City of Yachats

Lincoln County, Oregon

MIXING ZONE STUDY

FEBRUARY, 2010

The Dyer Partnership
Engineers & Planners, Inc.

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Project No. 141.11

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Executive Summary

ES

This Level 1 Mixing zone study was conducted for the City of Yachats Wastewater Treatment Plant Outfall. This study is intended to satisfy the requirements of the Oregon Department of Environmental Quality Regulatory Mixing Zone Internal Management Directive and is required under Mutual Agreement and Order (MAO) No. WQ/M-09-WR-133.

Background

Currently the City is operating their wastewater treatment plant (WWTP) under the limits and requirements of NPDES Permit Number 100812. It was previously determined in May, 2003 that a mixing zone/dilution study was not feasible due to the rocky nature of the outfall location. The City was, however, able to complete a Level 1 mixing zone study as required by the Oregon DEQ. A copy of the MAO, NPDES permit, and DEQ correspondence is located in the appendix for review.

Outfall Characteristics

The City of Yachats utilizes an ocean outfall for the disposal of effluent. The outfall pipe is a 10-inch diameter cast-iron pipe encased in a concrete backfill. The outfall is approximately 650 feet long and falls from the outfall manhole at elevation 30.50 feet to the pipe outfall at an elevation of approximately 0.00 feet. Under these conditions, the capacity of the outfall is approximately 3.1 million gallons per day (MGD). The outfall is installed on a shallow rock shelf that extends out to a chasm between two rock outcroppings. Wastewater discharges onto the rock shelf about three feet from the chasm and flows into the ocean. Violent wave action between the two outcroppings provides mixing action. The discharge pipe is exposed during minus tides.

The City's Wastewater Treatment Plant utilizes Ultraviolet Disinfection, eliminating the need to chlorinate the effluent.

Ammonia limits are not monitored due to DEQ's approval of Reasonable Potential Analysis indicating that ammonia levels are negligible and pose no potential toxic effects.

The discharge is allowed to cause no violations of the Clean Water Act, including no reduction in dissolved oxygen levels, no significant increase in temperature, and no more than a 10% increase in turbidity outside of the mixing zone. In addition the waters outside the mixing zone are limited to a pH between 7.0 and 8.5 and a maximum fecal coliform median concentration of 14 organisms per 100 milliliters (ml), with not more than ten percent of the samples exceeding 43 organisms per 100 ml. Currently the new WWTP is operating well within the NPDES permit and the Clean Water Act parameters.

Mixing Zone Modeling

The Mixing Zone Modeling was conducted by MixZon Inc. The mixing at the Zone of Immediate Dilution (ZID) and Regulatory Mixing Zone (RMZ) was evaluated. A copy of the mixing model and findings is located in Section 1 of this study. In summary, the mixing zone model concludes that the

discharge will comply with the thermal requirements. Estimated Effluent Dillutions at the ZID and RMZ, modeling assumptions, approach, and analysis are located within the Mixing Zone Modeling report.

Table 1 below includes a summary of the dilutions calculated with the modeling by MixZon.

Table 1. Low Tide Dilutions

Case	Discharge Flow Q_0 mgd	Velocity u_a m/s	ZID Zone of Initial Dilution (x= 10 ft (3.05 m))			RMZ Regulatory Mixing Zone (x=100 ft (30.5 m))		
			Minimum Centerline Dilution S = c_0/c	BV (m) Vert. Thickness	BH (m) Hor. Width	Bulk Dilution S = c_0/c	BV (m) Vert. Thickness	BH (m) Hor. Width
Low Tide	0.327	0.1	2.7[1]	0.69	1.1	4.4	0.72	1.3[1]
Mid-tide	0.327	0.1	3.6	0.21	4.3	10.2	0.71	6.0[1]
High Tide	0.327	0.1	10.7	0.55	3.3	91	1.1	7.8

Environmental Mapping

Environmental mapping and analysis was conducted by Land and Water Environmental Services, Inc. A copy of the environmental analysis and mapping is located in Section 2 of this study. In summary, there are nineteen species found on the threatened or endangered species list which are "present or may be present" within a 1.0 mile radius of the Yachats WWTP outfall. However, the review of the species determined that non of the listed species present or possibly present within the 1.0 mile radius are likely to be adversely affected by the outfall.

Environmental mapping was conducted in accordance with DEQ's Guidance Document "RMZ IMD Part 2: Reviewing Mixing Zone Studies December, 2007". Please refer to Section 2, Page 2 for the Environmental Features and Facilities Map. The information in the map was based on field observations and review of DEQ table 220A Designated Beneficial Uses, Fish Use Designation, and Figure 220B, Salmon and Steelhead Spawning Designations.

[1] Plume is laterally fully mixed within channel

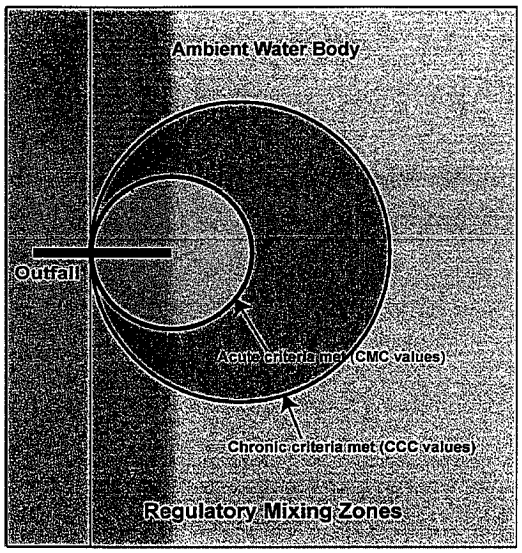
Section

1

MIXING ZONE MODELING

Mixing Zone Modeling Study
For
Dyer Partnership
Mixing Zone Study

Thursday, February 19, 2010



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Executive Summary

This report presents an ODEQ IMD Mixing Zone level 1 mixing zone study for the Yachats WWTP wastewater discharge Permit Number 100812 into Pacific Ocean Pacific at Ocean Mile 214.5.The City of Yachats operates a wastewater treatment facility that discharges a single port discharge into a coastal zone which is tidally influenced.

The outfall is above the water surface at low tide and is submerged at high tide. The bathymetry of the shoreline at the outfall varies significantly with tidal elevation. At low tide, a narrow channel forms parallel to the coastline into which the discharge occurs. At higher tides, this channel becomes deeper and broader and is less well defined as the tide stage increases.

Table 1 shows estimated dilutions for the existing single port outfall.

Table 1. Low Tide Dilutions

Case	Discharge Flow Q_0 mgd	Velocity u_a m/s	ZID Zone of Initial Dilution (x= 10 ft (3.05 m))			RMZ Regulatory Mixing Zone (x=100 ft (30.5 m))		
			Minimum Centerline Dilution S = c_0/c	BV (m) Vert. Thickness	BH (m) Hor. Width	Bulk Dilution S = c_0/c	BV (m) Vert. Thickness	BH (m) Hor. Width
Low Tide	0.327	0.1	2.7 [1]	0.69	1.1	4.4	0.72	1.3[1]
Mid-tide	0.327	0.1	3.6	0.21	4.3	10.2	0.71	6.0[1]
High Tide	0.327	0.1	10.7	0.55	3.3	91	1.1	7.8

[1] Plume is laterally fully mixed within channel

1 Introduction

MixZon Inc conducted modeling analysis to complete a Level 1 mixing zone study as described by Oregon Department of Environmental Quality (ODEQ) IMD for the Yachats WWTP wastewater discharge NPDES permit #100812 into Pacific Ocean at Ocean Mile 214.5. The discharge is classified as "minor" per ODEQ regulations.

MixZon estimated field data and ambient flow conditions based on available site data and in discussions with The Dyer Partnership Engineers and Planners, Inc., consultants for the Yachats WWTP.

This mixing zone report addresses the following technical objectives and information:

- Outfall and RMZ characterization: a description of the existing outfall and Regulatory Mixing Zone (RMZ).
- Ambient receiving water conditions: we describe and estimate ambient bathymetry, cross-section, velocity field, density structure, bottom roughness, etc..
- Discharge characteristics: we will include information on source conditions (density, temperature, pollutant constituent concentrations, etc.) to sufficiently document and characterize the mixing zone.
- Mixing zone modeling analysis: this study presents a Level 1 modeling effort and field data collection for a mixing zone model.

2 Discharge and Ambient Characteristics

Field data was collected by phone conversations with the WWTP consulting engineer. Figure 1 shows the discharge channel at low tide while Figure 2 shows the shoreline near the outfall location.

The 10 inch discharge port location is detailed in construction documents and by verified by WWTP staff. A discharge of 0.327 mgd was simulated for all cases. The discharge is assumed to have a "worst" case temperature of 20 deg C for all cases.

Ambient Density of 1026.59 kg/m^3 was calculated based upon a Salinity of 36 ppt and temperature of 12 deg C.

The discharge is located in a rocky "channel" with a width and depth that changes with tidal elevation. The velocity in the channel was simulated a u_a = 0.1 m/s for all cases to represent a small but realistic ambient velocity likely to occur at the site.

Lowest lows tides at the site are -2 tides. Highest highs tides are +9 tides, a range from low to high of 11 feet or 3.3 meters. The "channel" into which the discharge emits is schematized to have a width BS = 9 m at high tide, the channel depth is HD = 5.1 m. The channel width at a Mid-range tide BS = 6 m, with a depth of HD= 3.4 m. The channel width at a low tide BS= 1.3 m, with a depth of HD= 1.8 m. The Manning's n for all cases simulated was n= 0.2.

The mixing zone is defined as that portion of the Pacific Ocean within a one hundred (100) foot radius of the distribution piping and the ZID is defined as a ten (10) foot radius from the end of the outfall pipe. The capacity of the outfall line is approximately 3.1 MGD.

3 Mixing Zone Modeling

The CORMIX v6.0 model was selected for mixing zone modeling. CORMIX was selected because it i) explicitly simulates boundary interactions, ii) accounts for discharge stability, and iii) can predict near-field and far-field dilutions for various source configurations, iv) gives 3-D plume trajectory and dilution, and v) it has been validated for a wide range of discharge and mixing zone conditions in accordance with the IMD model selection requirements.

Because the discharge was observed to be located above water surface during low tides, a shoreline discharge source was schematized for simulation, using small discharge velocity at ambient channel entry. At the mid-tide and high-tide scenarios, the discharge was schematized as a submerged single port discharge. No ambient density stratification is expected at the site.

Table 2 presents CORMIX simulation results.

Table 2. Predicted Plume Properties at the ZID and RMZ

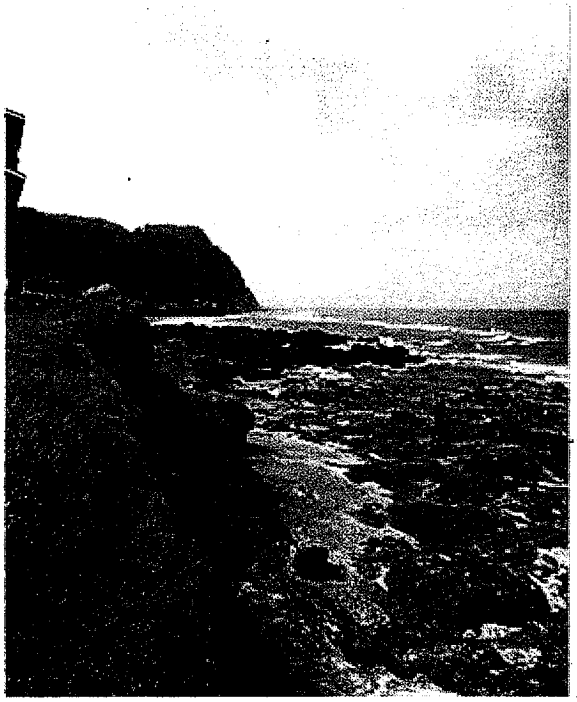
Case	Channel Width BS (m)	Channel Depth HD (m)	Flow Class	ZID (10 ft (3.04 m))			RMZ (100 ft(30.4 m))		
				Minimum Centerline $S = c_0/c$	BV (m)	BH (m)	Bulk Dilution (Centerline) $S = c_0/c$	BV (m)	BH (m)
Low Tide	1.3	1.8	PL1	2.7[2]	0.69	1.1	4.4 (9.0)	0.72	1.3[2]
Mid Tide	6	3.4	IPH1	3.6	0.21	4.3	10.2 (6.4)	0.71	6.0[2]
High Tide	9	5.1	IPH1	10.7	0.55	3.3	91 (57)	1.1	7.8

Table 2 summarizes the results of the mixing zone dilution modeling for the conditions at the RMZ and ZID. Dilution values at the ZID are the maximum centerline, while dilution values at the RMZ are bulk dilutions with the centerline dilutions show in parenthesis.

In general, dilutions at the ZID of 10-ft are quite limited, especially for low tides. This is a result of the limited discharge momentum and thus discharge induced mixing and relatively shallow water depth. The greater dilutions predicted at the RMZ 100-ft downstream are due to advections and dispersion by ambient turbulence. The RMZ dilutions are obtained from centerline dilution values multiplied by 1.6 for conversion of line source minimum centerline dilution values to flux-average or bulk dilution values for submerged single port simulations (mid tide and high tide) and by 1.3 for shoreline source simulations (low tide).

[2] Plume is laterally fully mixed within channel

Figure 1 Outfall channel a low tide. Discharge is visible in lower right of image as an above surface shoreline outfll.



View from small park in Yachats by which one can access beach and Yachats STP outfall. Red dotted line marks approx. location of buried outfall line. Photo taken at minus 2 tide on May 27, 2007.

Figure 2 View of shoreline at outfall location at -2 tide.

For the low tide conditions, CORMIX predicts a PL1 flow class, indicating shore hugging surface discharge plume with upstream spreading. Figure 3 shows the PL1 plume flow classification. The plume has limited discharge-induced initial mixing and plume trajectory and dilution is largely controlled by ambient turbulence. The PL1 flow class description appears in Table 3. Because the plume interacts substantially with both banks in the near-field, the CORMIX dilution predicts are reduces to reflect the near-field bank interaction. The prediction file appears in the Appendix.

For the mid- tidal stage scenario, a near-surface submerged single port discharge IPH1 flow class is indicated. Figure 4 shows the IPH1 flow classification, while Table 4 shows the flow class description. In this case, the plume interacts strongly with both banks strongly in the far-field so that the RMZ dilution is reduced. The reduction is dilution is estimated to be proportional to the over-estimate in plume area. The prediction file appears in the Appendix.

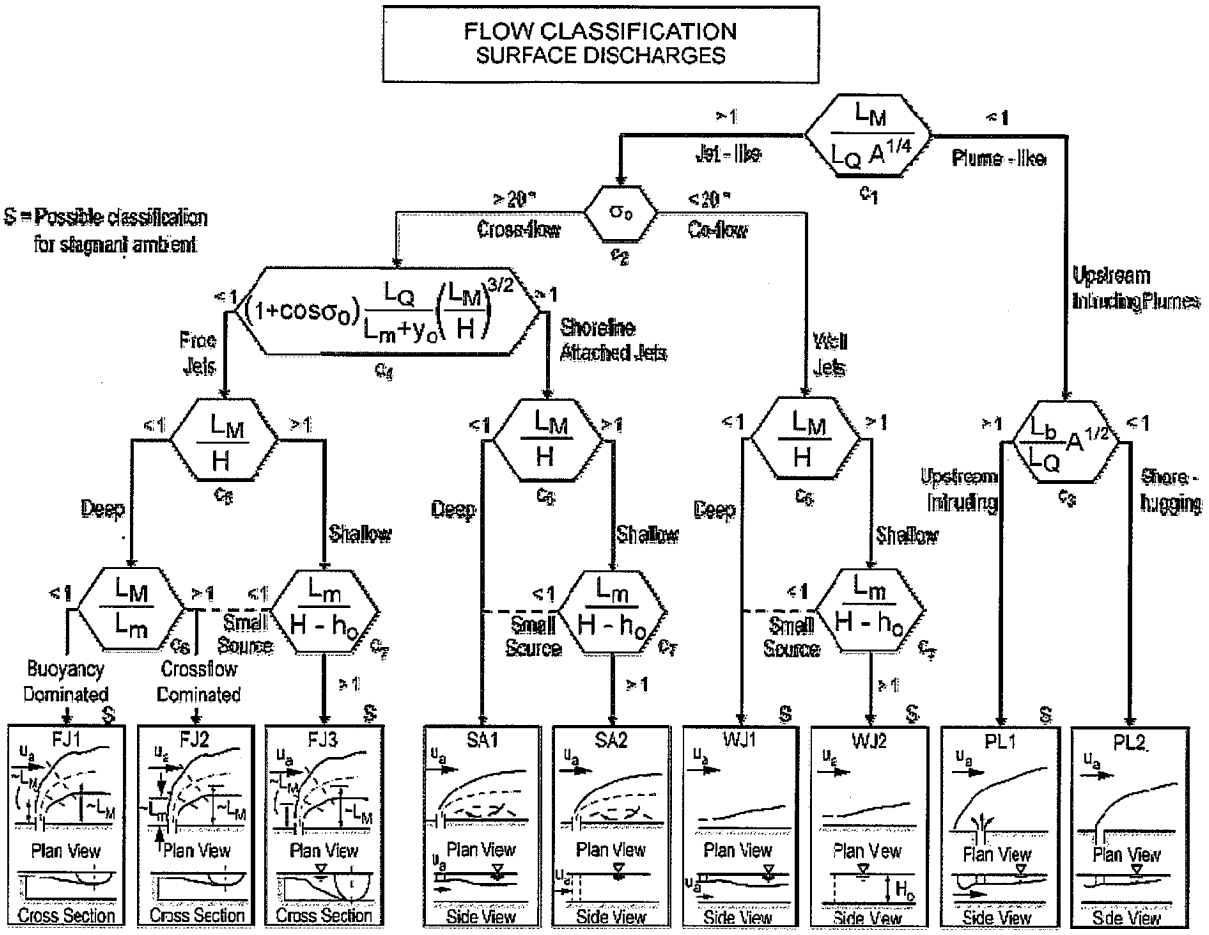


Figure 3 PL1 Flow Classification for Shoreline Discharge at Low Tide Conditions.

For the high- tidal stage scenario, a near-surface submerged single port discharge IPH1 flow class is indicated. Port height was adjusted in the schematization to comply with CORMIX port height restrictions. Since the port exit velocity is small (u_a < 0.3 m/s) this small adjustment in port height will not strongly influence dilution predictions. In this case, the plume does not interact strongly with both banks strongly in the far-field so that the RMZ dilution is not reduced and in the previous two scenarios. The prediction file appears in the Appendix.

Thermal Plume Analysis of the Discharge

For plume thermal analysis, a critical period was defined as September when ambient discharge and ocean temperature would be at the maximum. The average maximum temperature in early September is about 68 °F or 20 °C, so the maximum discharge temperature could be estimated to be 20 °C. The Pacific Ocean temperature for September is about 56 °F or 13.3 °C. The discharge could be expected to have a $\Delta T = 6.7$ °C at maximum.

The MZIMD lists a thermal shock criteria limits potential exposure of fish to temperatures of 25 °C or more. Since the temperature of the discharge is well below this value, no thermal impacts of the wastewater plume are anticipated.

Table 3 Description of CORMIX Flow Class PL1

The discharge is issued with relatively low velocity and high buoyancy into an environment with a relatively low ambient velocity. For this reason, the effluent will spread upstream along the shoreline against the ambient current. The receiving water is relatively deep in the vicinity of the discharge so no significant interaction with the bottom takes place in the near-field.

The flow will consist of the following flow regimes:

1) Upstream intrusion: Upstream of the discharge will be a steady layer of effluent. This upstream spreading is caused by the strong buoyancy of the effluent and a relatively weak ambient crossflow. This regime ends just downstream of the discharge where far-field buoyant spreading takes over.

