelhead is also listed as an ESA Listing Action that is Under Review for Critical Habitat.
http://www.nwr.noaa.gov/ESA-Salmon-Listings/upload/snapshot-09-08.pdf

(2) "***ESA-Listed Marine Mammals***" – Under the jurisdiction of NOAA Fisheries Service that may occur in Puget Sound, lists the following:
Southern Resident Killer Whale (Endangered), Orcinus orca;
Humpback Whale (Endangered), Megaptera novaeangliae; and,
Stella Sea Lion (Threatened), Eumetopias jubatus.
http://www.nwr.noaa.gov/Marine-Mammals/ESA-MM-List.cfm

Shandra O'Haleck (NOAA) informed EPA on June 28, 2007, that the Humpback Whale and the Stella Sea Lion are considered to have "No Effect" because they are rarely found inside Puget Sound.

EPA also researched the U.S. Fish and Wildlife Service website and found the "Listed and Proposed Endangered and Threatened Species And Critical Habitat: Candidate Species; and Species of Concern in Snohomish County" list (revised November 1, 2007). The USFWS "Listed" the following species for Snohomish County:
Bull Trout (Salvelinus confluentus)
Canada Lynx (Lynx canadensis)
Gray Wolf (Canis lupus)
Grizzly Bear (Ursus arctos = U. a. horribilis)
Marbled Murrelet (Brachyramphus marmoratus)
Northern Spotted Owl (Strix occidentalis caurina)

The following species were "Designated" by USFWS in Snohomish County:
Critical habitat for Bull Trout

Critical habitat for the Marbled Murrelet
Critical habitat for the Northern Spotted Owl

Evaluation of Species Listed

ESA listed species from NOAA and U.S FWS are described above. EPA evaluated each of these listed species and critical habitat species for potential impact from the Tulalip WWTP. Descriptions are grouped into fish and marine mammals which are described in (a) to (f); terrestrial species are described in (g) below.

(a) ***Puget Sound Chinook Salmon***

Status

The Puget Sound ESU of Chinook salmon was listed as threatened on March 24, 1999 (64 FR 14308).

Geographic Range and Spatial Distribution

The boundaries of this salmon ESU correspond with the Puget Lowland Ecoregion. This ESU encompasses all runs of Chinook salmon in the Puget Sound region from the North Fork Nooksack River to the Elwha River on the Olympic Peninsula. Chinook salmon in this area all exhibit an ocean-type life history. Although some spring-run Chinook salmon populations in the Puget Sound ESU have a high proportion of yearling smolt emigrants, the proportion varies substantially from year to year and appears to be environmentally mediated rather than genetically determined. Puget Sound stocks all tend to mature at ages 3 and 4 and exhibit similar, coastally-oriented, ocean migration patterns (Meyers et al. 1998).

Hatchery fish are known to spawn in the wild in the Elwha and Dungeness river basins and are not considered discrete stocks from the wild fish (WDFW and WWTIT 1994). Adult Chinook begin to enter the Elwha River in June and continue through early October. The timing for entry into the Dungeness is unknown. Spawning in both rivers takes place between August and October (WDFW and WWTIT 1994). Outmigration of Chinook smolts in the Elwha and Dungeness basins occurs between March and mid-July (Williams et al. 1975).

Critical Habitat

Critical habitat was initially designated for Puget Sound Chinook on February 16, 2000 (65 FR 7764) and has been revised on September 2, 2005 (70 FR 52630). Critical habitat consists of the water, substrate, and the adjacent riparian zone of accessible estuarine and riverine reaches. The February 2000 critical-habitat designation included Puget Sound marine areas, including the south Sound, Hood Canal, and north Sound to the international boundary at the outer extent of the Strait of Georgia, Haro Strait, and the Strait of Juan de Fuca to a straight line extending north from the west end of Freshwater Bay, inclusive. The revised critical habitat has added 12 miles of occupied habitat areas of the Middle Fork Nooksack, 47 miles of the South Fork Stillaguamish and 12 miles of the Cedar River. 6 miles of the unoccupied stream reaches of the Lower Snoqualmie River and tributaries of Lake Washington were excluded. The marine nearshore zone from extreme high tide to mean lower low tide within several Navy restricted zones has also been included in the final habitat designation.