2) Far-field buoyant spreading: The plume spreads laterally along the surface while being advected downstream with the ambient current. The mixing rate is relatively small and the thickness may decrease in this regime. The plume remains attached to the shoreline.

3) Passive ambient diffusion: The ambient turbulence becomes the predominant mixing process in this regime. The plume will grow in both the vertical and horizontal directions at a rate that is dependent on the magnitude of the ambient turbulence. The flow may interact with the bottom or the opposite shoreline in this regime.

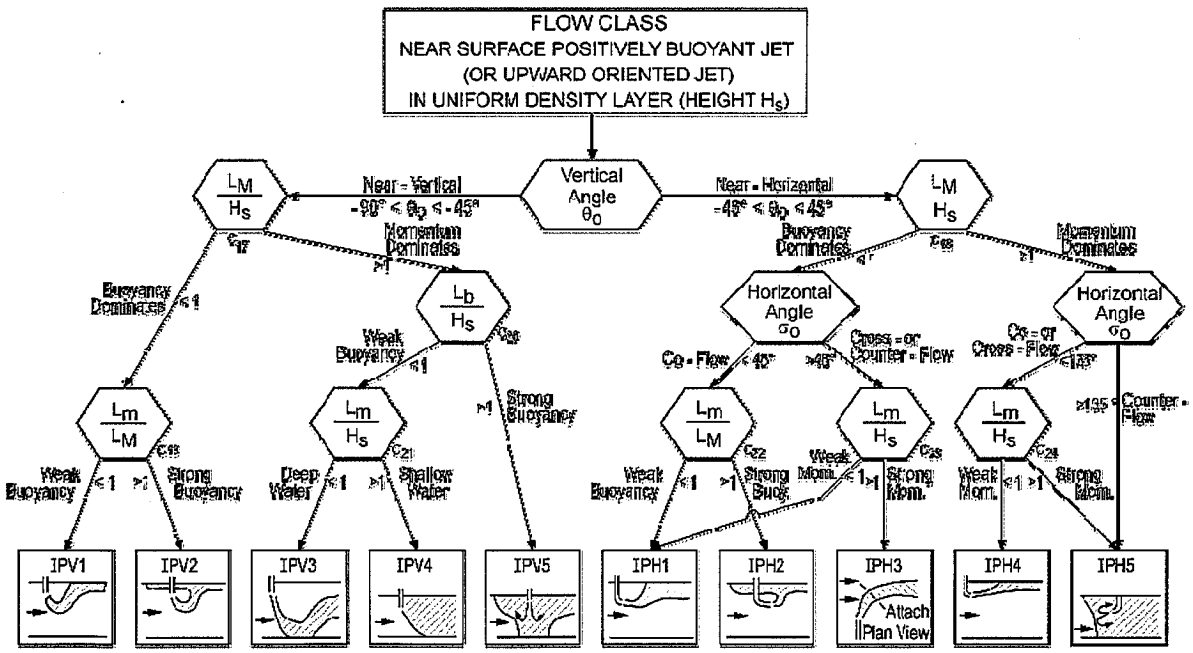


Figure 4 IPH1 Flow Classification for Submerged Discharge at Mid- and High Tide Conditions.

Table 4 Description of CORMIX Flow Class IPH1

A slightly submerged positively buoyant effluent issues horizontally or near-horizontally from the discharge port. The effect of ambient velocity is relatively strong. Alternatively, this flow may arise - even though the discharge may be negatively buoyant - when the discharge is oriented upwards and is arrested near the surface by some ambient stratification.
The discharge configuration is hydrodynamically "stable", that is the discharge strength (measured by its momentum flux) is weak in relation to the layer depth and in relation to the stabilizing effect of the negative discharge buoyancy (measured by its buoyancy flux).
The following flow zones exist:
1) Weakly deflected jet in crossflow: The flow is initially dominated by the effluent momentum (jet-like) and is weakly deflected by the ambient current. It sinks to a maximum distance (less than the layer depth) which is controlled by the negative buoyancy.
2) Strongly deflected plume in crossflow: After the maximum distance of fall, the positive discharge buoyancy becomes the dominating factor (plume-like flow). The strongly deflected plume is slowly rises towards the surface.
3) Surface approach: The bent-over submerged plume approaches the surface boundary. Within a short distance the concentration distribution becomes relatively uniform across the plume width and thickness.
*** The zones listed above constitute the NEAR-FIELD REGION in which strong initial mixing takes place. ***
4) Buoyant spreading at surface boundary: The plume spreads laterally along the surface while it is being advected by the ambient current. The plume thickness may decrease during this phase. The mixing rate is relatively small. The plume may interact with a nearby bank or shoreline.
5) Passive ambient mixing: After some distance the background turbulence in the ambient shear flow becomes the dominating mixing mechanism. The passive plume is growing in depth and in width. The plume may interact with the layer surface and/or banks.
*** Predictions will be terminated in zone 5 or 6 depending on the definitions of the REGULATORY MIXING ZONE or the REGION OF INTEREST. ***

4 Conclusions/Recommendations

A Level 1 mixing zone study was conducted for the Yachats WWTP discharge to comply with Oregon DEQ IMD mixing zone permit requirements.

The discharge and ambient was schematized based on observed conditions at the site. Likely scenarios for calculation of critical dilution were developed. The modeling approach implemented would in general tend to give conservative values for available dilution at the site.

Dilution modeling using CORMIX v6.0 was completed to determine dilutions at the Zone of Initial Dilution (ZID) at x = 10 feet and Regulatory Mixing Zone (RMZ) at trajectory x=100-ft from the outfall. Thermal plume analysis suggests that the discharge will comply with thermal requirements.

Appendix
CORMIX Simulations

Appendix A. Low tide conditions.

CORMIX3 PREDICTION FILE:
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CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX3: Buoyant Surface Discharges
CORMIX Version 6.0GTR
HYDRO3 Version 6.0.0.0 October 2009

CASE DESCRIPTION
Site name/label: Yachats WWTP
Design case: Spring Low Tide
FILE NAME: C:\...es\Consulting\Yachats\Yachats Spring Low Tide.prd
Time stamp: Mon Feb 1 13:02:56 2010

ENVIRONMENT PARAMETERS (metric units)
Bounded section
BS = 1.30 AS = 2.34 QA = 0.23 ICHREG= 1
HA = 1.80 HD = 1.80
UA = 0.100 F = 2.580 USTAR =0.5679E-01
UW = 2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND= U RHOAM = 1026.5900

DISCHARGE PARAMETERS (metric units)
BANK = LEFT DISTB = 0.00 Configuration: flush_discharge
SIGMA = 90.00 HDO = 1.30 SLOPE = 2.00 deg.
Rectangular channel geometry:
B0 = 1.300 H0 = 1.300 A0 =0.1690E+01 AR = 1.000
Reduced channel geometry due to intrusion:
B0 = 1.300 H0 = 0.077 A0 =0.9945E-01 AR = 0.059
(All relevant parameters further below are based on this geometry.)
U0 = 0.144 Q0 = 0.014 =0.1433E-01
RHO0 = 998.2051 DRHO0 =0.2838E+02 GP0 =0.2712E+00
C0 =0.1000E+03 CUNITS= %
IPOLL = 1 KS =0.0000E+00 KD =0.0000E+00

FLUX VARIABLES (metric units)
Q0 =0.1433E-01 M0 =0.2064E-02 J0 =0.3885E-02
Associated length scales (meters)
LQ = 0.32 LM = 0.16 Lm = 0.45 Lb = 3.88

NON-DIMENSIONAL PARAMETERS
FR0 = 0.49 FRCH = 1.00 R = 1.44

FLOW CLASSIFICATION

```
333333333333333333333333333333333333333333
3 Flow class (CORMIX3)     =   PL1   3
3 Applicable layer depth HS =    1.80  3
333333333333333333333333333333333333333333
```

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
C0 =0.1000E+03 CUNITS= %
NTOX = 0
NSTD = 0
REGMZ = 1
REGSPC= 1 XREG = 30.48 WREG = 0.00 AREG = 0.00
XINT = 152.40 XMAX = 152.40

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the WATER SURFACE and at center of discharge channel/outlet: 0.00 m from the LEFT bank/shore.
X-axis points downstream
Y-axis points to left as seen by an observer looking downstream
Z-axis points vertically upward (in CORMIX3, all values Z = 0.00)
NSTEP = 20 display intervals per module

BEGIN MOD301: DISCHARGE MODULE

Efflux conditions:

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.00	1.0	0.100E+03	0.08	0.65	.00000E+00

END OF MOD301: DISCHARGE MODULE

BEGIN MOD302: ZONE OF FLOW ESTABLISHMENT

Control volume inflow:

X	Y	Z	S	C	BV	BH	TT
0.00	0.00	0.00	1.0	0.100E+03	0.08	0.65	.00000E+00

Profile definitions:
BV = Gaussian 1/e (37%) vertical thickness
BH = Gaussian 1/e (37%) horizontal half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction efects, if any)
TT = Cumulative travel time

Control volume outflow: SIGMAE= 286.04

X	Y	Z	S	C	BV	BH	TT
0.01	-0.04	0.00	1.0	0.100E+03	0.08	0.67	.26922E+00

Cumulative travel time = 0.2692 sec

END OF MOD302: ZONE OF FLOW ESTABLISHMENT

BEGIN MOD331: UPSTREAM INTRUDING PLUME

Control volume inflow:

X	Y	Z	S	C	BV	BH	TT
0.01	-0.04	0.00	1.0	0.100E+03	0.08	0.67	.26922E+00

The PLUME EXTENDS ACROSS THE ENTIRE CHANNEL width at the point of discharge. For this reason the following predictions may be INACCURATE.

UPSTREAM INTRUSION PROPERTIES:

Upstream intrusion length = 2.19 m
X-position of upstream stagnation point = -2.19 m
Thickness in intrusion region = 0.69 m
Half-width at downstream end = 1.30 m
Thickness at downstream end = 0.69 m

Profile definitions:

BV = top-hat thickness,measured vertically
BH = top-hat half-width, measured horizontally from bank/shoreline
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

X	Y	Z	S	C	BV	BH	TT
-2.19	0.00	0.00	9999.9	0.000E+00	0.00	0.00	.26922E+00
-2.06	0.00	0.00	3.3	0.306E+02	0.21	0.18	.26922E+00
-1.41	0.00	0.00	1.4	0.725E+02	0.50	0.45	.26922E+00
-0.77	0.00	0.00	1.1	0.921E+02	0.64	0.60	.26922E+00
-0.13	0.00	0.00	1.0	0.998E+02	0.69	0.73	.26922E+00
0.52	0.00	0.00	1.3	0.784E+02	0.69	0.83	.53231E+01
1.16	0.00	0.00	2.3	0.439E+02	0.69	0.93	.11753E+02
1.80	0.00	0.00	3.6	0.278E+02	0.69	1.01	.18182E+02
2.44	0.00	0.00	4.8	0.210E+02	0.69	1.09	.24612E+02
3.09	0.00	0.00	5.6	0.180E+02	0.69	1.17	.31041E+02
3.73	0.00	0.00	6.0	0.167E+02	0.69	1.23	.37471E+02
4.37	0.00	0.00	6.3	0.159E+02	0.69	1.30	.43900E+02

Cumulative travel time = 43.9001 sec

END OF MOD331: UPSTREAM INTRUDING PLUME

** End of NEAR-FIELD REGION (NFR) **

BEGIN MOD341: BUOYANT AMBIENT SPREADING

Profile definitions:
BV = top-hat thickness,measured vertically
BH = top-hat half-width, measured horizontally from bank/shoreline
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	TT
4.37	0.00	0.00	6.3	0.159E+02	0.67	1.26	.43900E+02
4.38	0.00	0.00	6.3	0.159E+02	0.67	1.26	.43916E+02
4.38	0.00	0.00	6.3	0.159E+02	0.67	1.27	.43932E+02
4.38	0.00	0.00	6.3	0.159E+02	0.67	1.27	.43948E+02
4.38	0.00	0.00	6.3	0.159E+02	0.67	1.27	.43964E+02
4.38	0.00	0.00	6.3	0.159E+02	0.67	1.27	.43981E+02
4.38	0.00	0.00	6.3	0.159E+02	0.67	1.27	.43997E+02
4.39	0.00	0.00	6.3	0.159E+02	0.67	1.27	.44013E+02
4.39	0.00	0.00	6.3	0.159E+02	0.67	1.28	.44029E+02
4.39	0.00	0.00	6.3	0.158E+02	0.67	1.28	.44045E+02
4.39	0.00	0.00	6.3	0.158E+02	0.67	1.28	.44061E+02
4.39	0.00	0.00	6.3	0.158E+02	0.66	1.28	.44077E+02
4.39	0.00	0.00	6.3	0.158E+02	0.66	1.28	.44093E+02
4.40	0.00	0.00	6.3	0.158E+02	0.66	1.29	.44109E+02
4.40	0.00	0.00	6.3	0.158E+02	0.66	1.29	.44125E+02
4.40	0.00	0.00	6.3	0.158E+02	0.66	1.29	.44141E+02
4.40	0.00	0.00	6.3	0.158E+02	0.66	1.29	.44158E+02
4.40	0.00	0.00	6.3	0.158E+02	0.66	1.29	.44174E+02
4.40	0.00	0.00	6.3	0.158E+02	0.66	1.30	.44190E+02
4.41	0.00	0.00	6.3	0.158E+02	0.66	1.30	.44206E+02
4.41	0.00	0.00	6.3	0.158E+02	0.66	1.30	.44222E+02

Cumulative travel time = 44.2219 sec
Plume is LATERALLY FULLY MIXED at the end of the buoyant spreading regime.

END OF MOD341: BUOYANT AMBIENT SPREADING

BEGIN MOD361: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.205E-01 m^2/s
Horizontal diffusivity (initial value) = 0.256E-01 m^2/s

Profile definitions:

BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to water depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction efects, if any)
TT = Cumulative travel time

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	TT
4.41	0.00	0.00	6.3	0.158E+02	0.66	1.30	.44222E+02
11.81	0.00	0.00	6.5	0.154E+02	0.67	1.30	.11395E+03
19.21	0.00	0.00	6.7	0.150E+02	0.69	1.30	.18368E+03
26.61	0.00	0.00	6.8	0.146E+02	0.71	1.30	.25340E+03

** REGULATORY MIXING ZONE BOUNDARY **
In this prediction interval the plume DOWNSTREAM distance meets or exceeds the regulatory value = 30.48 m.
This is the extent of the REGULATORY MIXING ZONE.

34.01	0.00	0.00	7.0	0.143E+02	0.73	1.30	.32313E+03
41.41	0.00	0.00	7.2	0.139E+02	0.75	1.30	.39286E+03
48.81	0.00	0.00	7.4	0.135E+02	0.77	1.30	.46258E+03
56.21	0.00	0.00	7.6	0.131E+02	0.79	1.30	.53231E+03
63.60	0.00	0.00	7.8	0.128E+02	0.81	1.30	.60204E+03
71.00	0.00	0.00	8.1	0.124E+02	0.84	1.30	.67176E+03
78.40	0.00	0.00	8.3	0.120E+02	0.86	1.30	.74149E+03
85.80	0.00	0.00	8.6	0.116E+02	0.89	1.30	.81122E+03
93.20	0.00	0.00	8.9	0.113E+02	0.92	1.30	.88095E+03
100.60	0.00	0.00	9.2	0.109E+02	0.95	1.30	.95067E+03
108.00	0.00	0.00	9.5	0.105E+02	0.98	1.30	.10204E+04
115.40	0.00	0.00	9.8	0.102E+02	1.02	1.30	.10901E+04
122.80	0.00	0.00	10.2	0.983E+01	1.06	1.30	.11599E+04
130.20	0.00	0.00	10.6	0.947E+01	1.10	1.30	.12296E+04
137.60	0.00	0.00	11.0	0.912E+01	1.14	1.30	.12993E+04
145.00	0.00	0.00	11.4	0.877E+01	1.18	1.30	.13690E+04
152.40	0.00	0.00	11.9	0.842E+01	1.23	1.30	.14388E+04

Cumulative travel time = 1438.7611 sec

Simulation limit based on maximum specified distance = 152.40 m.
This is the REGION OF INTEREST limitation.

END OF MOD361: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX3: Buoyant Surface Discharges End of Prediction File
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Appendix B. Mid-tide conditions.

CORMIX1 PREDICTION FILE:
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CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1: Single Port Discharges
CORMIX Version 6.0GTR
HYDRO1 Version 6.0.0.0 October 2009

CASE DESCRIPTION
Site name/label: Yachats WWTP
Design case: Spring Low Tide
FILE NAME: C:\...les\Consulting\Yachats\Yachats Spring MidTide.prd
Time stamp: Mon Feb 1 13:41:12 2010

ENVIRONMENT PARAMETERS (metric units)
Bounded section
BS = 6.00 AS = 20.40 QA = 2.04 ICHREG= 1
HA = 3.40 HD = 3.40
UA = 0.100 F = 2.088 USTAR =0.5109E-01
UW = 2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND= U RHOAM = 1026.5900

DISCHARGE PARAMETERS (metric units)
BANK = LEFT DISTB = 0.50
D0 = 0.254 A0 = 0.051 H0 = 2.90 SUB0 = 0.50
THETA = 0.00 SIGMA = 0.00
U0 = 0.283 Q0 = 0.014 =0.1433E-01
RHO0 = 998.2051 DRHO0 =0.2838E+02 GP0 =0.2712E+00
C0 =0.1000E+03 CUNITS= %
IPOLL = 1 KS =0.0000E+00 KD =0.0000E+00

FLUX VARIABLES (metric units)
Q0 =0.1433E-01 M0 =0.4054E-02 J0 =0.3885E-02 SIGNJ0= 1.0
Associated length scales (meters)
LQ = 0.23 LM = 0.26 Lm = 0.64 Lb = 3.88
Lmp = 99999.00 Lbp = 99999.00

NON-DIMENSIONAL PARAMETERS
FR0 = 1.08 R = 2.83

FLOW CLASSIFICATION
11111111111111111111111111111111111111111
1 Flow class (CORMIX1) = IPH2 1
1 Applicable layer depth HS = 3.40 1

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MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
C0 =0.1000E+03 CUNITS= %
NTOX = 0
NSTD = 0
REGMZ = 1
REGSPC= 1 XREG = 30.48 WREG = 0.00 AREG = 0.00
XINT = 152.40 XMAX = 152.40

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.50 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 20 display intervals per module

BEGIN MOD101: DISCHARGE MODULE

X	Y	Z	S	C	B	Uc	TT	
0.00	0.00	2.90	1.0	0.100E+03	0.13	0.183	.00000E+00	

END OF MOD101: DISCHARGE MODULE

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet/plume transition motion in weak crossflow.