Historical Information

Chinook salmon were abundant in Washington State near the turn of the century, when estimates based on peak cannery pack suggested peak runs of near one million fish in the Oregon Coast, Washington Coast, and Puget Sound ESUs. However, Chinook salmon in this region has been strongly affected by losses and alterations of freshwater habitat. Timber harvesting and associated road building have occurred throughout this region. Agriculture is also widespread in the lower portions of river basins and has resulted in widespread removal of riparian vegetation, rerouting of streams, degradation of streambanks, and summer water withdrawals. Urban development has substantially altered watershed hydrodynamics and affected stream channel structure in many parts of Puget Sound.

The peak recorded harvest landed in Puget Sound occurred in 1908, when 95,210 cases of canned Chinook salmon were packed. This corresponds to a run-size of approximately 690,000 Chinook salmon at a time when both ocean harvest and hatchery production were negligible. (This estimate, as with other historical estimates, needs to be viewed cautiously; Puget Sound cannery pack probably included a portion of fish landed at Puget Sound ports but originating in adjacent areas, and the estimates of exploitation rates used in run-size expansions are not based on precise data.) Recent mean spawning escapements totaling 71,000 correspond to a run entering Puget Sound of approximately 160,000 fish. Based on an exploitation rate of one-third in intercepting ocean fisheries, the recent average potential run-size would be 240,000 Chinook salmon (ACOE 2000a).

Life History

Puget Sound Chinook salmon prefer to spawn and rear in the mainstem of rivers and larger streams (Williams et al. 1975, Healey 1991). Although the incubation period is determined by water temperatures, fry typically hatch in about eight weeks (Wydoski and Whitney 1979, Healey 1991). After emergence, Puget Sound juvenile Chinook salmon migrate to the marine environment during their first year.

Rearing and development to adulthood occurs primarily in estuarine and coastal waters (Meyers et al. 1998). The amount of time juvenile Chinook spend in estuarine areas depends upon their size at downstream migration and rate of growth. While residing in upper estuaries, juvenile prey mainly on benthic and epibenthic organisms, such as amphipods, mysids, and crustaceans. Juveniles typically move into deeper waters when they reach approximately 65-75 mm in fork length. As the juveniles grow and move to deeper waters with higher salinities, their main prey changes to pelagic organisms such as decapod larvae, larval and juvenile fish, drift insects, and euphausids (Simenstad et al. 1982).

Hatchery Influence

By 1908 there were state-run and federally-run Chinook hatcheries operating in this ESU. Transfers of Chinook salmon eggs to Puget Sound from other regions, especially the Lower Columbia River, were common practices of early hatcheries (Meyers et al. 1998). By the 1920's, several million Chinook salmon had been released into Puget Sound tributaries (Cobb 1930). Recently, stock integrity and genetic diversity have become important objectives. New policies have been initiated to reduce the impact of hatchery fish on natural populations (WDF 1991, WDF et al. 1993). The abundance of Chinook salmon in watersheds throughout this ESU has been closely related to hatchery efforts (Meyers et al. 1998).

WDFW classified 11 out of 29 stocks in this ESU as being sustained, in part, through artificial propagation. Nearly 2 billion fish have been released into Puget Sound tributaries since the 1950s. The vast majority of these have been derived from local returning fall-run adults. Returns to hatcheries have accounted for 57 percent of the total spawning escapement, although the hatchery contribution to spawner escapement is probably much higher than that, due to hatchery-derived strays on the spawning grounds (ACOE 2000a).

Population Trends and Risks

The abundance of Chinook salmon in this ESU has declined since historic levels. Widespread stream blockages have reduced available spawning habitat. Widespread release of hatchery fish from limited stocks has increased the risks of loss of genetic diversity and fitness to natural populations. In addition, the large numbers of hatchery releases masks natural population trends and makes it difficult to determine the sustainability of the natural populations. Forestry practices, farming and urbanization have also blocked or degraded fresh water habitat (Meyers et al. 1998).

Analysis of Potential Impacts to Puget Sound Chinook Salmon

In consideration of all factors pertaining to the Puget Sound Chinook Salmon and the discharge from the Tulalip WWTP, it is predicted that there will be no impact to the Puget Sound Chinook Salmon. This is because the characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Chinook Salmon. The discharge is not from a major facility, and the effluent is treated to Federal Secondary Treatment Standards, as well as meeting State Water Quality Standards. The outfall is also located in fairly deep water where significant dilution factors are achieved. The outfall is not located in salmon spawning areas, and the outfall pipe is pointed in the direction of significantly deeper water. There is no measurable impact to the Chinook Salmon, therefore, there is **no effect** on the Chinook Salmon from the discharge.

(b) Puget Sound Steelhead

Status

The Puget Sound steelhead was designated as threatened on May 11, 2007 (72 FR 26722). Critical habitat has not been designated for this species**.**

Geographic Range and Spatial Distribution

This coastal steelhead ESU occupies river basins of the Strait of Juan de Fuca, Puget Sound, and Hood Canal, Washington. Included are river basins as far west as the Elwha River and as far north as the Nooksack River. The Puget Sound steelhead DPS includes more than 50 stocks of summer- and winter-run fish, the latter being the most widespread and numerous of the two run types (WDF et al. 2005). Hatchery steelhead production in Puget Sound is widespread and focused primarily on the propagation of winter-run fish derived from a stock of domesticated, mixed-origin steelhead (the Chambers Creek Hatchery stock) originally native to a small Puget Sound stream that is now extirpated from the wild. Hatchery summer-run steelhead are also produced in Puget Sound; these fish are derived from the Skamania River in the Columbia River Basin. The majority of hatchery stocks are not considered part of this DPS because they are more than moderately diverged from the local native populations (NMFS, 2005).

Critical Habitat

Critical habitat has not been designated for this species.

Historical Information

Analysis of the catch records from 1889 to 1920 indicates that the estimated peak run size for Puget Sound would range from 327,592– 545,987 fish (NMFS 2005).

Habitat and Hydrology

In general, winter-run, or ocean maturing, steelhead return as adults to the tributaries of Puget Sound from December to April (WDF et al. 1973). Spawning occurs from January to mid-June, with peak spawning occurring from mid-April through May (Table 1). Prior to spawning, maturing adults hold in pools or in side channels to avoid high winter flows.

Steelhead tend to spawn in moderate to high-gradient sections of streams. In contrast to semelparous Pacific salmon, steelhead females do not guard their redds, or nests, but return to the ocean following spawning (Burgner et al. 1992). Spawned-out females that return to the sea are referred to as "kelts."

The life history of summer-run steelhead is highly adapted to specific environmental conditions. Because these conditions are not common in Puget Sound, the relative incidence and size of summer-run steelhead populations is substantially less than that for winter-run steelhead. Summer-run steelhead have also not been widely monitored, in part, because of their small population size and the difficulties in monitoring fish in their headwater holding areas.

The majority of steelhead juveniles reside in fresh water for two years prior to emigrating to marine habitats (Table 2a-c), with limited numbers emigrating as one or three-year old smolts. Smoltification and seaward migration occur principally from April to mid-May (WDF et al. 1972). Two-year-old naturally produced smolts are usually 140- 160 mm in length (Wydoski and Whitney 1979, Burgner et al. 1992). The inshore migration pattern of steelhead in Puget Sound is not well understood; it is generally thought that steelhead smolts move quickly offshore (Hartt and Dell 1986).

Steelhead oceanic migration patterns are poorly understood. Evidence from tagging and genetic studies indicates that Puget Sound steelhead travel to the central North Pacific Ocean (French et al. 1975, Hartt and Dell 1986, Burgner et al. 1992). Puget Sound steelhead feed in the ocean for one to three years before returning to their natal stream to spawn. Typically, Puget Sound steelhead spend two years in the ocean, although, notably, Deer Creek summer-run steelhead spend only a single year in the ocean before spawning (NMFS 2005).

Hatchery Influence

Because virtually all hatchery steelhead produced in Puget Sound are considered excluded from the Puget Sound steelhead ESU, the negative effects of these programs tend to outweigh any potential positive effects (NMFS 2005). The are two hatchery steelhead programs within the ESU, the Hamma Hamma River and the Green River, which have the potential to benefit natural populations in those rivers, but neither program has yet collected sufficient data to estimate their positive (or negative) effects with any certainty. It does appear that the Hamma Hamma program has successfully increased the number of natural spawners in the population, but the success of the program will not be known until the natural offspring of the captively reared spawners return (B. Berejikian, NMFS, unpubl. data). Risks associated with the hatchery programs in Puget Sound included potential effects of outbreeding depression resulting from the natural interbreeding of hatchery and wild fish, and adverse ecological interactions between hatchery and wild steelhead, including density dependent effects on growth and survival (NMFS 2005).