Zone of flow establishment: THETAE= 0.00 SIGMAE= 0.00
LE = 0.47 XE = 0.47 YE = 0.00 ZE = 2.90

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

X	Y	Z	S	C	B	Uc	TT	
0.00	0.00	2.90	1.0	0.100E+03	0.13	0.183	.00000E+00	
0.47	0.00	2.90	1.0	0.100E+03	0.13	0.183	.91262E-02	
0.49	0.00	2.90	1.0	0.100E+03	0.13	0.183	.91200E-01	
0.52	0.00	2.91	1.0	0.100E+03	0.13	0.183	.18958E+00	
0.55	0.00	2.92	1.0	0.100E+03	0.13	0.183	.27546E+00	
0.57	0.00	2.93	1.0	0.977E+02	0.13	0.183	.35726E+00	
0.60	0.00	2.94	1.1	0.945E+02	0.13	0.183	.43499E+00	

0.62	0.00	2.96	1.1	0.913E+02	0.13	0.183	.50900E+00
0.64	0.00	2.97	1.1	0.881E+02	0.13	0.183	.57976E+00
0.66	0.00	2.99	1.2	0.850E+02	0.13	0.183	.64773E+00
0.68	0.00	3.01	1.2	0.819E+02	0.13	0.183	.71334E+00
0.70	0.00	3.03	1.3	0.789E+02	0.14	0.183	.77695E+00
0.72	0.00	3.05	1.3	0.761E+02	0.14	0.183	.83888E+00
0.74	0.00	3.07	1.4	0.733E+02	0.14	0.183	.89939E+00
0.76	0.00	3.09	1.4	0.707E+02	0.14	0.183	.95870E+00
0.77	0.00	3.11	1.5	0.682E+02	0.14	0.183	.10170E+01
0.79	0.00	3.13	1.5	0.657E+02	0.14	0.183	.10744E+01
0.81	0.00	3.16	1.6	0.634E+02	0.15	0.183	.11311E+01
0.82	0.00	3.18	1.6	0.612E+02	0.15	0.183	.11872E+01
0.84	0.00	3.20	1.7	0.592E+02	0.15	0.183	.12428E+01
0.86	0.00	3.22	1.7	0.571E+02	0.15	0.183	.12980E+01
0.87	0.00	3.25	1.8	0.554E+02	0.15	0.183	.13473E+01

Cumulative travel time = 1.3473 sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

BEGIN MOD132: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

Vertical angle of layer/boundary impingement = 55.11 deg
Horizontal angle of layer/boundary impingement = 0.00 deg

UPSTREAM INTRUSION PROPERTIES:

Upstream intrusion length = 0.84 m
X-position of upstream stagnation point = 0.04 m
Thickness in intrusion region = 0.18 m
Half-width at downstream end = 1.20 m
Thickness at downstream end = 0.18 m

Control volume inflow:

X	Y	Z	S	C	B	TT
0.87	0.00	3.25	1.8	0.554E+02	0.15	.13473E+01

Profile definitions:

BV = top-hat thickness, measured vertically
BH = top-hat half-width, measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
0.04	0.00	3.40	9999.9	0.000E+00	0.00	0.00	3.40	3.40	.73348E+01

0.06	0.00	3.40	7.8	0.129E+02	0.04	0.17	3.40	3.36	.13473E+01
0.21	0.00	3.40	3.2	0.310E+02	0.10	0.41	3.40	3.30	.13473E+01
0.35	0.00	3.40	2.4	0.411E+02	0.14	0.56	3.40	3.26	.13473E+01
0.49	0.00	3.40	2.1	0.480E+02	0.16	0.67	3.40	3.24	.13473E+01
0.63	0.00	3.40	1.9	0.525E+02	0.17	0.77	3.40	3.23	.13473E+01
0.77	0.00	3.40	1.8	0.549E+02	0.18	0.86	3.40	3.22	.13473E+01
0.91	0.00	3.40	1.8	0.549E+02	0.18	0.93	3.40	3.22	.17142E+01
1.05	0.00	3.40	2.2	0.459E+02	0.18	1.01	3.40	3.22	.31194E+01
1.19	0.00	3.40	2.7	0.376E+02	0.18	1.07	3.40	3.22	.45245E+01
1.33	0.00	3.40	2.9	0.339E+02	0.18	1.14	3.40	3.22	.59297E+01
1.47	0.00	3.40	3.1	0.326E+02	0.18	1.20	3.40	3.22	.73348E+01

Cumulative travel time = 7.3348 sec

END OF MOD132: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

** End of NEAR-FIELD REGION (NFR) **

In this design case, the discharge is located CLOSE TO BANK/SHORE.
Some boundary interaction occurs at end of near-field.
This may be related to a design case with a very LOW AMBIENT VELOCITY.
The dilution values in one or more of the preceding zones may be too high.
Carefully evaluate results in near-field and check degree of interaction.

Consider locating outfall further away from bank or shore.
In the next prediction module, the plume centerline will be set
to follow the bank/shore.

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Plume is ATTACHED to LEFT bank/shore.
Plume width is now determined from LEFT bank/shore.

Profile definitions:
BV = top-hat thickness, measured vertically
BH = top-hat half-width, measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
1.47	0.50	3.40	3.1	0.326E+02	0.26	1.70	3.40	3.14	.73348E+01
2.65	0.50	3.40	3.4	0.290E+02	0.24	2.05	3.40	3.16	.19040E+02
3.83	0.50	3.40	3.9	0.257E+02	0.24	2.34	3.40	3.16	.30745E+02
5.01	0.50	3.40	4.4	0.228E+02	0.24	2.61	3.40	3.16	.42450E+02

6.18	0.50	3.40	5.0	0.201E+02	0.25	2.85	3.40	3.15	.54156E+02
7.36	0.50	3.40	5.6	0.177E+02	0.26	3.08	3.40	3.14	.65861E+02
8.54	0.50	3.40	6.4	0.156E+02	0.28	3.30	3.40	3.12	.77566E+02
9.72	0.50	3.40	7.3	0.138E+02	0.30	3.51	3.40	3.10	.89271E+02
10.90	0.50	3.40	8.2	0.122E+02	0.32	3.72	3.40	3.08	.10098E+03
12.08	0.50	3.40	9.3	0.108E+02	0.34	3.92	3.40	3.06	.11268E+03
13.26	0.50	3.40	10.4	0.958E+01	0.36	4.12	3.40	3.04	.12439E+03
14.44	0.50	3.40	11.7	0.854E+01	0.39	4.31	3.40	3.01	.13609E+03
15.61	0.50	3.40	13.1	0.763E+01	0.42	4.50	3.40	2.98	.14780E+03
16.79	0.50	3.40	14.6	0.685E+01	0.45	4.69	3.40	2.95	.15950E+03
17.97	0.50	3.40	16.2	0.616E+01	0.48	4.88	3.40	2.92	.17121E+03
19.15	0.50	3.40	18.0	0.555E+01	0.51	5.07	3.40	2.89	.18291E+03
20.33	0.50	3.40	19.9	0.503E+01	0.54	5.26	3.40	2.86	.19462E+03
21.51	0.50	3.40	21.9	0.456E+01	0.58	5.45	3.40	2.82	.20632E+03
22.69	0.50	3.40	24.1	0.415E+01	0.61	5.63	3.40	2.79	.21803E+03
23.87	0.50	3.40	26.4	0.378E+01	0.65	5.82	3.40	2.75	.22973E+03
25.04	0.50	3.40	28.9	0.346E+01	0.69	6.00	3.40	2.71	.24144E+03

Cumulative travel time = 241.4391 sec
Plume is LATERALLY FULLY MIXED at the end of the buoyant spreading regime.

END OF MOD141: BUOYANT AMBIENT SPREADING

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.347E-01 m^2/s
Horizontal diffusivity (initial value) = 0.434E-01 m^2/s

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
25.04	0.50	3.40	28.9	0.346E+01	0.69	6.00	3.40	2.71	.24144E+03

** REGULATORY MIXING ZONE BOUNDARY **
In this prediction interval the plume DOWNSTREAM distance meets or exceeds the regulatory value = 30.48 m.
This is the extent of the REGULATORY MIXING ZONE.

31.41	0.50	3.40	30.0	0.333E+01	0.72	6.00	3.40	2.68	.30467E+03

37.78	0.50	3.40	31.3	0.320E+01	0.75	6.00	3.40	2.65	.36791E+03
44.15	0.50	3.40	32.6	0.307E+01	0.78	6.00	3.40	2.62	.43114E+03
50.52	0.50	3.40	34.0	0.294E+01	0.81	6.00	3.40	2.59	.49437E+03
56.88	0.50	3.40	35.6	0.281E+01	0.85	6.00	3.40	2.55	.55761E+03
63.25	0.50	3.40	37.3	0.268E+01	0.89	6.00	3.40	2.51	.62084E+03
69.62	0.50	3.40	39.2	0.255E+01	0.94	6.00	3.40	2.46	.68407E+03
75.99	0.50	3.40	41.2	0.243E+01	0.98	6.00	3.40	2.42	.74731E+03
82.35	0.50	3.40	43.5	0.230E+01	1.04	6.00	3.40	2.36	.81054E+03
88.72	0.50	3.40	45.9	0.218E+01	1.10	6.00	3.40	2.30	.87378E+03
95.09	0.50	3.40	48.7	0.205E+01	1.16	6.00	3.40	2.24	.93701E+03
101.46	0.50	3.40	51.7	0.193E+01	1.23	6.00	3.40	2.17	.10002E+04
107.83	0.50	3.40	55.1	0.182E+01	1.32	6.00	3.40	2.08	.10635E+04
114.19	0.50	3.40	58.9	0.170E+01	1.41	6.00	3.40	1.99	.11267E+04
120.56	0.50	3.40	63.1	0.159E+01	1.51	6.00	3.40	1.89	.11899E+04
126.93	0.50	3.40	67.8	0.147E+01	1.62	6.00	3.40	1.78	.12532E+04
133.30	0.50	3.40	73.1	0.137E+01	1.75	6.00	3.40	1.65	.13164E+04
139.66	0.50	3.40	79.1	0.126E+01	1.89	6.00	3.40	1.51	.13796E+04
146.03	0.50	3.40	85.8	0.117E+01	2.05	6.00	3.40	1.35	.14429E+04
152.40	0.50	3.40	93.2	0.107E+01	2.23	6.00	3.40	1.17	.15061E+04

Cumulative travel time = 1506.1119 sec

Simulation limit based on maximum specified distance = 152.40 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX1: Single Port Discharges End of Prediction File

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Appendix C. High tide conditions.

CORMIX1 PREDICTION FILE:
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CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1: Single Port Discharges
CORMIX Version 6.0GTR
HYDRO1 Version 6.0.0.0 October 2009

CASE DESCRIPTION
Site name/label: Yachats WWTP
Design case: Spring Low Tide
FILE NAME: C:\...es\Consulting\Yachats\Yachats Spring HighTide.prd
Time stamp: Mon Feb 1 15:47:11 2010

ENVIRONMENT PARAMETERS (metric units)
Bounded section
BS = 9.00 AS = 45.90 QA = 4.59 ICHREG= 1
HA = 5.10 HD = 5.10
UA = 0.100 F = 1.824 USTAR =0.4775E-01
UW = 2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND= U RHOAM = 1026.5900

DISCHARGE PARAMETERS (metric units)
BANK = RIGHT DISTB = 0.50
D0 = 0.254 A0 = 0.051 H0 = 3.40 SUB0 = 1.70
THETA = 0.00 SIGMA = 90.00
U0 = 0.283 Q0 = 0.014 =0.1433E-01
RHO0 = 998.2051 DRHO0 =0.2838E+02 GP0 =0.2712E+00
C0 =0.1000E+03 CUNITS= %
IPOLL = 1 KS =0.0000E+00 KD =0.0000E+00

FLUX VARIABLES (metric units)
Q0 =0.1433E-01 M0 =0.4054E-02 J0 =0.3885E-02 SIGNJ0= 1.0
Associated length scales (meters)
LQ = 0.23 LM = 0.26 Lm = 0.64 Lb = 3.88
Lmp = 99999.00 Lbp = 99999.00

NON-DIMENSIONAL PARAMETERS
FR0 = 1.08 R = 2.83

FLOW CLASSIFICATION
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1 Flow class (CORMIX1) = IPH1 1

1 Applicable layer depth HS = 5.10 1
1111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
C0 =0.1000E+03 CUNITS= %
NTOX = 0
NSTD = 0
REGMZ = 1
REGSPC= 1 XREG = 30.48 WREG = 0.00 AREG = 0.00
XINT = 152.40 XMAX = 152.40

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.50 m from the RIGHT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 20 display intervals per module

BEGIN MOD101: DISCHARGE MODULE

X	Y	Z	S	C	B	Uc	TT	
0.00	0.00	3.40	1.0	0.100E+03	0.13	0.283	.00000E+00	

END OF MOD101: DISCHARGE MODULE

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet/plume transition motion in strong crossflow.

Zone of flow establishment: THETAE= 0.00 SIGMAE= 81.67
LE = 0.00 XE = 0.00 YE = 0.00 ZE = 3.40

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

X	Y	Z	S	C	B	Uc	TT	
0.00	0.00	3.40	1.0	0.100E+03	0.13	0.283	.22628E-01	
0.02	0.08	3.42	1.0	0.100E+03	0.13	0.283	.25004E+00	
0.03	0.14	3.46	1.1	0.952E+02	0.13	0.283	.43889E+00	
0.06	0.20	3.53	1.2	0.855E+02	0.13	0.283	.62816E+00	
0.08	0.25	3.60	1.3	0.759E+02	0.14	0.283	.81960E+00	
0.11	0.28	3.68	1.5	0.681E+02	0.14	0.283	.98467E+00	

0.14	0.32	3.75	1.6	0.612E+02	0.15	0.283	.11450E+01
0.17	0.34	3.83	1.8	0.552E+02	0.15	0.283	.13029E+01
0.19	0.37	3.91	2.0	0.499E+02	0.16	0.283	.14600E+01
0.23	0.39	3.98	2.2	0.452E+02	0.17	0.283	.16172E+01
0.26	0.41	4.06	2.4	0.412E+02	0.18	0.283	.17753E+01
0.29	0.43	4.14	2.7	0.376E+02	0.19	0.283	.19348E+01
0.32	0.45	4.22	2.9	0.344E+02	0.19	0.283	.20960E+01
0.36	0.46	4.29	3.2	0.317E+02	0.20	0.283	.22592E+01
0.40	0.48	4.37	3.4	0.292E+02	0.21	0.283	.24246E+01
0.43	0.49	4.45	3.7	0.270E+02	0.22	0.283	.25923E+01
0.47	0.50	4.52	4.0	0.250E+02	0.23	0.283	.27624E+01
0.51	0.52	4.60	4.3	0.233E+02	0.24	0.283	.29350E+01
0.55	0.53	4.68	4.6	0.217E+02	0.25	0.283	.31102E+01
0.59	0.54	4.75	4.9	0.203E+02	0.26	0.283	.32879E+01
0.63	0.55	4.83	5.2	0.191E+02	0.27	0.283	.34501E+01

Cumulative travel time = 3.4501 sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

BEGIN MOD131: LAYER BOUNDARY/TERMINAL LAYER APPROACH

Control volume inflow:

X	Y	Z	S	C	B	TT
0.63	0.55	4.83	5.2	0.191E+02	0.27	.34501E+01

Profile definitions:

BV = top-hat thickness, measured vertically
BH = top-hat half-width, measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
0.51	0.51	5.10	5.2	0.191E+02	0.00	0.00	5.10	5.10	.34501E+01
0.58	0.52	5.10	5.2	0.191E+02	0.50	0.25	5.10	4.60	.34501E+01
0.65	0.53	5.10	5.2	0.191E+02	0.60	0.36	5.10	4.50	.34501E+01
0.71	0.54	5.10	5.2	0.191E+02	0.66	0.44	5.10	4.44	.34501E+01
0.78	0.55	5.10	5.2	0.191E+02	0.70	0.51	5.10	4.40	.34501E+01
0.84	0.56	5.10	5.6	0.178E+02	0.73	0.56	5.10	4.37	.43442E+01
0.91	0.57	5.10	6.5	0.153E+02	0.76	0.62	5.10	4.34	.52548E+01
0.98	0.58	5.10	7.5	0.133E+02	0.78	0.67	5.10	4.32	.61654E+01
1.04	0.59	5.10	8.3	0.121E+02	0.79	0.71	5.10	4.31	.70759E+01
1.11	0.60	5.10	8.7	0.115E+02	0.80	0.76	5.10	4.30	.79865E+01
1.17	0.61	5.10	8.9	0.112E+02	0.80	0.80	5.10	4.30	.88971E+01

Cumulative travel time = 8.8971 sec

END OF MOD131: LAYER BOUNDARY/TERMINAL LAYER APPROACH

** End of NEAR-FIELD REGION (NFR) **

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Profile definitions:
BV = top-hat thickness, measured vertically
BH = top-hat half-width, measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT
1.17	0.61	5.10	8.9	0.112E+02	0.80	0.80	5.10	4.30	.88971E+01
1.20	0.61	5.10	9.0	0.112E+02	0.79	0.82	5.10	4.31	.91064E+01
1.22	0.61	5.10	9.0	0.111E+02	0.77	0.83	5.10	4.33	.93158E+01
1.24	0.61	5.10	9.1	0.110E+02	0.76	0.85	5.10	4.34	.95252E+01
1.26	0.61	5.10	9.1	0.110E+02	0.75	0.87	5.10	4.35	.97345E+01
1.28	0.61	5.10	9.1	0.109E+02	0.74	0.89	5.10	4.36	.99439E+01
1.30	0.61	5.10	9.2	0.109E+02	0.73	0.90	5.10	4.37	.10153E+02
1.32	0.61	5.10	9.2	0.108E+02	0.72	0.92	5.10	4.38	.10363E+02
1.34	0.61	5.10	9.3	0.108E+02	0.71	0.93	5.10	4.39	.10572E+02
1.36	0.61	5.10	9.3	0.107E+02	0.70	0.95	5.10	4.40	.10781E+02
1.38	0.61	5.10	9.4	0.107E+02	0.69	0.97	5.10	4.41	.10991E+02
1.41	0.61	5.10	9.4	0.106E+02	0.69	0.98	5.10	4.41	.11200E+02
1.43	0.61	5.10	9.4	0.106E+02	0.68	1.00	5.10	4.42	.11409E+02
1.45	0.61	5.10	9.5	0.105E+02	0.67	1.01	5.10	4.43	.11619E+02
1.47	0.61	5.10	9.5	0.105E+02	0.66	1.03	5.10	4.44	.11828E+02
1.49	0.61	5.10	9.6	0.105E+02	0.66	1.04	5.10	4.44	.12038E+02
1.51	0.61	5.10	9.6	0.104E+02	0.65	1.05	5.10	4.45	.12247E+02
1.53	0.61	5.10	9.6	0.104E+02	0.65	1.07	5.10	4.45	.12456E+02
1.55	0.61	5.10	9.7	0.103E+02	0.64	1.08	5.10	4.46	.12666E+02
1.57	0.61	5.10	9.7	0.103E+02	0.63	1.10	5.10	4.47	.12875E+02
1.59	0.61	5.10	9.7	0.103E+02	0.63	1.11	5.10	4.47	.13084E+02

Cumulative travel time = 13.0843 sec

Plume is ATTACHED to RIGHT bank/shore.
Plume width is now determined from RIGHT bank/shore.

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT	
1.59	-0.50	5.10	9.7	0.103E+02	0.63	2.22	5.10	4.47	.13084E+02	
3.41	-0.50	5.10	10.9	0.916E+01	0.55	2.85	5.10	4.55	.31177E+02	
5.22	-0.50	5.10	12.2	0.822E+01	0.52	3.35	5.10	4.58	.49270E+02	
7.04	-0.50	5.10	13.6	0.735E+01	0.51	3.79	5.10	4.59	.67363E+02	
8.85	-0.50	5.10	15.3	0.655E+01	0.52	4.18	5.10	4.58	.85455E+02	
10.67	-0.50	5.10	17.1	0.583E+01	0.54	4.55	5.10	4.56	.10355E+03	
12.48	-0.50	5.10	19.3	0.518E+01	0.57	4.89	5.10	4.53	.12164E+03	
14.30	-0.50	5.10	21.7	0.461E+01	0.60	5.22	5.10	4.50	.13973E+03	
16.11	-0.50	5.10	24.4	0.410E+01	0.63	5.54	5.10	4.47	.15783E+03	
17.93	-0.50	5.10	27.4	0.365E+01	0.67	5.85	5.10	4.43	.17592E+03	
19.74	-0.50	5.10	30.7	0.326E+01	0.72	6.15	5.10	4.38	.19401E+03	
21.56	-0.50	5.10	34.3	0.291E+01	0.76	6.45	5.10	4.34	.21210E+03	
23.37	-0.50	5.10	38.3	0.261E+01	0.81	6.74	5.10	4.29	.23020E+03	
25.19	-0.50	5.10	42.6	0.235E+01	0.87	7.03	5.10	4.23	.24829E+03	
27.00	-0.50	5.10	47.2	0.212E+01	0.92	7.32	5.10	4.18	.26638E+03	
28.82	-0.50	5.10	52.2	0.192E+01	0.98	7.60	5.10	4.12	.28448E+03	

** REGULATORY MIXING ZONE BOUNDARY **
In this prediction interval the plume DOWNSTREAM distance meets or exceeds the regulatory value = 30.48 m.
This is the extent of the REGULATORY MIXING ZONE.