Population Trends and Risks

Total steelhead run size (catch and escapement) for Puget Sound in the early 1980s can be calculated from estimates in Light (1987) to be approximately 100,000 winter-run and 20,000 summer-run fish. In the 1990s the total run size for major stocks in this ESU was greater than 45,000, with total natural escapement of about 22,000. Busby et al. (1996) estimated 5-year average natural escapements for streams with adequate data range from less than 100 to 7,200, with corresponding total run sizes of 550-19,800. Of the 21 populations in the Puget Sound ESU reviewed by Busby et al. (1996), 17 had declining and 4 increasing trends, with a range from 18% annual decline (Lake Washington winter-run steelhead) to 7% annual increase (Skykomish River winter-run steelhead).

Analysis of Potential Impacts to Puget Sound Steelhead

In consideration of all factors pertaining to the Puget Sound Steelhead and the discharge from the Tulalip WWTP, it is predicted that there will be no impact to the Puget Sound Steelhead. This is because the characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Steelhead. The discharge is not from a major facility, and the effluent is treated to Federal Secondary Treatment Standards, as well as meeting State Water Quality Standards; therefore, no harmful effects are predicted. The outfall is also located in fairly deep water where significant dilution factors are achieved. The outfall is not located in steelhead spawning areas, and the outfall pipe is pointed in the direction of significantly deeper water. There is no measurable impact to the Steelhead, therefore, there is **no effect** to the Steelhead from the discharge.

(c) Puget Sound Bull Trout

Status

The coastal/Puget Sound (PS) bull trout DPS encompasses all Pacific coast drainages within Washington, including Puget Sound and Olympic Peninsula (50 FR Part 17). This 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 has been designated for Puget Sound bull trout on September 26, 2005 (70 FR 56213). The critical habitat designation for Puget Sound bull trout critical habitat 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 demonstrates 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). 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 Bull Trout

In consideration of all factors pertaining to the Bull Trout and the discharge from the Tulalip WWTP, it is predicted that there will be no impact to the bull Trout. The discharge does not contribute to the factors responsible for the bull trout's decline as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Bull Trout. The bull trout is a highly mobile species, discharge is not from a major facility, and the effluent is treated to Federal Secondary Treatment Standards, as well as meeting State Water Quality Standards; therefore, no harmful effects are predicted. The outfall is also located in fairly deep water where significant dilution factors are achieved. The outfall is not located in bull trout spawning areas, and the outfall pipe is pointed towards the direction of significantly deeper marine water. There is no measurable impact to the bull trout, therefore, there is **no effect** on the bull trout from the discharge.

(d) Southern Resident Killer Whale

Status

The Southern Resident killer whale (Orcinus orca) has been designated as endangered throughout their entire range under the Endangered Species Act on November 18, 2005 (70 FR 69903).

Geographic Range and Spatial Distribution

Killer whales are the most widely distributed marine mammals. They are found in all parts of the ocean and in most seas from the Arctic to the Antarctic. In the North Pacific Ocean, killer whales are often sighted from the eastern Bering Sea to the Aleutian Islands; in the waters of southeastern Alaska and the intercoastal waterways of British Columbia and Washington State; along the coasts of Washington, Oregon and California; along the Russian coast in the Bering Sea and the Sea of Okhotsk; and on the eastern side of Sakhalin and the Kuril Islands and the Sea of Japan.

The Southern Resident killer whale population contains three pods – J pod, K pod and L pod. Their range during the spring, summer and fall includes the island waterways of Puget Sound, the Strait of Juan de Fuca, and Southern Georgia Strait. Their occurrence in the coastal waters off Oregon, Washington and Vancouver Island, and more recently off the coast of central California in the south and off Queen Charlotte Islands to the north has been documented. Little is known about the winter movements and range of the Southern Resident stock.

Critical Habitat

Critical habitat for the Southern Resident killer whale was designated on November 29, 2006. Approximately 2,560 square miles of marine habitat within the area occupied by Southern Resident killer whales in Washington was designated as critical habitat. Three areas are encompassed in the critical habitat and include 1) the summer core area of marine waters in Whatcom and San Juan counties and all marine waters in Skagit County west and north of Deception Pass Bridge; 2) the Puget Sound area and 3) the Strait of Juan de Fuca area.

Life History

Killer whales are the most widely distributed cetacean species in the world. Killer whales have a distinctive color pattern, with black dorsal and white ventral portions. They also have a white patchabove and behind the eye and a gray or white saddle behind the dorsal fin. Adult male killer whales can reach up to 32 feet in length and can weigh nearly 22,000 lbs; females can reach 28 feet in length and can weigh up to 16,500 lbs.

Sexual maturity of female killer whales occurs when the whales reach approximately 15-18 feet in length, depending on the geographic location. The gestation period for killer whales varies from 15-18 months, and birth may occur in any month. Calves nurse for at

least one year, and wean between one and two years of age. The bith rate for killer whales is estimated as every 5 years for an average period of 25 years. Life expectancy for wild female killer whales is approximately 50 years , but it is estimated they can live to 80-90 years. Male killer whales usually live for about 30 years, but it is estimated they can live up to 50-60 years.
The diet of killer whales can be specific to geography or population. In the eastern North Pacific, resident killer whale populations feed mainly on salmonids including Chinook and chum salmon, while transient whale populations feed more on marine mammals, including Dall's porpoises, Pacific white-sided dolphins, California and Steller sea lions, harbor seals, sea otters, and even large baleen whales.

Killer whales are highly social mammals and usually occur in pods, or groups of up to 40-50 animals. Single whales, usually adult males, may also occur in populations. Differences in spatial distribution, abundance, behavior, availability of food resources probably account for the variation in group size for whale populations. Like all cetaceans, killer whales depend heavily on underwater sound for orientation, feeding and communication. Killer whales of different populations demonstrate specific vocalization types.

<u>Population Trends and Risks</u>

There is little historical information on the abundance of killer whales worldwide. It is thought that many populations have declined since 1800 due to diminished stocks of fish, whales, seals and sea lions in the ocean. During the past few decades, the use of photo-identification studies or line-transect counts have been used to survey killer whale populations. The Southern Resident killer whale population is currently estimated at about 88 whales, a decline from its estimated historical levels of about 200 in mid-to late 1800s. Beginning around 1967 and estimated 47 whales were removed using live-capture fishery for oceanarium display. The population fell approximately 30% to about 67 whales by 1971. By 2003, the population is estimated to have increased to 83 whales, still reduced from historical estimates.

<u>Analysis of Potential Impacts to Southern Resident Killer Whale</u>
In consideration of all factors pertaining to the Southern Resident Killer Whale and the discharge from the Tulalip WWTP, it is predicted that there will be no impact to the Puget Sound Southern Resident Killer Whale. This is because the characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Killer Whale. The discharge is not from a major facility, and the effluent is treated to Federal Secondary Treatment Standards, as well as meeting State Water Quality Standards; therefore, no harmful effects are predicted. The outfall is also located in fairly deep water where significant dilution factors are achieved. In addition, the Killer Whale is a marine mammal that is highly mobile. It is expected that the discharge to have no measurable impact to the Killer Whale, therefore, there is **no effect** on the killer whale.

(e) Humpback Whale

Status

Humpback whales are listed as endangered throughout their entire range under the Endangered Species act on June 2, 1970 (35 FR 8491).

Geographic Range and Spatial Distribution

Surveys indicate that humpbacks occupy habitats around the world, with three major distinct populations: the north Atlantic, the north Pacific, and the southern oceans. These three populations do not interbreed. Humpbacks generally feed for 6-9 months of the year on their feeding grounds in Arctic and Antarctic waters. The animals then fast and live off their fat layer for the winter period while on the tropical breeding grounds (USEPA 2002). The north Pacific herd of humpback whales that typically occupies southeastern Alaska waters also migrates to Hawaii and Mexico in the winter months for breeding. Humpback whales in the North Pacific are seasonal migrants feeding on zooplankton, and small schooling fish in coastal waters off the coastal waters of the western United States, Canada (NMFS 2002).

Humpback whales are not expected to be routinely present in Washington.