30.63	-0.50	5.10	57.6	0.174E+01	1.05	7.89	5.10	4.05	.30257E+03	
32.45	-0.50	5.10	63.4	0.158E+01	1.11	8.17	5.10	3.99	.32066E+03	
34.26	-0.50	5.10	69.6	0.144E+01	1.18	8.45	5.10	3.92	.33875E+03	
36.08	-0.50	5.10	76.2	0.131E+01	1.25	8.72	5.10	3.85	.35685E+03	
37.89	-0.50	5.10	83.2	0.120E+01	1.32	9.00	5.10	3.78	.37494E+03	

Cumulative travel time = 374.9398 sec
Plume is LATERALLY FULLY MIXED at the end of the buoyant spreading regime.

END OF MOD141: BUOYANT AMBIENT SPREADING

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.487E-01 m^2/s
Horizontal diffusivity (initial value) = 0.609E-01 m^2/s

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL	TT	
37.89	-0.50	5.10	83.2	0.120E+01		1.32	9.00	5.10	3.78	.37494E+03
43.62	-0.50	5.10	86.6	0.116E+01		1.38	9.00	5.10	3.72	.43202E+03
49.34	-0.50	5.10	90.2	0.111E+01		1.44	9.00	5.10	3.66	.48909E+03
55.07	-0.50	5.10	94.1	0.106E+01		1.50	9.00	5.10	3.60	.54617E+03
60.79	-0.50	5.10	98.3	0.102E+01		1.56	9.00	5.10	3.54	.60324E+03
66.52	-0.50	5.10	102.9	0.972E+00		1.64	9.00	5.10	3.46	.66032E+03
72.25	-0.50	5.10	107.8	0.928E+00		1.72	9.00	5.10	3.38	.71739E+03
77.97	-0.50	5.10	113.1	0.884E+00		1.80	9.00	5.10	3.30	.77447E+03
83.70	-0.50	5.10	118.9	0.841E+00		1.89	9.00	5.10	3.21	.83154E+03
89.42	-0.50	5.10	125.2	0.799E+00		1.99	9.00	5.10	3.11	.88862E+03
95.15	-0.50	5.10	132.1	0.757E+00		2.10	9.00	5.10	3.00	.94569E+03
100.87	-0.50	5.10	139.6	0.717E+00		2.22	9.00	5.10	2.88	.10028E+04
106.60	-0.50	5.10	147.7	0.677E+00		2.35	9.00	5.10	2.75	.10598E+04
112.32	-0.50	5.10	156.5	0.639E+00		2.49	9.00	5.10	2.61	.11169E+04
118.05	-0.50	5.10	166.2	0.602E+00		2.65	9.00	5.10	2.45	.11740E+04
123.77	-0.50	5.10	176.6	0.566E+00		2.81	9.00	5.10	2.29	.12311E+04
129.50	-0.50	5.10	187.9	0.532E+00		2.99	9.00	5.10	2.11	.12881E+04
135.22	-0.50	5.10	200.2	0.500E+00		3.19	9.00	5.10	1.91	.13452E+04
140.95	-0.50	5.10	213.4	0.469E+00		3.40	9.00	5.10	1.70	.14023E+04
146.67	-0.50	5.10	227.5	0.440E+00		3.62	9.00	5.10	1.48	.14594E+04
152.40	-0.50	5.10	242.5	0.412E+00		3.86	9.00	5.10	1.24	.15164E+04

Cumulative travel time = 1516.4469 sec

Simulation limit based on maximum specified distance = 152.40 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX1: Single Port Discharges End of Prediction File

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Section

2

ENVIRONMENTAL MAPPING AND ANALYSIS

ENVIRONMENTAL MAPPING
AND
THREATENED OR ENDANGERED SPECIES REVIEW
FOR THE
CITY OF YACHATS WASTE WATER TREATMENT PLANT OUTFALL
YACHATS, OREGON

Prepared for:
The Dyer Partnership Engineers & Planners
1330 Teakwood Avenue
Coos Bay, Oregon 97420

Prepared by;
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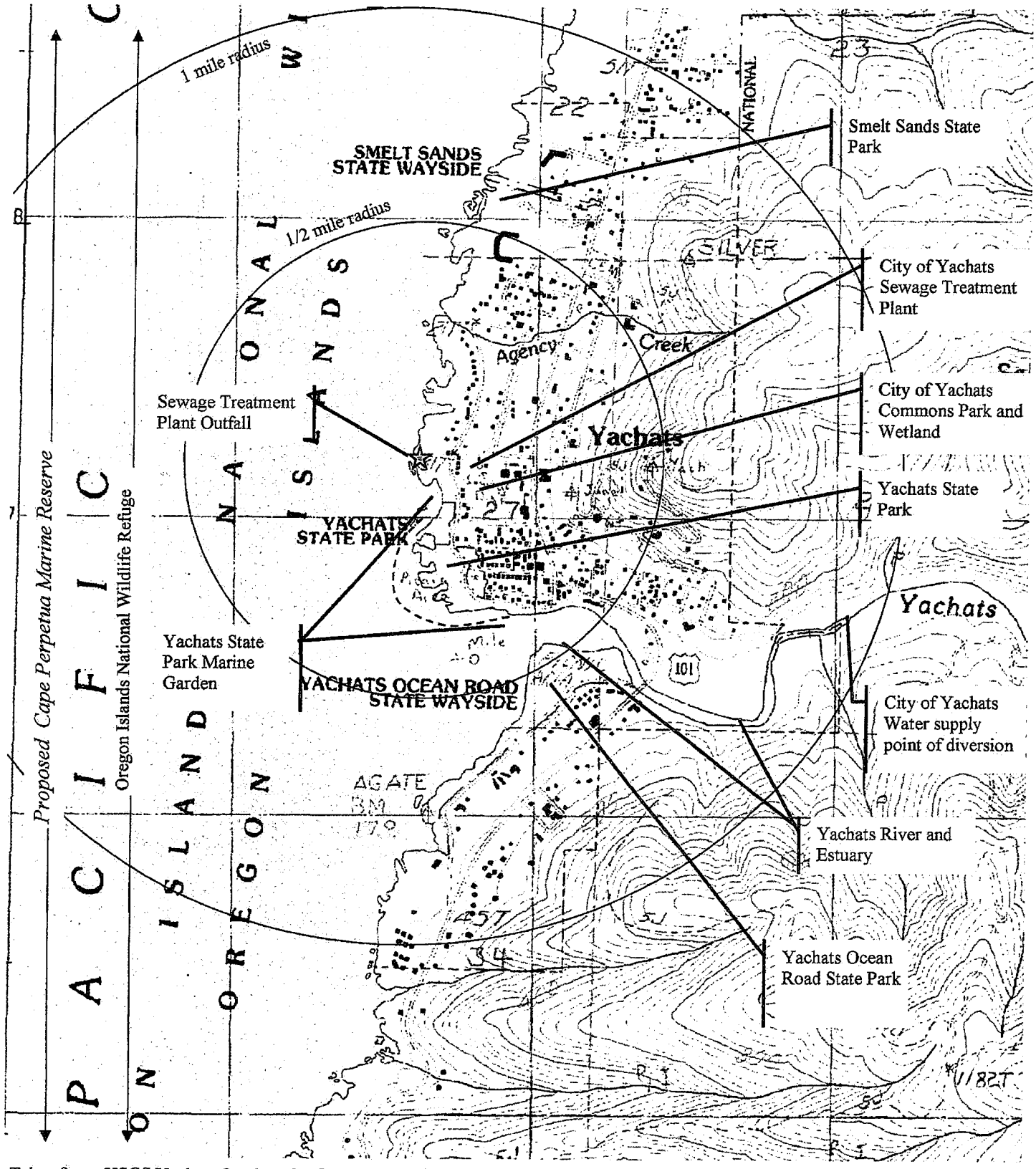
525 SE Main Street
Roseburg, Oregon 97470
541-672-0393

January 15, 2010

INTRODUCTION

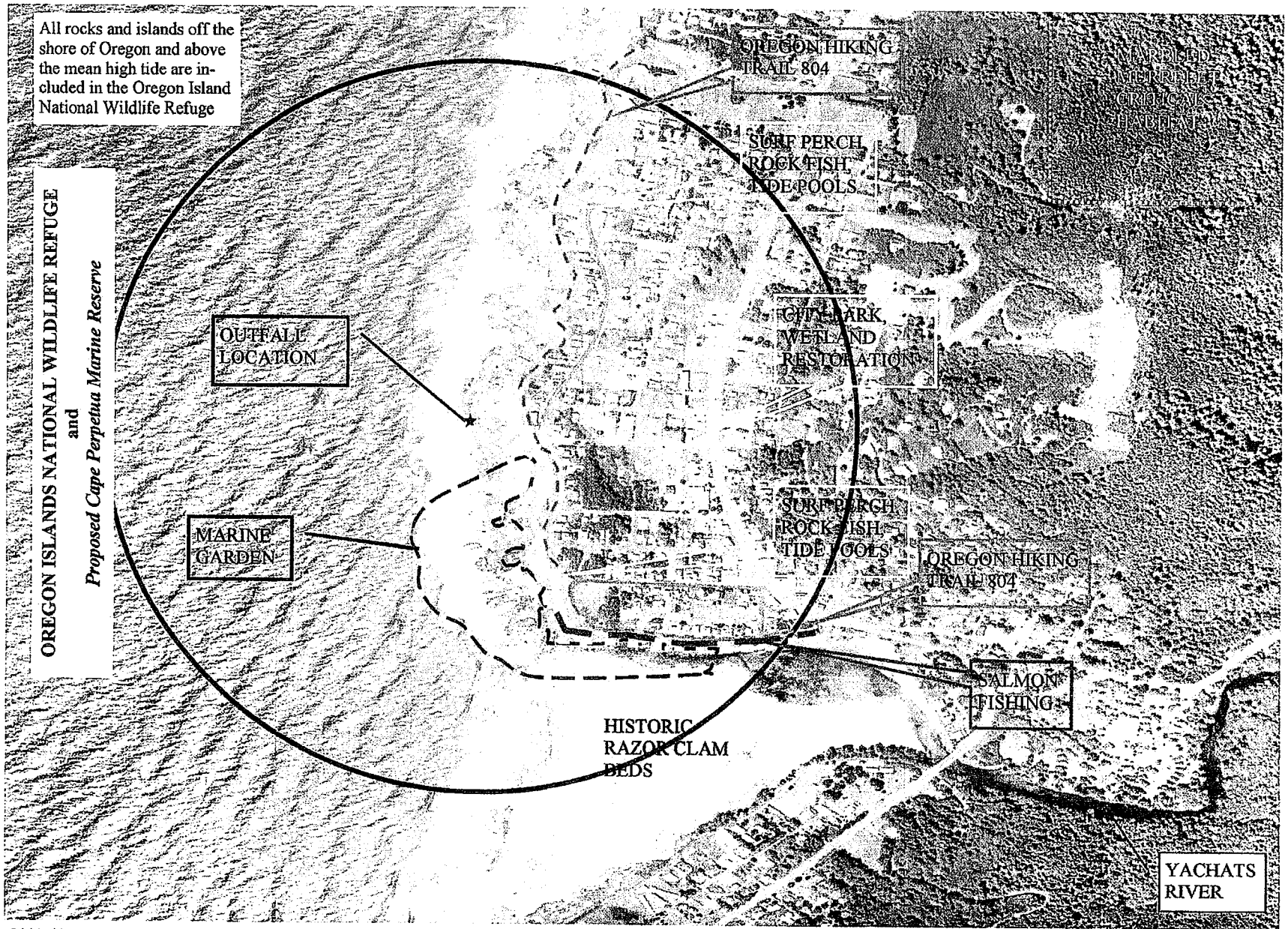
Land Water Environmental Services, Inc. was contracted by The Dyer Partnership Engineers & Planners, Inc. to perform environmental mapping and evaluate the potential presence of threatened or endangered species in the vicinity of the outfall location for the Yachats waste water treatment plant (WWTP) in Yachats, Oregon. Included in this report is a map indicating the locations of various environmental features and facilities within 0.5 and 1.0 miles of the Yachats WWTP outfall and an aerial photograph which indicates the locations of biogeographic and human use areas of interest within 0.5 miles of the WWTP outfall. Following the Environmental Map and the Biogeographic Area Photo is a tabulation briefly describing the features and providing internet address links where further information pertaining to the feature can be obtained. Threatened and Endangered Species which are listed by federal and/or state agencies are then reviewed for relevance to the Yachats WWTP outfall. The lists are attached.

There were nineteen species found on the threatened or endangered species lists which are "present or may be present" within a 1.0 mile radius of the Yachats WWTP outfall. However, the review of the species determined that none of the listed species present or possibly present within the 1.0 mile radius are likely to be adversely affected by the outfall.



Taken from: USGS Yachats Quadrangle, Oregon, 7.5 Minute Series Topographic Map

Environmental Features and Facilities Location Map
"City of Yachats Waste Water Treatment Plant Outfall Mixing Zone Study"



2005 AERIAL PHOTOGRAPH PROVIDED BY OREGON STATE UNIVERSITY

BIOGEOGRAPHIC AND HUMAN USE PHOTOGRAPH

"City of Yachats Waste Water Treatment Plant Outfall Mixing Zone Study"

ENVIRONMENTAL MAPPING

The following environmental features and facilities have been identified on the environmental map. Other features not found are also listed.

Oregon Islands National Wildlife Refuge

The Oregon Islands National Wildlife Refuge consists of all rocks and islands off the shore of Oregon and above the line of mean high tide. There appear to be several rock outcrops within a 0.5 and 1.0 mile radius of the WWTP outfall that qualify for inclusion in the refuge. Most of this refuge is included in Oregon Islands Wilderness Area. The refuge is managed by the United States Fish and Wildlife Service.

www.fws.gov/refuges
www.fws.gov/oregoncoast/oregonislands/index.htm

Oregon Islands Wilderness Area

The Oregon Islands Wilderness Area is located within the Oregon Islands National Wildlife Refuge. All of the island acreage on the Oregon coast is designated National Wilderness, with a few exceptions not within the area of concern.

www.fws.gov/oregoncoast/oregonislands/index.htm

Smelt Sands State Park

The Smelt Sands State Park is located 0.5 miles north of the WWTP outfall and is within the Oregon Islands National Wildlife Refuge. The park consists of a small parking lot and a portion of the low rocky bluffs and tide lands. The park is known for tidepooling, rock fishing and the yearly smelt run.

http://www.oregonstateparks.org/park_128.php

Oregon Hiking Trail 804

The southern 804 Trail is a paved walking trail which extends 0.75 miles from the Smelt Sands State Park to the Yachats River. The trail is located primarily on the low bluff above the intertidal rocky shoreline. The trail, which has numerous benches scattered along its length, is popular for whale watching, photography, tidepooling, and rock fishing.

http://www.oregonstateparks.org/park_128.php
http://www.oregon.gov/OPRD/PARKS/docs/OCT_5_comb.pdf
http://www.ci.yachats.or.us/special/trails_brochure-sm.pdf

City of Yachats Commons Park and Wetland

The City of Yachats Commons Park is located adjacent to the south side of the WWTP. A 2.42 acre wetland restoration site is located in the center of the park. A ball field, parking lot, picnic shelter, and playground are in the east portion of the park. A second-growth spruce forest is in the west portion of the park. The site is considered to be in the Agency Creek watershed, however, water discharging from the wetland during storm events enters the Pacific Ocean approximately 300 feet to the north of the WWTP outfall.

http://people.oregonstate.edu/~adamusp/Yachats/Yachats%20wetland%20restoration%20plan.pdf

Yachats State Park and Yachats State Park Marine Garden

Yachats State Park is located along the western side of Ocean View Drive from 1st Street to 6th Street in the central district of Yachats. The park offers a view of the Yachats River as it meets the Pacific Ocean and the rocky Pacific shore. The park is commonly used for tide pooling and fishing for surf perch, rock fish, and salmon. The park is also the location of the "Yachats Marine Garden" which includes all rocky areas, tide pools, and sand beaches situated between extreme high tide and extreme low tide lying between the north and south boundaries of the Yachats State Park. The WWTP outfall is approximately 600 feet north of the area designated as "marine garden".

http://www.oregon.gov/OPRD/PLANS/docs/rocky_shores/p70-74.pdf
http://www.oregon.gov/OPRD/PLANS/docs/rocky_shores/p154-158.pdf
http://www.coastalatlas.net/index.php?option=com_custompages&r=35&Itemid=72

Yachats River and Estuary

The mouth of the Yachats River is located within 0.5 miles to the south of the WWTP outfall. A sand bar is present on the south side of the mouth of the river. The sand bar follows the line of the coast and an estuary lies behind. The mouth of the river is a popular fishing location. There are no boat ramps located within 1.0 mile of the WWTP outfall or in the estuary. A boat ramp is present on the Yachats River approximately 1.0 miles east of US Highway 101. Drift boats may be extracted from the river on the south side of the estuary. Historically, razor clams have been harvested from the sand bar; however, local residents report that clams are no longer present on the bar.

City of Yachats Water Supply Point of Diversion

The City of Yachats water supply point of diversion is located on the Yachats River at approximate river mile 1.0. The diversion point is approximately 0.9 miles from the WWTP outfall location. The diversion point is within tidal influence but is not subject to salt water

intrusion.