Critical Habitat

There is no designated critical habitat for the Humpback whale.

Historical Information

Whaling took large numbers of humpbacks from the late 1800s through the early 20^{th} century. Even though the International Whaling Commission provided protection to the species in the early 1960s, the Soviet Union has recently revealed massive illegal and unreported kills that occurred up until 1970 in the southern oceans.

Population Trends and Risks

The humpback whale population is listed as “depleted” under the Marine Mammal Protection Act. As a result, the Central North Pacific population of humpback whale is classified as a strategic stock. The Central North Pacific population has increased in abundance between the early 1980s and early 1990s; but the status of this population relative to its optimum sustainable population size is unknown (NMFS 2002).

The largest threats to their survival include entanglements in fishing gear, collisions with ship traffic, and pollution of their coastal habitat from human settlements (USEPA 2002).

<u>Analysis of Potential Impacts to the Humpback Whale</u>

In consideration of all factors pertaining to the Humpback Whale and the discharge from the Tulalip WWTP, it is predicted that there will be no impact to the Humpback Whale.

This is because the characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Humpback Whale. The discharge is not from a major facility, and the effluent is treated to Federal Secondary Treatment Standards, as well as meeting State Water Quality Standards; therefore, no harmful effects are predicted. The outfall is also located in fairly deep water where significant dilution factors are achieved. In addition, the Humpback Whale is a marine mammal that is highly mobile and is seldom found in Puget Sound. It is expected that the discharge would have no measurable impact to the Humpback Whale, therefore, there is **no effect** on the Humpback Whale.

(f) Steller Sea Lion

Status

The Steller sea lion was listed as a threatened species under emergency role by NMFS in April 1990; final listing for the species became effective in December 1990.

Geographic Range and Spatial Distribution

Steller sea lions are polygamous and use traditional territorial sites for breeding and resting. Breeding sites, also known as rookeries, occur on both sides of the north Pacific, but the Gulf of Alaska and Aleutian Islands contain most of the large rookeries. Adults congregate for purposes other than breeding in areas known as haulouts (USEPA 2002). In 1997, NMFS classified Steller sea lions into two distinct population segments divided by the 144 W latitude. The eastern population segment occupies habitat including southeastern Alaska and Admiralty Island. Currently, NMFS has classified the western population segment as endangered, while classifying the eastern population segment as threatened (62FR24345). Although the Steller sea lion population has declined steadily for the last 30 years, scientists have yet to identify the cause of the decline (USEPA 2002).

Steller sea lions may be observed in Puget Sound year-round, but they are most abundant during the fall and winter months. Three major haulout areas exist on the Washington outer coast and one major haulout area is located at the Columbia River south jetty.

No breeding rookeries have been identified in Washington waters (NMFS 1992).

Critical Habitat

Steller sea lion critical habitat has been designated in Alaska, California, and Oregon (64 FR 14051) and includes a 20-nautical-mile buffer around all major haulouts and rookeries, as well as associated terrestrial, air, and aquatic zones, and three large offshore foraging areas. No critical habitat has been designated in Washington.

Life History

Steller sea lion habitat includes both marine and terrestrial areas that are used for a variety of purposes. Terrestrial areas (e.g., beaches) are used as rookeries for pupping and breeding. Rookeries usually occur on beaches with substrates that include sand, gravel, cobble, boulder, and bedrock (NMFS 1992). Haul-out areas are used other than during the breeding and pupping season. Sites used as rookeries may be used as haul-out areas during other times of the year. When Steller sea lions are not using rookery or haul-out areas, they occur in nearshore waters and out over the continental shelf. Some individuals may enter rivers in pursuit of prey (Jameson and Kenyon 1977).

Steller sea lions are opportunistic feeders and consume a variety of fishes such as flatfish cod, and rockfish; and invertebrates such as squid and octopus. Demersal and off-bottom schooling fishes predominate (Jones 1981). Steller sea lions along the coasts of Oregon and California have eaten rockfish, bake, flatfish, cusk-eel, squid, and octopus (Fiscus and Baines 1966, Jones 1981, Treacy 1985); rockfish and hake are considered to be consistently important prey items (NMFS 1992). Feeding on lamprey in estuaries and river mouths has also been documented at sites in Oregon and California (Jones 1981, Treacy 1985). Spalding (1964) and Olesiuk et al. (1990) have documented Steller sea lions feeding on salmon, but they are not considered a major prey item (Osborne 1988).