Http://www.ci.yachats.or.us/Water%20 Resources%20-%20Water%20Permit.html

Yachats Ocean Road State Park (State Natural Site)

Yachats Ocean Road State Park is located on the west side of Yachats Ocean Road beginning at the south bank of the Yachats River where US Highway 101 crosses the river of Yachats, and continuing for approximately 1.0 mile in a loop along the shoreline. The park includes the sand bar at the mouth of the Yachats River estuary and rocky shoreline to the south. The area is used for fishing of surf perch, rock fish, and salmon. Historically, clams were dug on the sand bar. Harbor seals periodically use the area near the mouth of the Yachats River. Other human activities include tide pooling and whale watching. A portion of the park, the sand bar, and the mouth of the Yachats River are located within 0.5 miles of the WWTP outfall. The remainder of the park is located within 1.0 miles of the WWTP outfall.

http://www.oregonstateparks.org/park_132.php
http://www.oregon.gov/OPRD/PLANS/docs/rocky_shores/index.shtml
http://www.coastalatlas.net/index.php?option=com_custompages&r=35&Itemid=72

Proposed Cape Perpetua Marine Reserve

The proposed Cape Perpetua Marine Reserve extends from the Smelt Sands Beach, north of the WWTP outfall, south 14 miles to Berry Creek which is south of Heceta Head. The proposed reserve extends from the shore line west to Oregon State's three-mile boundary. A determination on the proposal will be made by the Governor of Oregon in 2010.

http://www.ouroregonocean.org

Marine Protected areas

There are no marine protected areas currently listed with National Oceanic and Atmospheric Administration within five miles of the WWTP outfall.

http://mpa.gov/
http://oceanservice.noaa.gov/topics/oceans/mpa/welcome.html

Marine Sanctuaries

There are no marine sanctuaries currently listed with the National Oceanic and Atmospheric Administration within five miles of the WWTP outfall.

http://oceanservice.noaa.gov/topics/oceans/mpa/welcome.html

Marine Parks or Marine National Parks

The Yachats Marine Garden is addressed above and is present in close proximity to the WWTP outfall. There were no other Marine Parks or Marine National Parks identified within the search area of 5.0 miles.

http://www.nps.gov/findapark/index.htm

Marine Historical Monuments

There were no Marine Historical Monuments identified within the search area of 5.0 miles from the WWTP ourtfall.

http://www.fs.fed.us/fstoday/080822/03.1Looking_Back/national_monuments.pdf

National Seashores

There were no National Seashores or other National Parks identified within the search area of 5.0 miles from the WWTP outfall.

http://www.nps.gov/findapark/index.htm

Coral Reefs

There are were no Coral Reefs identified within the search area of 5.0 miles from the WWTP outfall.

http://www.enchantedlearning.com/biomes/coralreef/coralreef.shtml

THREATENED AND ENDANGERED (T & E) SPECIES

The following regulatory agency threatened and endangered species lists for the area of concern have been reviewed:

- National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS)

  http://www.nwr.noaa.gov/Species-Lists.cfm

- U. S. Fish and Wildlife Service (USFWS)

  http://www.fws.gov/oregonfwo/Species/Lists/

- Oregon Department of Fish and Wildlife (ODFW)

  http://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=esalinks

- Oregon Department of Agriculture (ODA)

  http://www.oregon.gov/ODA/PLANT/CONSERVATION/statelist.shtml

- Oregon Natural Heritage Information Center (ORNHIC)

  htt://oregonstate.edu/ornhic/data/inverts2007.xls

Additional information with regard to species identified at or near the location of the Yachats WWTP outfall was requested by letter from NMFS, USFWS, ODFW, and ODA. Additional information, beyond the published lists, was received from the USFWS and from NMFS.

Ms. Liza Kelly, USFWS, stated that "there are no listed species concerns in the project areas for the City of Yachats WWTP Mixing Zone Study"

Ms. Lisa Wright, NMFS, identified the following species concerns:

-Oregon Coast coho salmon + critical habitat
-Green sturgeon + critical habitat
- Southern DPS eulachon (aka Columbia River smelt) - proposed for ESA-listing, no designated critical habitat
- EFH Pacific salmon, groundfish, coastal pelagics

<u>Birds: Threatened and Endangered Species</u>

There are four bird species listed by USFWS as threatened or endangered, which may occur in Lincoln County, Oregon.

Present or May be Present

- Marbled murrelet (*Brachyramphus marmoratus)* is listed as threatened and critical habitat has been designated for this specie. The marbled murrelet requires old growth Douglas fir trees for nesting platforms. Critical habitat for the marbled murrelet has been identified within 1.0 mile northeast of the WWTP outfall. It is not likely that the outfall would adversely effect the marbled murrelet or its nesting habitat.

- Northern spotted owl *(Strix occidentalis caurina)* is listed as threatened and critical habitat has been designated for this specie. The spotted owl nests in the cavities of old growth timber. Old growth timber is present within 1.0 mile northeast of the WWTP outfall. However, it is not likely that the outfall would adversely effect the northern spotted owl or its habitat.

Absent

- Western snowy (coastal) plover *(Charadrius alexandrinus nivosus)* is listed as threatened and critical habitat has been designated for this specie. The plover is a shorebird that nests on sandy beaches, laying their eggs in shallow depressions. There is no suitable habitat or designated critical habitat for the snowy plover within 1.0 mile of the WWTP outfall.

- Short-tailed albatross *(Phoebastria albatrus)* is listed as endangered. The albatross nests and breeds in Japan and alights on the ocean surface to feed. The Short-tailed Albatross feeds mainly on squid, but will follow processing ships for their discarded offal. It is not likely that the WWTP outfall would adversely effect the short-tailed albatross.

There is one bird species on the ODFW list, which occurs in Lincoln County.

- Bald Eagle *(Haliaeetus leucocephalus)* is listed by ODFW as threatened. Bald eagles have been de-listed by USFWS, however they remain protected under the Bald and Golden Eagle Protection Act (Eagle Act). "The Eagle Act prohibits anyone from taking bald eagles. Among other actions, 'take' includes disturbance of bald eagles." No bald or golden eagle nests were observed during a site visit by LAWESI personnel within the radius of concern during a site visit on December 4, 2009; however, if present it is not likely that they would be adversely effected by the WWTP ourfall.

Invertebrates: Threatened and Endangered Species

There is one invertebrate specie listed by USFWS as threatened or endangered, which may occur in Lincoln County.

Absent

- Oregon silverspot butterfly *(Speyeria zerene hippolyta)* is listed as threatened and critical habitat has been designated for this specie. The silverspot requires salt spray grassland meadow habitat and which is not present in urbanized environments. Designated critical habitat or suitable habitat for the Oregon Silverspot butterfly are not present within 1.0 mile of the WWTP outfall.

In addition to the federal list, there are seven invertebrate species listed as occurring in Lincoln

County on the ORNHIC T&E List 1 ("threatened with extinction or presumed to be extinct throughout their entire range") or List 2 ("threatened with extirpation or presumed to be extirpated from the state of Oregon").

Present or May be Present

- Newcomb's littorine snail *(Algamorda newcombiana)* is a List 1 ORNHIC specie. This is a marine snail which clings to rocks in upper intertidal zones similar to those present adjacent to the WWTP outfall. Although the snail may be present in the upper intertidal zone adjacent to the WWTP outfall, it is not likely that it would be adversely effected by the outfall.

- Hoary elfin (butterfly) *(Callophrys polios maritima)* is a List 1 ORNHIC specie. This butterfly requires kinnikinnick on coastal bluffs and ancient sand dunes. Kinnikinnick is likely to be present along the low bluffs within 1.0 mile of the WWTP outfall providing required habitat for the butterfly. It is not likely that the outfall would adversely effected the hoary elfin due to the intertidal separation between the outfall and the bluffs.

- Siuslaw sand tiger beetle (*Cicindela hirticollis siuslawensis)* is a List 1 & 2 ORNHIC specie. This beetle's habitat is the sandy edge of river mouths on beaches along the coast. Potential Siuslaw sand tiger beetle habitat is located within 1.0 mile of the WWTP outfall. The principal threats to the beetle are physical disturbance of its sandy beach habitat, particularly by human activity such as off road vehicle use and it has a narrow range of moisture tolerance that make it susceptible to droughts, pollution, pesticides, river damming, channelization, and other shoreline modification. It is not likely that the WWTP outfall would adversely effect the beetle if it were present in the mouth of the Yachats River.

- Oregon giant earthworm *(Driloleirus macelfreshi)* is a List 1 ORNIHIC specie. This seldom recorded specie's habitat is under the earth of mixed forests. It is not likely that the WWTP outfall would adversely effect the earthworm.

- Warty jumping-slug *(Hemphillia glandulosa)* is a List 2 ORNHIC specie. The habitat for this slug is undisturbed coniferous forests or riparian areas. It is not likely that the WWTP outfall would adversely effected the jumping-slug.

- Crowned tightcoil (snail) *(Pristiloma pilsbryi)* is a List 1 ORNHIC specie. This rare snail is found in forested land with plentiful downed rotting trees. It is not likely that the WWTP outfall would adversely effect the snail.

Absent

- Oregon plant bug *(Lygus oregonae)* is a List 2 ORNHIC specie. The Oregon plant bug's habitat is sand dunes. Suitable habitat for the bug is not present within 1.0 mile of the WWTP outfall.

Mammals: Threatened and Endangered Species

There are no mammals listed by USFWS as threatened or endangered, which may occur within Lincoln County. There are seven whale and three other species listed by ODFW, which may occur in Lincoln County or the territorial waters of Oregon adjacent to Lincoln County.

Present or May be Present

- Blue whale *(Balaenoptera musculus)* Listed as endangered by ODFW and NMFS. Open sea, occasionally shallow inshore waters.
- Fin whale *(Balaenoptera physalus)* Listed as endangered by ODFW and NMFS. Inshore and offshore.
- Humpback whale *(Megaptera novaeangliae)* Listed as endangered by ODFW and NMFS. Inshore and offshore.
- North Pacific Right Whale *(Eubalaena japonica)* Listed as endangered by ODFW. Inshore and offshore.
- Sei Whale *(Balaenoptera borealis)* Listed as endangered by ODFW and NMFS. Near shore.
- Sperm Whale *(Physeter macrocephalus)* Listed as endangered by ODFW and NMFS. Near shore
- Gray whale *(Eschrichtius robustus)* Listed as endangered by ODFW. Coastal waters, close to shore

All of the listed whale species migrate through the coastal waters of Oregon twice annually and may be observed within the 1.0 mile radius, some very close to shore. Whales do not stop to eat during their migration, but swim almost constantly, stopping only to rest for short periods of time. Whales are not resident in Oregon's coastal waters. Considering the whales activities while migrating, it is not likely that the WWTP outfall would have any adverse effect on whales.

Present or May be Present

- Sea otter *(Enhydra lutris)*. Listed as threatened by ODFW. The sea otter has been extinct on the Oregon coats since 1906. However, there have been periodic rare sightings of lone sea otters along the coast as recent as February 2009.

Absent

- Gray wolf *(Canis lupus)* Listed as endangerd by ODFW. Gray wolves have been re-introduced into Oregon. However, their current or future presence within the area of concern is highly doubtful due to urbanization and it is not likely that the WWTP outfall would ever adversely effect the wolf.

- Wolverine *(Gulo gulo)* is listed by ODFW as threatened. Wolverine frequent alpine habitats, avoiding areas of heavy human concentration. This residential coastal area is not habitat for wolverine.

Fish: Threatened and Endangered Species

There are no threatened or endangered species of fish on the USFWS list, which may occur in Lincoln County. There is one specie listed by NMFS.

Present

- Oregon Coast (OC) coho salmon *(Oncorhynchus kisutch)* is listed as threatened by NMFS. Also freshwater streams along the Oregon Coast are designated as critical habitat under section 305 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Under the MSA, Essential Fish Habitat (EFH) is designated if the stream is or was historically accessible to coho and Chinook salmon. Although OC coho is not listed by ODFW, Essential Salmonid Habitat (ESH) has been designated for the OC coho based on the OC coho Evolutionary Significant Unit (ESU). The mouth of the Yachats River lies approximately 1,760 feet to the south of the WWTP outfall. Considering the rocky shoreline and adjacent deep water it is not likely that the WWTP outfall would adversely effect the migration of the Oregon Coast coho salmon into the Yachats River.

Plants: Endangered and Threatened Species

There are no endangered and threatened plant species on the USFWS list, which may occur in Lincoln County. There are three plant species on the ODA list of administratively protected plants, which occur in Lincoln County.

Absent

- Pink sand verbena *(Abronia umbellata* ssp. *breviflora)* is listed as endangered on the ODA list. This verbena requires littoral beach and unstabilzed sand dunes. The required habitat is not present within 1.0 miles of the WWTP outfall.

  http://www.calflora.net/bloomingplants/pinksandverbena.html

- Point Reyes bird's-beak *(Cordylanthus maritimus* ssp. *palustris)* is listed as endangered on the ODA list and as a specie of concern by USFWS. This plant grows in salt marshes along the coast, just above tide water. The required habitat is not present within 1.0 miles of the WWTP outfall.

  http://www.centerforplantconservation.org

- Coast Range fawn lily *(Erythronium elegans)* is listed as threatened on the ODA list and as a specie of concern on the USFWS list. This fawn lily's habitat is located at higher elevations in the Coast Range and would not be present within 1.0 miles of the WWTP outfall.

  http://www.centerforplantconservation.org

Amphibians and Reptiles: Endangered and Threatened Species

There are no amphibians or reptiles on the USFWS list. ODFW lists four species of sea turtle.

Present or May be Present

- Green Sea Turtle (*Chelonia mydas)* is listed as endangered by ODFW. Green sea turtles mainly stay near the coastline and around islands and live in bays and protected shores, especially in areas with seagrass beds. Rarely are they observed in the open ocean. The required habitat is not present within 1.0 miles of the WWTP outfall.

- Leatherback Sea Turtle *(Dermochelys coriacea) is* listed as endangered by ODFW. Primarily found in the open ocean, as far north as Alaska and as far south as the southern tip of Africa, though satellite tracking research indicates that leatherbacks feed in areas just offshore in the Pacific, Atlantic, and Indian Oceans. Jellyfish are the main staple of the leatherback sea turtle diet, but it is also known to feed on sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed. Known to be active in water below 40 degrees Fahrenheit. Due to the long range migratory movements of sea turtles between nesting beaches in tropical and subtropical areas and foraging areas far to the north and south, the Leatherback sea turtle may migrate through and feed in the area of concern. However, it is not likely that the WWTP outfall would adversely effect the non-resident migrant turtle.

  http://www.fws.gov/northflorida/seaturtles/turtle%20factsheets/leatherback-sea-turtle.htm

Absent

- Loggerhead Sea Turtle *(Caretta caretta)* is listed as threatened by ODFW. The loggerhead sea turtle prefers to feed in coastal bays and estuaries, as well as in the shallow water along the continental shelves of the Atlantic, Pacific and Indian Oceans. It eats horseshoe crabs, clams, mussels, and other invertebrates. The Yachats River estuary does not provide adequate habitat for the loggerhead sea turtle.

- Pacific Ridley Sea Turtle *(Lepidochelys olivacea)* is listed as threatened by ODFW. The pacific ridley sea turtle is also known as the olive ridley and is generally found in coastal bays and estuaries in tropical and subtropical water of the Pacific, Indian and Atlantic Oceans, but can be very oceanic over some parts of its range. They typically forage off shore in surface waters or dive to depths of 500 feet (150 m) to feed on bottom dwelling crustaceans. It is not likely that the Pacific Ridley Seat Turtle would extend its range into the cold Pacific waters off of the Oregon coast.

  http://www.cccturtle.org/ccctmp.php

General Conclusion

The City of Yachats waste water treatment plant (WWTP) is centrally located within the urbanized area of the city. The outfall lies to the west of the treatment plant. The WWTP outfall is located at the outer edge of the rocky shore approximately 300 feet beyond the low coastal bluffs. The outfall is at an elevation that is exposed only during the lower tides. The outfall discharges into a north-south trending fissure between the rocky shore and a narrow outcrop with approximately the same elevation as the adjacent shore. The fissure into which the outfall discharges drains both to the north and the south during low tides and is the location of continual vigorous wave action. Human activity in the area of the outfall is generally restricted to the walking trail (Trail 804) along the bluff. Fishermen and tide poolers use the rocky shore below the bluff when the tides and the sea allow. State parks located to both the north and the south of the WWTP outfall provide parking and access to the bluff and rocky shore line between them. The Yachats State Park immediately south of the WWTP outfall is the location of a Marine Garden. The mouth of the Yachats River, which has the highest use by fisherman, is located approximately 0.5 miles to the south of the WWTP outfall. Considering the limited access to the location of the outfall and its proximity to deep turbulent water, it is not likely that the presence of the WWTP outfall would adversely effect the current or future human use of the shoreline.

There were nineteen species found on the threatened or endangered species lists which are either "present" or "may be present" within a 1.0 mile radius of the Yachats WWTP outfall. However, the review of the species determined that none of the listed species present or possibly present within the 1.0 mile radius are likely to be adversely affected by the outfall.

Document Preparation

Document prepared by Land And Water Environmental Service, Inc.:

Allen Liles, RPG
President

Loran Waldron, Biologist
Vice President

Dayl Waldron, Research Consultant

Linda Graham, Project Technician

List of Attachments

- Federally Listed, Proposed, Candidate Species and Species of Concern: US Fish and Wildlife Service and accompanying letter

-Oregon Listed Plants: Oregon Department of Agriculture

-Threatened, Endangered, and Candidate Fish and Wildlife Species in Oregon: Oregon Department of Fish and Wildlife

-Oregon T & E Invertebrates: Oregon Natural Heritage Information Center

-Endangered Species Act Status of West Coast Salmon & Steelhead: National Marine Fisheries Service and Essential Fish habitat letter

-Final Critical Habitat for the Oregon Coast Coho Salmon ESU, Alsea Subbasin: Federal Register/Vol. 73, No. 28/Monday, February 11, 2008/Rules and Regulations, 7865

-ESA - Listed Marine Mammals: National Marine Fisheries Service

-ESA - Listed Marine Turtles: National Marine Fisheries Service

-Other ESA - Listed Species: National Marine Fisheries Service

-Ms. Liz Kelly, USFWS, letter dated 12/09/2009

-Ms. Lisa Wright, NMFS, letter dated January 4, 2010

FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES AND SPECIES OF CONCERN UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE WHICH MAY OCCUR WITHIN LINCOLN COUNTY, OREGON

LISTED SPECIES

Birds

Marbled murrelet	*Brachyramphus marmoratus*	CH T
Western snowy (coastal) plover	*Charadrius alexandrinus nivosus*	CH T
Short-tailed albatross	*Phoebastria albatrus*	E
Northern spotted owl	*Strix occidentalis caurina*	CH T

Invertebrates

Insects:

Oregon silverspot butterfly	*Speyeria zerene hippolyta*	CH T

PROPOSED SPECIES

None

No Proposed Endangered Species	PE
No Proposed Threatened Species	PT

SPECIES OF CONCERN

Mammals

White-footed vole	*Arborimus albipes*
Red tree vole	*Arborimus longicaudus*
California wolverine	*Gulo gulo luteus*
Silver-haired bat	*Lasionycteris noctivagans*
Long-eared myotis bat	*Myotis evotis*
Fringed myotis bat	*Myotis thysanodes*
Long-legged myotis bat	*Myotis volans*
Yuma myotis bat	*Myotis yumanensis*

Birds

Northern goshawk	*Accipiter gentilis*
Olive-sided flycatcher	*Contopus cooperi*
Black oystercatcher	*Haematopus bachmani*
Harlequin duck	*Histrionicus histrionicus*
Lewis' woodpecker	*Melanerpes lewis*
Mountain quail	*Oreortyx pictus*
Band-tailed pigeon	*Patagioenas fasciata*
Purple martin	*Progne subis*

Reptiles and Amphibians

Coastal tailed frog	*Ascaphus truei*
Northern red-legged frog	*Rana aurora aurora*
Southern torrent (seep) salamander	*Rhyacotriton variegatus*

Fish

River lamprey	*Lampetra ayresi*

FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES AND SPECIES OF CONCERN UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE WHICH MAY OCCUR WITHIN LINCOLN COUNTY, OREGON

Pacific lamprey	*Lampetra tridentata*
Coastal cutthroat trout	*Oncorhynchus clarki ssp*

Invertebrates

Snails:

Newcomb's littorine snail	*Algamorda newcombiana*

Insects:

Goeden's lepidostoman caddisfly	*Lepidostoma goedeni*
Roth's blind ground beetle	*Pterostichus rothi*

Plants

Bog anemone	*Anemone oregana var. felix*
Pt. Reyes bird's-beak	*Cordylanthus maritimus ssp. palustris*
Coast Range fawn lily	*Erythronium elegans*
Queen-of-the-forest	*Filipendula occidentalis*
Seaside gilia	*Gilia millefoliata*
Frye's Limbella	*Limbella fryei*
San Francisco bluegrass	*Poa unilateralis*
Bristly-stemmed sidalcea	*Sidalcea hirtipes*

DELISTED SPECIES

Birds

American Peregrine falcon	*Falco peregrinus anatum*
Bald eagle	*Haliaeetus leucocephalus*
Brown pelican	*Pelecanus occidentalis*

Definitions:

Listed Species: An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future.