The breeding range of Steller sea lions extends from southern California to the Bearing Sea (Osborne 1988). Breeding colonies consisting of small numbers of sea lions also exist on the outer coasts of Oregon and British Columbia. There are currently no breeding colonies in Washington State (NMFS 1992), although three major haul-out areas exist on the Washington outer coast and one major haul-out area is located at the Columbia River south jetty (NMFS 1992). Jagged Island and Spit Rock are used as summer haul-outs, and Umatilla Reef is used during the winter (National Marine Mammal Laboratory, unpublished data). Other rocks, reefs, and beaches as well as floating docks, navigational aids, jetties, and breakwaters are also used as haul-out areas (NMFS 1992).

Population Trends and Risks

The worldwide Steller sea lion population is estimated at just under 200,000, with the majority occurring in Alaska. The range of the Steller sea lion extends around the North Pacific Ocean rim from northern Japan, the Kuril Islands and Okhotsk Sea, through the Aleutian Islands and Bering Sea, along Alaska's southern coast, and south to California (Kenyon and Rice 1961, Loughlin et al. 1984).

Responses to various types of human-induced disturbances have not been specifically studied. Close approach by humans, boats, or aircraft will cause hauled-out sea lions to go into the water. Disturbances that cause stampedes on rookeries may cause trampling and abandonment of pups (Lewis 1987). Areas subjected to repeated disturbance may be permanently abandoned (Kenyon 1962), and/or the repeated disturbance may negatively affect the condition or survival of pups through interruption of normal nursing cycles. Low levels of occasional disturbance may have little long-term effect (NMFS 1992).

Analysis of Potential Impacts to the Stellar Sea Lion

In consideration of all factors pertaining to the Stellar Sea Lion and the discharge from the Tulalip WWTP, it is predicted that there will be no impact to the Stellar Sea Lion.

This is because the characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Stellar Sea Lion. The discharge is not from a major facility, and the effluent is treated to Federal Secondary Treatment Standards, as well as meeting State Water Quality Standards; therefore, no harmful effects are predicted. The outfall is also located in fairly deep water where significant dilution factors are achieved. In addition, the Stellar Sea Lion is a marine mammal that is highly mobile and is seldom found in Puget Sound. It is expected that the discharge to have no measurable impact to the Stellar Sea Lion, therefore, there is **no effect** on the Stellar Sea Lion.

(g) Terrestrial Species

The Canada Lynx, Gray Wolf, Grizzly bear, Marbled Murrelet, and Northern Spotted Owl are listed species. Of these, the Marbled Murrelet and the Northern Spotted Owl are also designated as having critical habitat.

Analysis of Potential Impacts to Terrestrial Species

The effluent discharged is located beneath 51 feet of marine waters, and therefore, does not come into contact on terrestrial species. Since there is no measurable impact, there is **no effect** on terrestrial species from the discharge.

Analysis of Potential Impacts to all Listed Species, and Species with Critical Habitat

EPA has evaluated all the listed species and species with critical habitat from NOAA and the U.S. Fish and Wildlife that could potentially be impacted from the discharge. Based on the information above, EPA has determined that there is no measurable impact, therefore, there is **no effect** to all ESA listed species and critical habitat.

B. Essential Fish Habitat

Essential fish habitat (EFH) includes 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 EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) Essential Fish Habitats. 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.

According to the services, the U.S. Fish and Wildlife and NOAA, there is critical habitat for Chinook salmon along the shore up to a depth of 30 feet below MLLW. This is because the services believe thirty feet is the end of the euphotic zone, which is habitat for juvenile Chinook salmon. For comparison, the outfall for the Tulalip WWTP is located at a depth of approximately 51 feet below MLLW, significantly deeper than 30 feet below MLLW; therefore, juvenile Chinook salmon is not expected to be affected by the discharge.

Due to the nature of this relatively small wastewater treatment plant with secondary treatment, which operates with UV disinfection, and the outfall which is significantly deep at 51 feet below MLLW, EPA has determined that issuance of this permit has no measurable impact to EFH, therefore, there is **no effect** on EFH in the vicinity of the discharge.