Proposed Species: Taxa for which the Fish and Wildlife Service or National Marine Fisheries Service has published a proposal to list as endangered or threatened in the Federal Register.

Candidate Species: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

Species of Concern: Taxa whose conservation status is of concern to the U.S. Fish and Wildlife Service (many previously known as Category 2 candidates), but for which further information is still needed. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing.

Delisted Species: A species that has been removed from the Federal list of endangered and threatened wildlife and plants.

Key:

E Endangered

FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES AND SPECIES OF CONCERN UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE WHICH MAY OCCUR WITHIN LINCOLN COUNTY, OREGON

T	Threatened
CH	Critical Habitat has been designated for this species
PE	Proposed Endangered
PT	Proposed Threatened
PCH	Critical Habitat has been proposed for this species

Notes:

Marine & Anadromous Species: Please consult the National Marine Fisheries Service (NMFS) (http://www.nmfs.noaa.gov/pr/species/) for marine and anadromous species. The National Marine Fisheries Service (NMFS) manages mostly marine and anadromous species, while the U.S. Fish and Wildlife Service manages the remainder of the listed species, mostly terrestrial and freshwater species.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish and Wildlife Office
2600 SE 98th Avenue, Suite 100
Portland, Oregon 97266
Phone: (503) 231-6179 FAX: (503) 231-6195

December 12, 2009

Subject: Lists of threatened and endangered species that may occur in selected Oregon counties

To Whom It May Concern:

This letter accompanies a species list(s) downloaded from our website (http://www.fws.gov/oregonfwo/Species/Lists/RequestList.asp), which shows threatened and endangered species that may occur within the area of your proposed project. The species list(s) fulfills the requirement of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq.*, Federal agencies are required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species or critical habitats. Recommended contents of a Biological Assessment are described in Enclosure A, as well as 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that threatened and endangered species and/or designated critical habitat may be affected by the project, the agency is required to consult with the Service following the requirements of the regulations that implement the Act (50 CFR 402).

The county species list(s) includes a list of candidate species under review for listing and those species that the Service considers "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be listed prior to the completion of your project. Species of concern are those taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

If a proposed project may affect only candidate species or species of concern, you are not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends minimizing impacts to these species to the extent possible in order to prevent potential future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, your agency may wish to request technical assistance from this office.

If your project includes communications or cell towers, you should be aware that migratory birds, another of our Trust Resources, can suffer significant mortality from collisions with towers. Further information on this issue can be obtained from the following web sites: http://migratorybirds.fws.gov (Click on "issues"), and http://www.towerkill.com. Please refer to the recently approved Service Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers (http://www.fws.gov/migratorybirds/issues/towers/comtow.html). We recommend its application to relevant projects. We also recommend the tower site evaluation form (found on the guidance webpage), which you may find useful in helping to determine the effects of your proposed project to endangered species and migratory birds.

The bald eagle (*Haliaeetus leucocephalus*) has recovered and was removed from the Federal List of Endangered and Threatened Wildlife and Plants in 2007. The bald eagle occurs in all Oregon counties, and the species continues to be protected under the Bald and Golden Eagle Protection Act. For more information on bald eagles, and for the Service's "National Bald Eagle Management Guidelines," please visit the Service's regional webpage devoted to the bald eagle (http://www.fws.gov/pacific/eagle/).

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. Please include a copy of this letter and any species lists downloaded from our website with any request for consultation or correspondence about your project that you submit to our office. If you have questions regarding your responsibilities under the Act, please contact Cat Brown at (503) 231-6179. For questions regarding listed salmon and steelhead trout, please contact NOAA Fisheries Service, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232, (503) 230-5400.

Enclosure A

ENCLOSURE A

RESPONSIBILITIES OF FEDERAL AGENCIES UNDER SECTION 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Section 7(a) of the Act requires:

1. Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;
2. Consultation with the U.S. Fish and Wildlife Service (Service) when a Federal action may affect a listed endangered or threatened species or designated critical habitat to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat. The process is initiated by the Federal agency after it has determined if its action may affect a listed species; and
3. Conference with the Service when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Preparation of a Biological Assessment

Section 7(c) of the Act requires Federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects.[1] For actions that are not construction projects, we recommend that a biological evaluation similar to a BA be prepared to evaluate the effects of the proposed project on listed and proposed species and critical habitats. The purpose of the BA or biological evaluation is to identify listed and proposed species which are likely to be affected by a proposed project. The process is initiated by a Federal agency by requesting a list of threatened and endangered species and critical habitats. The BA or biological evaluation should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the species list should be informally verified with the Service. No irreversible commitment of resources is to be made during the preparation of the BA which would foreclose reasonable and prudent alternatives to jeopardy to listed species. Planning, design, and administrative actions may be taken; however, no construction may begin.

A biological assessment or biological evaluation should include the following information:

1. Description of proposed action (project).
Describe the following and attach any relevant maps, diagrams, or designs;

- **Who** is proposing the action?
- **Where** is the action? Be as specific as possible. Include maps, county, township, range, stream, and any other pertinent information.
- **What** is the proposed action? Describe what is planned, the objectives of the action, include designs, diagrams, and best management practices applied, etc.
- **How** is the action going to be implemented? Give specific details, such as what type

[1] A construction project (or other undertaking having similar physical impacts) is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332. (2)c.

of equipment is used, how the action area will be accessed, etc.
- **When** will the action be implemented?

2. Description of listed and proposed species and critical habitat, status, distribution and habitat use by the species in the project area.

Identify which listed, proposed and candidate species and critical habitats may potentially be affected (beneficially or adversely) by the action. Describe how the species use the project area. Assistance with this information can be obtained from local offices of the Service.

3. Description of the action area.

Describe all areas affected by the proposed project. The action area refers to the area directly or indirectly affected by the proposed action; this area will usually be larger than the project footprint. Include on-site inspection or survey data, views of recognized experts (e.g., ODFW), and literature reviews.

4. Effects of the proposed action on listed and proposed species and designated or proposed critical habitat.

Describe in detail the effects of the action on the species and their habitats including direct and indirect effects, as well as effects that are interrelated and interdependent effects. Summarize your analysis of all project effects.

5. Description of measures to minimize effects to listed species, and proposed project monitoring.

Describe methods to be used to avoid, minimize and correct adverse short and long-term effects. Describe what will be monitored, who will monitor and the frequency of monitoring.

6. Determination of effect.

Clearly state your final effects determination for each listed and proposed species and designated and proposed critical habitat. Effects determinations may be:
- no effect
- may affect, not likely to adversely affect (appropriate for actions that have only beneficial, insignificant, or discountable effects)
- may affect, likely to adversely affect (appropriate for actions with effects to listed species or designated critical habitat that are not entirely insignificant, discountable or wholly beneficial)

7. Attachments.

Attachments should include all relevant information supporting the above categories such as maps, project design, drawings, specifications, pollution control plan, photos of project site and adjacent area, site survey data, and literature cited.

For more information on consultation under section 7 of the Endangered Species Act, visit the Service's national consultation website at http://www.fws.gov/endangered/consultations/index.html.

Oregon listed plants

Oregon Department of Agriculture

Overview

Currently, there are 60 plant species that are administratively protected in the State of Oregon. Of these 60 species, 30 are listed as endangered and 28 are listed as threatened. Two species, *Arabis macdonaldiana* (pdf, 399 KB) and *Howellia aquatilis*, have been federally listed, but the Oregon Administrative Rules (OAR 603-073) have not been updated to reflect the state protection that is conferred by federal listing. All federally listed plant species occurring in Oregon are administratively protected by the Oregon Department of Agriculture. In addition, Oregon has 76 candidate species.

Endangered plant species

Scientific Name	Common Names
Abronia umbellata ssp. *breviflora*	Pink sandverbena
*Arabis macdonaldiana**	Red Mountain rockcress
Artemisia campestris ssp. *borealis* var. *wormskioldii*	Northern wormwood
Astragalus applegatei	Applegate's milkvetch
Astragalus mulfordiae	Mulford's milkvetch
Calochortus coxii	Crinite mariposa lily
Calochortus indecorus	Sexton Mountain mariposa lily
Calochortus umpquaensis	Umpqua mariposa lily
Castilleja levisecta	Golden paintbrush
Cordylanthus maritimus ssp. *palustris*	Point Reyes bird's-beak

Delphinium leucophaeum	White rock larkspur
Delphinium pavonaceum	Peacock larkspur
Erigeron decumbens	Willamette daisy
Fritillaria gentneri	Gentner's fritillary
Haplopappus radiatus	Snake River goldenweed
Ivesia rhypara var. *rhypara*	Grimy ivesia
Lilium occidentale	Western lily
Limnanthes floccosa ssp. *grandiflora*	Big-flowered wooly meadowfoam
Lomatium bradshawii	Bradshaw's desert parsley
Lomatium cookii	Cook's desert parsley
Lomatium erythrocarpum	Red-fruited lomatium
Lupinus cusickii	Cusick's lupine
Mentzelia mollis	Smooth mentzelia
Mirabilis macfarlanei	Macfarlane's four o'clock
Plagiobothrys hirtus	Rough popcornflower, rough allocarya
Plagiobothrys lamprocarpus	Shiny-fruited allocarya
Ranunculus reconditus	Dalles Mountain buttercup
Silene spaldingii	Spalding's campion
Stephanomeria malheurensis	Malheur wire-lettuce
Thelypodium howellii ssp. *spectabilis*	Howell's spectacular thelypody
Trifolium owyheense	Owyhee clover

* Species has been listed federally, but the Oregon Administrative Rules (OAR 603-073) have not yet been updated. All federally listed plant species occurring in Oregon are administratively protected by the State of Oregon.

Threatened plant species

Scientific Name	Common Name
Amsinckia carinata	Malheur Valley fiddleneck
Aster curtus	White-topped aster
Aster vialis	Wayside aster
Astragalus collinus var. *laurentii*	Laurent's milkvetch
Astragalus diaphanus var. *diurnus*	South Fork John Day milkvetch
Astragalus peckii	Peck's milkvetch
Astragalus sterilis	Sterile milkvetch
Astragalus tyghensis	Tygh Valley milkvetch
Botrychium pumicola	Pumice grape-fern
Calochortus howellii	Howell's mariposa lily
Eriogonum chrysops	Golden buckwheat
Eriogonum crosbyae	Crosby's buckwheat
Erythronium elegans	Coast Range fawn lily
Gratiola heterosepala	Boggs Lake hedge hyssop
Hackelia cronquistii	Cronquist's stickseed
Hastingsia bracteosa	Large-flowered rush lily
*Howellia aquatilis**	Howellia
Lepidium davisii	Davis' peppergrass
Limnanthes floccosa ssp. *pumila*	Dwarf meadowfoam
Lomatium greenmanii	Greenman's desert parsley
Lupinus sulphureus ssp. *kincaidii*	Kincaid's lupine
Mentzelia packardiae	Packard's mentzelia
Microseris howellii	Howell's microseris
Oenothera wolfii	Wolf's evening-primrose

Phacelia argentea	Silvery phacelia
Pleuropogon oregonus	Oregon semaphore grass
Sidalcea nelsoniana	Nelson's checkermallow
Silene douglasii var. *oraria*	Cascade Head catchfly
Thelypodium eucosmum	Arrow-leaf thelypody

* Species has been listed federally, but the Oregon Administrative Rules (OAR 603-073) have not yet been updated. All federally listed plant species occurring in Oregon are administratively protected by the State of Oregon.

Candidate plant species

Scientific Name	Common Name
Achnatherum hendersonii	Henderson ricegrass
Agrostis howellii	Howell's bentgrass
Arabis koehleri var. *koehleri*	Koehler's rockcress, shrubby rockcress
Arabis suffrutescens var. *horizontalis*	Crater Lake rockcress
Asarum wagneri	Green-flowered wild ginger
Astragalus tegetarioides	Deschutes milkvetch, bastard kentrophyta
Bensoniella oregana	Bensoniella
Bolandra oregana	Oregon bolandra
Botrychium ascendens	Upswept moonwort, upward-lobed moonwort
Botrychium crenulatum	Dainty moonwort, crenulate grape-fern
Botrychium paradoxum	Paradox moonwort, twin-spike moonwort
Botrychium pedunculosum	Stalked moonwort
Calochortus greenei	Greene's mariposa lily
Calochortus longebarbatus var. *peckii*	Peck's mariposa lily

Calochortus persistens	Siskiyou mariposa lily
Camassia howellii	Howell's camassia
Camissonia pygmaea	Pygmy evening primrose, dwarf evening primrose
Cardamine nuttallii var. *gemmata*	Purple dentaria, purple toothwort
Cardamine pattersonii	Saddle Mountain bittercress
Carex constanceana	Constance's sedge
Caulanthus major var. *nevadensis*	Nevada wild cabbage, slender wild cabbage
Cimicifuga elata	Tall bugbane
Collomia renacta	Barren Valley collomia
Corydalis aquae-gelidae	Clackamas corydalis, cold water corydalis
Cypripedium fasciculatum	Clustered lady slipper
Delphinium oreganum	Willamette Valley larkspur
Draba howellii	Howell's whitlow grass
Epilobium oreganum	Oregon willowherb
Epilobium siskiyouense	Siskiyou willowherb
Erigeron howellii	Howell's daisy, Howell's fleabane
Erigeron oreganus	Oregon daisy, Oregon fleabane
Eriogonum cusickii	Cusick's buckwheat, Cusick's eriogonum
Eriogonum prociduum	Prostrate buckwheat
Filipendula occidentalis	Queen of the forest
Frasera umpquaensis	Umpqua frasera, Umpqua swertia
Gentiana setigera	Elegant gentian, Waldo gentian
Hackelia diffusa var. *diffusa*	Diffuse stickseed
Horkelia congesta ssp. *congesta*	Shaggy horkelia
Lasthenia macrantha ssp. *prisca*	Large flowered goldfields, perennial lasthenia

Leptodactylon pungens ssp. *hazeliae*	Snake River prickly phlox, Hazel's prickly phlox
Limbella fryei	Frye's limbella moss
Limnanthes floccosa ssp. *bellingeriana*	Bellinger's meadowfoam
Limnanthes gracilis var. *gracilis*	Slender meadowfoam
Lomatium suksdorfii	Suksdorf's lomatium
*Luina serpentina**	Colonial luina
Lupinus lepidus var. *ashlandensis*	Ashland lupine, Mount Ashland lupine
Meconella oregana	White meconella
Mimulus evanescens	Disappearing monkeyflower
Mimulus hymenophyllus	Thinsepal monkeyflower, membrane-leaved monkeyflower
Mimulus jungermannioides	Jungermann's monkeyflower, hepatic monkeyflower
*Mimulus patulus**	Stalk leaved monkeyflower
Montia howellii	Howell's montia
Myosurus sessilis	Sessile mousetail
Penstamon barrettiae	Barrett's penstemon
Perideridia erythrorhiza	Red root yampah
Phacelia minutissima	Least phacelia
Plagiobothrys figuratus ssp. *corallicarpus*	Coral seeded allocarya
Ranunculus austrooreganus	Southern Oregon buttercup
Rorippa columbiae	Columbia cress
Rubus bartonianus	Bartonberry
Saxifraga hitchcockiana	Saddle Mountain saxifrage
Sedum moranii	Rogue River stonecrop
Sedum oblanceolatum	Applegate stonecrop
*Senecio ertterae**	Ertter's senecio

Senecio hesperius	Western senecio
Sidalcea campestris	Meadow sidalcea, meadow checkermallow
Sidalcea hirtipes	Hairy stemmed checkermallow, bristly-stemmed sidalcea
Sidalcea malviflora ssp. *patula*	Mallow sidalcea, coast checker bloom
Sisyrinchium sarmentosum	Pale blue eyed grass
Sophora leachiana	Western sophora, western necklace
Streptanthus howellii	Howell's streptanthus
Sullivantia oregana	Oregon sullivantia, sullivantia
Tauschia howellii	Howell's tauschia
Trifolium leibergii	Leiberg's clover
Triteleia hendersonii var. *leachiae*	Leach's brodiaea, blue-striped brodiaea
Viola primulifolia ssp. *occidentalis*	Western bog violet

* Species was previously listed as threatened or endangered by the Oregon Department of Agriculture, but has since been delisted.

Threatened and endangered plant definitions

Endangered species

(a) Any native plant species determined by the director to be in danger of extinction throughout all or any significant portion of its range; or

(b) Any plant species listed as an endangered species pursuant to the federal Endangered Species Act of 1973 (PL 93-205, 16 USC § 1531), as amended.

Threatened species

(a) Any native plant species the director determines is likely to become endangered within the foreseeable future throughout all or any significant portion of its range; or

(b) Any plant species listed as a threatened species pursuant to the federal Endangered Species Act of 1973 (PL 93-205, 16 U.S.C. § 1531), as amended.

Candiate species

Any plant species designated for study by the director (of the Oregon Department of Agriculture) whose numbers are believed low or declining, or whose habitat is sufficiently threatened and declining in quantity and quality, so as to potentially qualify for listing as a threatened or endangered species in the foreseeable future.

Delisted species

Any plant species, previously listed as threatened or endangered by the Oregon Department of Agriculture, which has been removed from list. All delisted species are placed on the candidate species list.

Threatened, Endangered, and Candidate Fish and Wildlife Species in Oregon

The State of Oregon and the federal government maintain separate lists of threatened and endangered (T&E) species. These are species whose status is such that they are at some degree of risk of becoming extinct.

Under State law (ORS 496.171-496.192) the Fish and Wildlife Commission through ODFW maintains the list of native wildlife species in Oregon that have been determined to be either "threatened" or "endangered" according to criteria set forth by rule (OAR 635-100-0105).

Plant listings are handled through the Oregon Department of Agriculture.
Most invertebrate listings are handled through the Oregon Natural Heritage Program.
Under federal law the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration share responsibility for implementing the federal Endangered Species Act of 1973 (Public Law 93-205, 16 U.S.C. § 1531), as amended. In general, USFWS has oversight for land and freshwater species and NOAA for marine and anadromous species. In addition to information about species already listed, the USFWS-Oregon Field Office maintains a list of Species of Concern.

Additional information about the federal programs in place in Oregon can be found at the following websites:

- U.S. Fish and Wildlife-Oregon (http://www.fws.gov/oregonfwo)
- Northwest Region of NOAA-Fisheries (http://www.nwr.nmfs.noaa.gov)

Threatened, Endangered, and Candidate Fish and Wildlife Species in Oregon
(T=threatened, E=endangered, C=candidate, DPS=Distinct Population Segment)

Common Name	Scientific Name	State status	Federal status
FISH			
Borax Lake Chub	*Gila boraxobius*	E	E
Lost River Sucker	*Deltistes luxatus*	E	E
Shortnose Sucker	*Chasmistes brevirostris*	E	E
Lower Columbia River Coho Salmon	*Oncorhynchus kisutch*	E	T
Modoc sucker	*Catostomus microps*		E
Oregon Chub	*Oregonichthys crameri*		E
Snake River Sockeye Salmon	*Oncorhynchus nerka*		E
Upper Columbia River Spring Chinook Salmon	*Oncorhynchus tshawytscha*		E
Upper Columbia River Steelhead	*Oncorhynchus mykiss*		E
Foskett Speckled Dace	*Rhinichthys osculus* ssp	T	T
Hutton Spring Tui Chub	*Gila bicolor* ssp.	T	T
Lahontan Cutthroat Trout	*Oncorhynchus clarki henshawi*	T	T
Snake River Chinook Salmon (Fall)	*Oncorhynchus tshawytscha*	T	T
Snake River Chinook Salmon (Spring/Summer)	*Oncorhynchus tshawytscha*	T	T
Warner Sucker	*Catostomus warnerensis*	T	T
Green sturgeon (Southern DPS)	*Acipenser medirostris*		T
Columbia River Chum Salmon	*Oncorhynchus keta*		T
Oregon Coast Coho Salmon	*Oncorhynchus kisutch*		T
Southern Oregon Coho Salmon	*Oncorhynchus kisutch*		T
Lower Columbia River Steelhead	*Oncorhynchus mykiss*		T
Middle Columbia River Steelhead	*Oncorhynchus mykiss*		T
Snake River Steelhead	*Oncorhynchus mykiss*		T
Upper Willamette River Steelhead	*Oncorhynchus mykiss*		T
Lower Columbia River Chinook Salmon	*Oncorhynchus tshawytscha*		T
Upper Willamette River Chinook Salmon	*Oncorhynchus tshawytscha*		T
Bull Trout (Range-wide)	*Salvelinus confluentus*		T
AMPHIBIANS AND REPTILES			
Green Sea Turtle	*Chelonia mydas*	E	E

Common Name	Scientific Name	State status	Federal status
Amphibians and Reptiles (cont'd)			
Leatherback Sea Turtle	*Dermochelys coriacea*	E	E
Loggerhead Sea Turtle	*Caretta caretta*	T	T
Pacific Ridley Sea Turtle	*Lepidochelys olivacea*	T	T
Columbia spotted frog	*Rana luteiventris*		C
Oregon spotted frog	*Rana pretiosa*		C
BIRDS			
Short-tailed Albatross	*Diomedea albatrus*	E	E
Brown Pelican	*Pelecanus occidentalis*	E	E
California Least Tern	*Sterna antillarum browni*	E	E
Marbled Murrelet	*Brachyramphus marmoratus*	T	T
Northern Spotted Owl	*Strix occidentalis caurina*	T	T
Western Snowy Plover	*Charadrius alexandrinus nivosus*	T	T (Coastal population only)
Bald Eagle	*Haliaeetus leucocephalus*	T	
Yellow-billed cuckoo	*Coccyzus americanus*		C
Streaked horned lark	*Eremophila alpestris strigata*		C
MAMMALS			
Blue Whale	*Balaenoptera musculus*	E	E
Fin Whale	*Balaenoptera physalus*	E	E
Gray Wolf	*Canis lupus*	E	E
Humpback Whale	*Megaptera novaeangliae*	E	E
North Pacific Right Whale	*Eubalaena japonica*	E	E
Sei Whale	*Balaenoptera borealis*	E	E
Sperm Whale	*Physeter macrocephalus*	E	E
Sea Otter	*Enhydra lutris*	T	T
Columbian White-tailed Deer (Lower Columbia River population only)	*Odocoileus virginianus leucurus*		E
Gray Whale	*Eschrichtius robustus*	E	
Washington Ground Squirrel	*Spermophilus washingtoni*	E	C
Kit Fox	*Vulpes macrotis*	T	
Wolverine	*Gulo gulo*	T	
Northern (Steller) Sea Lion	*Eumetopias jubatus*		T
Fisher	*Martes pennanti*		C

Oregon T&E Invertebrates
ORNHIC 2007 Data

http://oregonstate.edu/ornhic/data/inverts2007.xls

Scientific Name	Common Name	Heritage Global Rank	Heritage State Rank	Heritage list	Oregon County Distribution
Acalypta cooleyi	Cooley's lace bug	G2	S2	3	Harn, Jack
Acalypta lillianus	Lillian's lace bug	G3	S1	3	Lane
Acetropis americana	American grass bug	G1	S1	1	Bent, Yamh
Acupalpus punctulatus	Marsh ground beetle	G2?	S2?	3	Bent, Wash
Agapetus denningi	Denning's agapetus caddisfly	GH	SH	3	Jack
Agonum belleri	Beller's ground beetle	G3	S1?	2	Clac, Wasc
Algamorda newcombiana	Newcomb's littorine snail	G1G2	S1	1	Coos, Linc
Allomyia scotti	Scott's apatanian caddisfly	G1	S1	1	Clac
Amerigoniscus malheurensis	Malheur isopod	G1	S1	1	Harn
Anodonta californiensis	California floater (mussel)	G3Q	S1	2	Clat, Colu, Coos?, Desc, Gran, Harn, Klam, Linn, Malh, Mult, Sher, Wasc, Wash
Anodonta oregonensis	Oregon floater (mussel)	G5Q	S3	4	Bent, Clac, Clat, Colu, Coos, Doug, Harn, Klam, Lane, Linc, Mari, Mult, Polk, Sher, Wasc, Wash
Anodonta wahlametensis	Willamette floater (mussel)	G2Q	S1	1	Clat, Colu, Harn, Mult, Wasc?
Apatania tavala	Cascades apatanian caddisfly	G3	S3	4	Clac, Croo, Doug, Jeff, Klam, Linn
Apochthonius malheuri	Malheur pseudoscorpion	G1G2	S1	1	Harn
Atrazonotus umbrosus	Umbrose seed bug	G3	S2	3	
Bembidion tigrinum	Cryptic beach carabid beetle	G5	S4	3	Clat, Coos, Till
Boloria bellona	Meadow fritillary (butterfly)	G5	S1	2	Umat
Boloria selene	Silver-bordered fritillary	G5	S2	2	Bake, Croo, Gran
Bombus franklini	Franklin's bumblebee	GNR	S3?	3	Doug, Jack
Boreostolus americanus	American unique-headed bug	G2	S2?	3	Jack, Lane, Linn
Branchinecta lynchi	Vernal pool fairy shrimp	G3	S2S3	1	Jack
Callophrys johnsoni	Johnson's hairstreak (butterfly)	G3G4	S2?	1	Bake, Coos, Curr, Doug, Hood, Jack, Jeff, Jose, Klam, Lake, Lane, Linn, Mari, Polk, Wall, Wasc
Callophrys polios maritima	Hoary elfin (butterfly)	G5T2T3	S1?	1	Curr, Linc
Cardiastethus borealis	Boreal minute pirate bug	G4	S2	3	
Chloealtis aspasma	Siskiyou short-horned grasshopper	G1	S1	1	Bent, Jack
Cicindela columbica	Columbia River tiger beetle	G2	SH	1-ex	Gill, Hood, Sher, Umat, Wasc
Cicindela hirticollis siuslawensis	Siuslaw sand tiger beetle	G5T1T2	S1S2	4	Coos, Lane, Linc, Till
Colligyrus depressus	Harney Basin duskysnail	G1	S1	1	Harn
Colligyrus sp. 3	Blue Mountains duskysnail	G1	S1	1	Bake, Gran
Colligyrus sp. 4	Columbia duskysnail	G2	S2	1	Clac, Hood, Mult, Wasc
Colligyrus sp. 5	Klamath duskysnail	G1	S1	1	Klam
Colligyrus sp. 7	Mare's egg duskysnail	G1	S1	1	Klam
Colligyrus sp. 8	Nodose duskysnail	G1	S1	1	Klam
Criocoris saliens	Salien plant bug	G4	S2	3	
Cryptomastix devia	Puget oregonian (snail)	G3	S1	1	Hood, Mult, Wasc
Cryptomastix hendersoni	Columbia Gorge oregonian (snail)	G1G2	S1S2	1	Hood, Sher, Wasc
Cryptomastix populi	Poplar oregonian (snail)	G2	S1	1	Wall
Cryptomastix sp. 3	Disc oregonian (snail)	G2	S1	1	Wall
Dendrocoris arizonensis	Arizona stink bug	G4	S2	3	Bent, Jack
Derephysia foliacea	Foliaceous lace bug	G2	S1	3	Bent, Lane
Deroceras hesperium	Evening fieldslug	G2	S1	1	Clac, Clat, Colu, Jack, Klam
Driloleirus macelfreshi	Oregon giant earthworm	G1	S1	1	Linc, Linn, Mari, Polk, Yamh
Eobrachycentrus gelidae	Mt. Hood brachycentrid caddisfly	G3	S3	4	Clac, Doug, Hood, Linn, Mult

Euphydryas editha taylori	Taylor's checkerspot (butterfly)	G5T1	S1	1	Bent, Lane, Polk
Eusattus rectus	Sandbar darkling beetle	GNR	SH	3	Clat, Wasc?
Farula constricta	A caddisfly	G1?	S1?	1	Mult
Farula davisi	Green Springs Mountain farulan caddisfly	GH	SH	3	Jack
Farula jewetti	Mt. Hood farulan caddisfly	G3	S3	4	Clac, Hood, Mult
Farula reapiri	Tombstone Prairie farulan caddisfly	G3	S3	4	Doug, Lane, Linn
Fisherola nuttalli	Shortface lanx (=Giant Columbia River limpet)	G2	S1S2	1	Jeff, Mult, Sher, Wall, Wasc
Fluminicola fuscus	Columbia pebblesnail or spire snail	G?	S1	1	Mult, Wall, Wasc
Fluminicola insolitus	Donner und Blitzen pebblesnail	G1	S1	1	Harn
Fluminicola modoci	Modoc pebblesnail	G1	S1	1	Lake
Fluminicola sp. 10	Metolius pebblesnail	G1	S1	1	Jeff
Fluminicola sp. 11	Nerite pebblesnail	G1	S1	1	Jack
Fluminicola sp. 12	Odessa pebblesnail	G1	S1	1	Klam
Fluminicola sp. 13	Ouxy Spring pebblesnail	G1	S1	1	Klam
Fluminicola sp. 14	Tall pebblesnail	G1	S1	1	Klam
Fluminicola sp. 15	Tiger lily pebblesnail	G1	S1	1	Klam
Fluminicola sp. 16	Toothed pebblesnail	G1	S1	1	Jack
Fluminicola sp. 17	Tuscan pebblesnail	G1	S1	1	Wasc
Fluminicola sp. 18	Wood River pebblesnail	G1	S1	1	Klam
Fluminicola sp. 19	Keene Creek pebblesnail	G1	S1	1	Jack, Klam
Fluminicola sp. 2	Casebeer pebblesnail	G1	S1	1	Klam
Fluminicola sp. 20	Crooked Creek pebblesnail	G2	S2	1	Klam
Fluminicola sp. 21	Pinhead pebblesnail	G1	S1	1	Clac
Fluminicola sp. 3	Diminutive pebblesnail	G1	S1	1	Jack
Fluminicola sp. 4	Fall Creek pebblesnail	G1	S1	1	Jack
Fluminicola sp. 5	Klamath pebblesnail	G2	S1S2	1	Klam, Lake
Fluminicola sp. 6	Klamath Rim pebblesnail	G1	S1	1	Klam
Fluminicola sp. 7	Lake of the Woods pebblesnail	G1G2	S1S2	1	Klam
Fluminicola sp. 8	Lost River pebblesnail	G1	S1	1	Klam
Fluminicola sp. 9	Malheur pebblesnail	G1	S1	1	Harn, Malh
Fluminicola turbiniformis	Turban pebblesnail	G3	S1	1	Harn, Lake
Gliabates oregonius	Salamander slug	G1	S1	1	Clac, Hood, Lane, Linn
Goeracea oregona	Sagehen Creek goeracean caddisfly	G3	SNR	3	Doug, Jack
Gomphus lynnae	Columbia clubtail (dragonfly)	G2	S1?	3	Gill, Gran, Malh, Whee
Gonidea angulata	Western ridged mussel	G3	S2	2	Clac, Colu, Desc, Harn, Klam, Linn, Malh, Mari, Mult, Wasc, Wash
Hebrus buenoi	Bueno's velvet water bug	G4	S2	3	Harn, Lane
Helisoma newberryi newberryi	Great Basin ramshorn (snail)	G1T1	S1	1	Klam, Lake
Helminthoglypta hertleini	Oregon shoulderband (snail)	G1	S1	1	Doug, Jack, Jose
Hemphillia glandulosa	Warty jumping-slug	G3G4	S2	2	Bent, Linc, Till, Yamh
Hemphillia malonei	Malone jumping-slug	G3	S3	4	Bent, Clac, Hood, Mari, Mult
Hesperarion mariae	Tillamook westernslug	G2	S2	1	Doug, Lane, Till
Hesperocimex coloradensis	Colorado bed bug	G4	S2	3	Gran, Klam
Hochbergellus hirsutus	Sisters hesperian (snail)	G1	S1	1	Curr
Homoplectra schuhi	Schuh's homoplectran caddisfly	G3Q	S3	3	Jack, Klam
Hoplistoscelis heidemanni	Heidemann's damsel bug	G4	S2	3	Bent, Curr
Hydrometra martini	Martin's water-measurer	G5	S2	3	Bent
Juga acutifilosa	Scalloped juga (snail)	G2	S1	1	Jack

Juga bulbosa	Bulb juga (snail)	G1	S1	1	Jeff, Sher, Wasc
Juga hemphilli dallesensis	Dalles juga (snail)	G2T1	S1	1	Hood, Wasc
Juga hemphilli hemphilli	Barren juga (snail)	G2T1	S1	1	Mult, Wasc
Juga hemphilli maupinensis	Purple-lipped juga (snail)	G2T1	S1	1	Jeff, Sher, Wasc
Juga hemphilli ssp. 1	Indian Ford juga (snail)	G2T1	S1	1	Desc
Juga sp. 1	Basalt juga (snail)	G1	S1	1	Hood, Wasc
Juga sp. 2	Blue Mountains juga (snail)	G1	S1	1	Gran
Juga sp. 3	Brown juga (snail)	G1	S1	1	Hood, Mult
Juga sp. 4	Opal Springs (Crooked River) juga (snail)	G1	S1	1	Jeff, Wasc
Juga sp. 6	Purple juga (snail)	G1	S1	1	Wasc
Juga sp. 7	Three-band juga (snail)	G1	S1	1	Gill, Hood, Sher, Wasc
Kenkia rhynchida	A flatworm (planarian)	G1G2	S1S2	1	Harn
Lanx alta	Highcap lanx (snail)	G2	S1	1	Curr, Jack, Jose, Klam
Lanx klamathensis	Scale lanx (snail)	G1	S1	1	Klam
Lanx subrotunda	Rotund lanx (snail)	G2	S2	1	Doug
Lepania cascada	A caddisfly	G3	S3	3	Bent, Hood, Linc
Lygus oregonae	Oregon plant bug	G2	S2	1	Linc, Till
Macrotylus essigi	Essig's plant bug	G3	S2	3	Lane
Malezonotus obrieni	Obrien's seed bug	G3	S2	3	Lane
Margaritifera falcata	Western pearlshell	G4	S3	4	Bent, Clac, Clat, Coos, Croo, Desc, Doug, Harn, Klam, Lane, Linc, Linn, Mari, Polk, Sher, Wasc, Wash, Whee
Megomphix hemphilli	Oregon megomphix (snail)	G3	S3	4	Bent, Clat, Colu, Coos, Doug, Lane, Linn, Mari, Mult, Till, Wash, Yamh
Megomphix lutarius	Umatilla megomphix (snail)	G1	SH	3	Umat, Wall?
Mesovelia mulsanti	Mulsant's water treader	G4	S2	3	Bent, Harn, Linn, Till, Yamh
Micracanthia fennica	Harney Hot Spring shore bug	G5	S1?	2	Harn
Micracanthia schuhi	Schuh's shore bug	G3	S2	3	Clac
Monadenia chaceana	Chace sideband (snail)	G2	S1S2	1	Doug, Jack, Jose
Monadenia fidelis beryllica	Green sideband (snail)	G4G5T1T2	S1S2	1	Coos, Curr
Monadenia fidelis celeuthia	Traveling sideband (snail)	G4G5T1	S1	1	Jack
Monadenia fidelis columbiana	Columbia sideband (snail)	G4G5T1	S1	1	Hood
Monadenia fidelis minor	Oregon snail (Dalles sideband)	G4G5T2	S1	1	Sher, Wasc
Monadenia fidelis ssp. 1	Deschutes sideband (snail)	G4G5T1	S1	1	Sher, Wasc
Monadenia fidelis ssp. 11	Modoc Rim sideband	G4G5T1	S1	1	Klam
Moselyana comosa	A caddisfly	G3	S3	3	Bent, Clac, Doug, Hood, Jack, Klam, Lane
Nabicula propinqua	Marsh damsel bug	G5	S2	3	Coos, Till
Nabicula subcoleoptrata	Black damsel bug	G5	S2	3	Wall
Namamyia plutonis	A caddisfly	G3	S3	2	Bent, Curr, Jack, Jose, Lane, Mari
Nebria gebleri fragariae	Strawberry Mountains gazelle beetle	G4G5T3?	S3?	4	Gran
Nebria gebleri siskiyouensis	Siskiyou gazelle beetle	G4G5T4	S4	3	Curr, Jack, Jose
Nebria piperi	Piper's gazelle beetle	G5	S3?	3	Lane
Neothremma andersoni	Columbia Gorge caddisfly	G1	S1	1	Mult
Ochlodes yuma	Yuma skipper (butterfly)	G5	S1?	2	Lake, Wall
Ogaridiscus subrupicola	Southern tightcoil (snail)	G1	S1	1	Umat, Wall
Oligophlebodes mostbento	Tombstone Prairie caddisfly	G3	S3	3	Lane, Linn
Oncopodura mala	Malheur Cave springtail	G2G3	S1	1	Harn

Orectoderus schuhi	Schuh's plant bug	G3	S2	3	Klam
Oreohelix sp. 29	Hells Canyon mountainsnail	G2	S1?	1	Wall
Oreohelix strigosa delicata	Blue mountainsnail	G5T1	S1	1	Umat
Oreohelix variabilis	Dalles mountainsnail	G2Q	S1	1	Sher, Wasc
Oreohelix variabilis ssp. 1	Deschutes mountainsnail	G2T1	S1	1	Sher, Wasc
Ostrea conchaphila	Native oyster	G5	SNR	3	Linc, Till
Petrophysa sp. 1	Hotspring physa (snail)	G1	S1	1	Malh
Philotiella leona	Leona's little blue (butterfly)	G1G2	S1S2	3	Klam
Physa megalochlamys	Large-mantle physa (snail)	G3	S1	2	Harn
Physella columbiana	Rotund physa (snail)	G2	SH	1	Clat, Colu, Hood, Mult, Wasc
Pinalitus solivagus	True fir plant bug	G5	S2	3	Bent, Hood, Jose, Lane
Pisidium sp. 1	Modoc peaclam	G1	S1	1	Klam
Pisidium ultramontanum	Montane peaclam	G1	S1	1	Klam
Planorbella oregonensis	Borax Lake ramshorn (snail)	G1	S1	1	Harn
Platylygus pseudotsugae	Douglas-fir plant bug	G5	S2	3	Bent, Lane
Plebejus icarioides fenderi	Fender's blue (butterfly)	G5T1	S1	1	Bent, Lane, Polk, Yamh
Plebejus podarce	Gray blue (butterfly)	G3G4	S2	2	Doug, Jack, Klam
Plebejus saepiolus littoralis	Insular blue (butterfly)	G5T1T3	S1	1	Curr, Lane
Polites mardon	Mardon skipper (butterfly)	G2G3	S2	1	Curr, Jack, Klam
Polygyrella polygyrella	Humped coin (snail)	G3	SH	3	Umat
Pomatiopsis binneyi	Robust walker	G1	S1	1	Curr, Jose
Pomatiopsis californica	Pacific walker	G1	S1	1	Coos, Lane
Pomatiopsis chacei	Marsh walker	G1	S1?	1	Curr
Pristiloma arcticum crateris	Crater Lake tightcoil (snail)	G3G4T3	S1	1	Desc, Doug, Jeff, Klam
Pristiloma johnsoni	Broadwhorl tightcoil (snail)	G2G3	S2?	2	Doug?, Lane, Till
Pristiloma pilsbryi	Crowned tightcoil (snail)	G1	S1	1	Linc, Mult
Pristiloma wascoense	Shiny tightcoil (snail)	G3	SH	3	Wall, Wasc
Pristinicola hemphilli	Pristine springsnail	G3	S2	3	Bake, Clac, Gran, Hood, Jeff, Lane, Mult, Sher, Unio, Wall, Wasc
Pronotocrepis clavicornis	Thick-antennaed plant bug	G2	S2	3	Lake
Prophysaon sp. 1	Klamath tail-dropper	G2	S1S2	1	Doug, Jack, Jose, Klam
Prophysaon vanattae pop. 1	Spotted tail-dropper	G4T2	S2	1	Clac, Coos, Lane, Till
Pterostichus johnsoni	Johnson's waterfall carabid beetle	GNR	S2?	2	Doug?, Lane, Till
Pterostichus rothi	Roth's blind ground beetle	G1	S1	1	Bent, Linc
Pyrgulopsis archimedis	Archimedis springsnail	G1	S1	1	Klam
Pyrgulopsis intermedia	Crooked Creek springsnail	G1	S1	1	Malh
Pyrgulopsis robusta	Jackson Lake springsnail	G4	S1	2	Harn, Lake, Sher, Umat, Wasc
Pyrgulopsis sp. 10	Lake Abert springsnail	G1	S1	1	Lake
Pyrgulopsis sp. 11	Malheur springsnail	G1	S1	1	Malh
Pyrgulopsis sp. 12	Owyhee hot springsnail	G1	S1	1	Malh
Pyrgulopsis sp. 7	Lost River springsnail	G1	S1	1	Klam
Pyrgulopsis sp. 9	Klamath Lake springsnail	G1	S1	1	Klam
Radiodiscus abietum	Fir pinwheel (snail)	G4	S1	2	Unio, Wall
Rhyacophila chandleri	A caddisfly	G3	S3	2	Desc, Doug, Lane
Rhyacophila colonus	O'Brien rhyacophilan caddisfly	GH	SH	3	Jose
Rhyacophila haddocki	Haddock's rhyacophilan caddisfly	G1	S1	1	Bent, Curr
Rhyacophila leechi	A caddisfly	G3	S3	2	Jack, Lane
Rhyacophila unipunctata	One-spot rhyacophilan caddisfly	G3	S3	3	Hood, Lane
Saldula villosa	Hairy shore bug	G3	S1	2	Coos

Sixeonotus sp. 1	A plant bug	G2	S1	2	Desc
Speyeria callippe ssp. 1	Willamette callippe fritillary (butterfly)	G5TH	SX	1-ex	Bent
Speyeria coronis coronis	Coronis fritillary (butterfly)	G5T3T4	S1	2	Jack, Jose
Speyeria zerene bremnerii	Valley silverspot (butterfly)	G5T3T4	SH	2-ex	Bent, Polk
Speyeria zerene hippolyta	Oregon silverspot (butterfly)	G5T1	S1	1	Clat, Lane, Linc, Till, Yamh
Stygobromus hubbsi	Malheur Cave amphipod	G1G2	S1	1	Harn
Stygobromus oregonensis	Oregon Cave amphipod	G1G2	S1	1	Doug
Taylorconcha insperata	A freshwater snail	G1	S1	1	Malh, Wall
Teratocoris paludum	Pale plant bug	G4	S1	2	Coos
Vanduzeeina borealis californica	California shield-backed bug	G3T3	S1	2	Hood, Lane
Vespericola sierranus	Siskiyou hesperian (snail)	G2	S1	1	Jack, Jose
Vespericola sp. 1	Oak Springs hesperian (snail)	G1	S1	1	Sher, Wasc
Vespericola sp. 2	Bald hesperian (snail)	G1	S1	1	Lane
Vorticifex effusa dalli	Dall's ramshorn (snail)	G3T1	S1	1	Klam
Vorticifex effusa diagonalis	Lined ramshorn (snail)	G3T1	S1	1	Klam
Vorticifex klamathensis klamathensis	Klamath ramshorn (snail)	G1T1Q	S1	1	Klam
Vorticifex klamathensis sinitsini	Sinitsin ramshorn (snail)	G1T1Q	S1	1	Klam
Vorticifex neritoides	Nerite ramshorn (snail)	G1Q	SH	1	Clat, Colu, Hood, Mult
Zapada wahkeena	Wahkeena Falls flightless stonefly	G2	S2	1	Mult

Endangered Species Act Status of West Coast Salmon & Steelhead

Species[1]			Current Endangered Species Act Listing Status[2]	ESA Listing Actions Under Review
Sockeye Salmon (*Oncorhynchus nerka*)	1	Snake River	Endangered	
	2	Ozette Lake	Threatened	
	3	Baker River	Not Warranted	
	4	Okanogan River	Not Warranted	
	5	Lake Wenatchee	Not Warranted	
	6	Quinalt Lake	Not Warranted	
	7	Lake Pleasant	Not Warranted	
Chinook Salmon (*O. tshawytscha*)	8	Sacramento River Winter-run	Endangered	
	9	Upper Columbia River Spring-run	Endangered	
	10	Snake River Spring/Summer-run	Threatened	
	11	Snake River Fall-run	Threatened	
	12	Puget Sound	Threatened	
	13	Lower Columbia River	Threatened	
	14	Upper Willamette River	Threatened	
	15	Central Valley Spring-run	Threatened	
	16	California Coastal	Threatened	
	17	Central Valley Fall and Late Fall-run	Species of Concern	
	18	Upper Klamath-Trinity Rivers	Not Warranted	
	19	Oregon Coast	Not Warranted	
	20	Washington Coast	Not Warranted	
	21	Middle Columbia River spring-run	Not Warranted	
	22	Upper Columbia River summer/fall-run	Not Warranted	
	23	Southern Oregon and Northern California Coast	Not Warranted	
	24	Deschutes River summer/fall-run	Not Warranted	
Coho Salmon (*O. kisutch*)	25	Central California Coast	Endangered	
	26	Southern Oregon/Northern California	Threatened	
	27	Lower Columbia River	Threatened	• Critical habitat
	28	Oregon Coast	Threatened	
	29	Southwest Washington	Undetermined	
	30	Puget Sound/Strait of Georgia	Species of Concern	
	31	Olympic Peninsula	Not Warranted	
Chum Salmon (*O. keta*)	32	Hood Canal Summer-run	Threatened	
	33	Columbia River	Threatened	
	34	Puget Sound/Strait of Georgia	Not Warranted	
	35	Pacific Coast	Not Warranted	
Steelhead (*O. mykiss*)	36	Southern California	Endangered	
	37	Upper Columbia River	Threatened	
	38	Central California Coast	Threatened	
	39	South Central California Coast	Threatened	
	40	Snake River Basin	Threatened	
	41	Lower Columbia River	Threatened	
	42	California Central Valley	Threatened	
	43	Upper Willamette River	Threatened	
	44	Middle Columbia River	Threatened	
	45	Northern California	Threatened	
	46	Oregon Coast	Species of Concern	
	47	Southwest Washington	Not Warranted	
	48	Olympic Peninsula	Not Warranted	
	49	Puget Sound	Threatened	• Critical habitat
	50	Klamath Mountains Province	Not Warranted	
Pink Salmon (*O. gorbuscha*)	51	Even-year	Not Warranted	
	52	Odd-year	Not Warranted	

1 The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries Service considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA Fisheries Service has delineated distinct population segments (DPSs) for consideration as "species" under the ESA.

Enclosure. Species with designated EFH in the Estuarine EFH Composite in the State of Oregon.

Groundfish Species	
Leopard Shark (southern OR only)	*Triakis semifasciata*
Soupfin Shark	*Galeorhinus zyopterus*
Spiny Dogfish	*Squalus acanthias*
California Skate	*Raja inornata*
Spotted Ratfish	*Hydrolagus colliei*
Lingcod	*Ophiodon elongatus*
Cabezon	*Scorpaenichthys marmoratus*
Kelp Greenling	*Hexagrammos decagrammus*
Pacific Cod	*Gadus macrocephalus*
Pacific Whiting (Hake)	*Merluccius productus*
Black Rockfish	*Sebastes melanops*
Bocaccio	*Sebastes paucispinis*
Brown Rockfish	*Sebastes auriculatus*
Copper Rockfish	*Sebastes caurinus*
Quillback Rockfish	*Sebastes maliger*
English Sole	*Pleuronectes vetulus*
Pacific Sanddab	*Citharichthys sordidus*
Rex Sole	*Glyptocephalus zachirus*
Rock Sole	*Lepidopsetta bilineata*
Starry Flounder	*Platichthys stellatus*
Coastal Pelagic Species	
Pacific Sardine	*Sardinops sagax*
Pacific (Chub) Mackerel	*Scomber japonicus*
Northern Anchovy	*Engraulis mordax*
Jack Mackerel	*Trachurus symmetricus*
California Market Squid	*Loligo opalescens*
Pacific Salmon Species	
Chinook Salmon	*Oncorhynchus tshawytscha*
Coho Salmon	*Oncorhynchus kisutch*

Essential Fish Habitat (EFH) Programmatic Consultation between the National Marine Fisheries Service, Southwest Region and NOAA Restoration Center, Community-Based Restoration Program

Purpose

Under Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), Federal agencies are required to consult with the Secretary of Commerce on any action that may adversely affect Essential Fish Habitat (EFH). Consultation can be addressed programmatically to broadly consider as many adverse effects as possible through programmatic EFH conservation recommendations.

This programmatic consultation applies to restoration activities undertaken in the Southwest region through the NOAA Restoration Center's (RC) Community-Based Restoration Program (CRP) to restore habitat for living marine resources. The Southwest region includes areas managed by Fishery Management Councils in the Pacific and Western Pacific.

Program Description

The NOAA Community-Based Restoration Program began in 1996 to inspire local efforts to conduct meaningful, on-the-ground restoration of marine, estuarine and riparian habitat. Since that time, NOAA has secured funding for 179 small-scale habitat restoration projects around the U.S. coastline. Habitat restoration is defined here as activities that directly result in the reestablishment or re-creation of stable, productive marine, estuarine, lagoon, or coastal river ecological systems. The Program is a systematic effort to catalyze partnerships at the national and local level to contribute funding, technical assistance, land, volunteer support or other in-kind services to help citizens carry out technically sound restoration projects that promote stewardship and a conservation ethic for living marine resources.

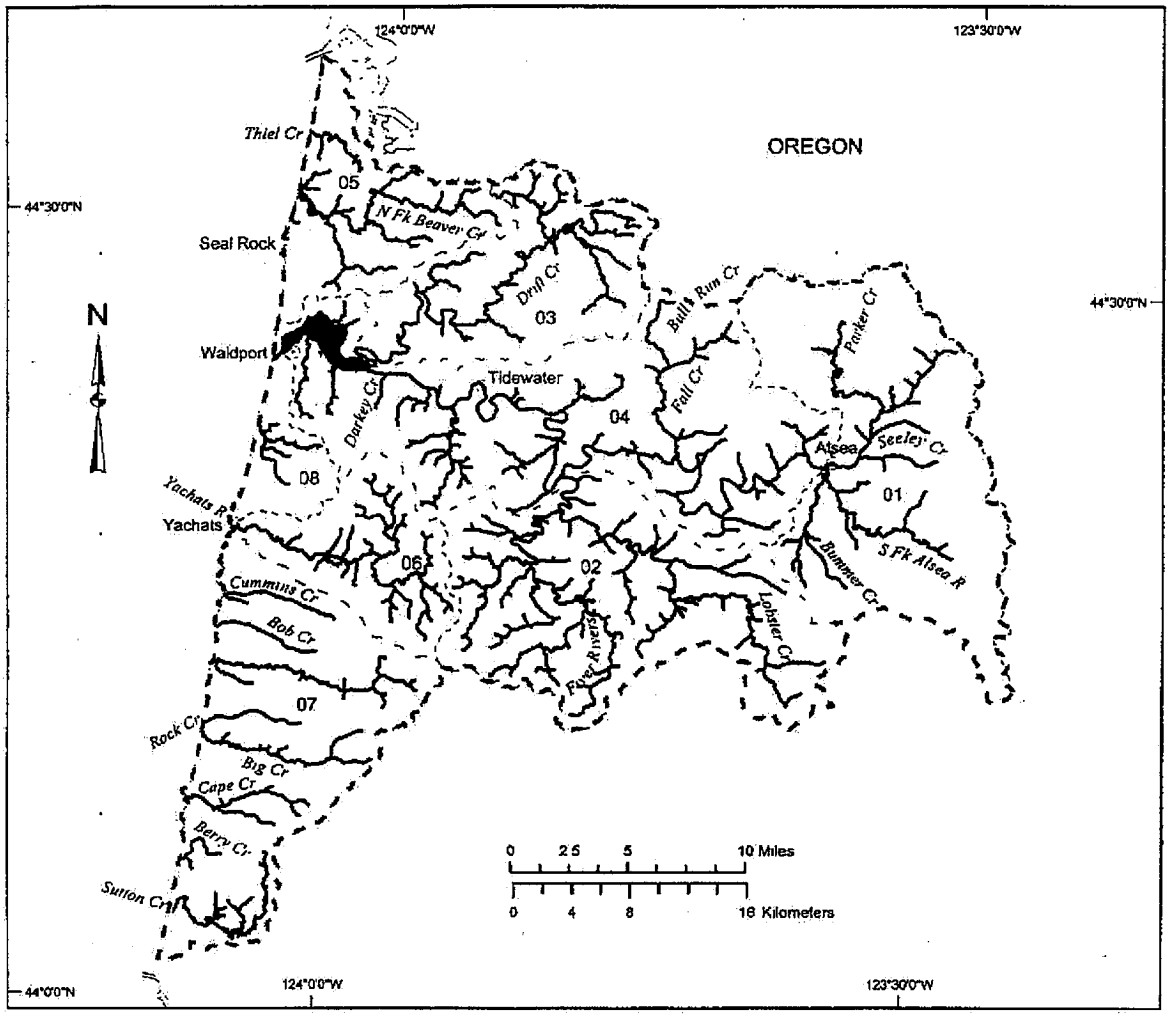
The program links seed money and technical expertise to citizen-driven restoration projects, and emphasizes collaborative strategies built around improving NOAA trust resources and the quality of the communities they sustain. Human activities and development have caused unprecedented destruction of coastal and wetland habitat. In a world of reliance on natural resources for a sound economy, and stress over natural resource management issues, stakeholders are coming together to assess and evaluate natural resource priorities, promote awareness and education, develop common goals and facilitate local habitat enhancement projects. Community-based habitat restoration helps repair habitats required by fish, endangered species and marine mammals. Restoration may include, but is not limited to: improvement of coastal wetland tidal exchange or reestablishment of historic hydrology; dam or berm removal; fish passageway improvements; natural or artificial reef/substrate/habitat creation; establishment or repair of riparian buffer zones and improvement of freshwater habitats that support fishes; planting of native coastal wetland and submerged aquatic vegetation (SAV); and improvements to feeding, shade or refuge, spawning and rearing areas that are essential to fisheries.

All restoration activities shall comply with Federal statutory and regulatory procedures, as well as state requirements, prior to implementation. Records of Federal and state permits/consultations will be maintained in-house if RC issues individual awards for projects.

In the Southwest region, the RC CRP is evaluated through the National Environmental Policy Act components consisting of a Draft and Final Environmental Assessment (EA) and Finding of No Significant Impact (FONSI). The purpose of the EA document is to address NEPA compliance of Federal

Final Critical Habitat for the Oregon Coast Coho Salmon ESU

ALSEA SUBBASIN 17100205

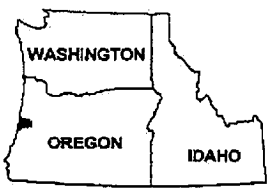


Legend

- Cities / Towns
- Critical Habitat
- Subbasin Boundary
- Watershed Boundaries

01 - 08 = Watershed code - last 2 digits of 17100205xx

Area of Detail



Page Title: ESA MM List
URL: http://www.nwr.noaa.gov/Marine-Mammals/ESA-MM-List.cfmhttp://www.nwr.noaa.gov/Marine-Mammals/ESA-MM-List.cfm

ESA-Listed Marine Mammals

Under the jurisdiction of NOAA Fisheries Service that may occur:

off Washington & Oregon

- Southern Resident Killer Whale (E), *Orcinus orca*; critical habitat
- Humpback Whale (E), *Megaptera novaeangliae*
- Blue Whale (E), *Balaenoptera musculus*
- Fin Whale (E), *Balaenoptera physalus*
- Sei Whale (E), *Balaenoptera borealis*
- Sperm Whale (E), *Physeter macrocephalus*
- Steller Sea Lion (T), *Eumetopias jubatus*; critical habitat

in Puget Sound

- Southern Resident Killer Whale (E), *Orcinus orca*; critical habitat
- Humpback Whale (E), *Megaptera novaeangliae*
- Steller Sea Lion (T), *Eumetopias jubatus*; critical habitat

(E) = Endangered
(T) = Threatened

Page last updated: 2009-05-27 15:17:43

Page Title: ESA Turtle List
URL: http://www.nwr.noaa.gov/Other-Marine-Species/ESA-Turtle-List.cfmhttp://www.nwr.noaa.gov/Other-Marine-Species/ESA-Turtle-List.cfm

ESA-Listed Marine Turtles

Under the jurisdiction of NOAA Fisheries Service that may occur off Washington & Oregon:

- Leatherback Sea Turtle (E), *Dermochelys coriacea*
- Loggerhead Sea Turtle (T), *Caretta caretta*
- Green Sea Turtle (E), *Chelonia mydas*
- Olive Ridley Sea Turtle (E), *Lepidochelys olivacea*

Sightings and strandings of these animals are very rare, and there are no breeding beaches in the Northwest Region.

(E) = Endangered
(T) = Threatened

Page last updated: 2009-03-03 10:51:04

Page Title: ESA Other List
URL: http://www.nwr.noaa.gov/Other-Marine-Species/ESA-Other-List.cfmhttp://www.nwr.noaa.gov/Other-Marine-Species/ESA-Other-List.cfm

Other ESA-Listed Species

Under the jurisdiction of NOAA Fisheries Service that may occur off Washington & Oregon:

- Southern distinct population segment, or DPS, of north American green sturgeon (T), (*Acipenser medirostris*), listed in the NOAA Fisheries Service Southwest Region

Page last updated: 2009-03-03 10:53:48

YAHOO! MAIL Classic

Fw: response to species/critical habitat information requests

Wednesday, December 9, 2009 12:55 PM

From: "Loran Waldron" <lwaldron@landandwater.biz>
To: "Dayl Waldron" <daylwaldron@yahoo.com>, "Allen Liles" <aliles@landandwater.biz>

—— Original Message ——
From: Liz_Kelly@fws.gov
To: lwaldron@landandwater.biz
Sent: Wednesday, December 09, 2009 12:05 PM
Subject: response to species/critical habitat information requests

Hi Loran, good to talk with you earlier.

There are no listed species concerns in the project areas for Seal Rock Water District for the construction of a new District Office and Shop facility, and for the City of Yachats for the WWTP Mixing Zone Study.

Here is a list of helpful websites for determining species presence (hopefully all the links work!). The FWS county species lists and ECOS website (critical habitat) are the first places to check. There are other websites in other FWS regions that go into more detail about Biological Assessments than our region and these can be found through Google.

Let me know if you have any additional questions.

Liz

US Fish and Wildlife Service websites

U.S. Fish and Wildlife Service, Oregon statewide list (updated weekly). Federally listed, proposed, candidate, delisted species and species of concern (by county).
http://www.fws.gov/oregonfwo/Species/Lists/

To request a species list (be sure to download the cover letter, which outlines responsibilities):
http://www.fws.gov/oregonfwo/Species/Lists/Documents/SpeciesListCoverLetter.pdf

Environmental Conservation Online System (can map critical habitat with ECOS mapper):
http://ecos.fws.gov/ecos/indexPublic.do

USFWS's "National Bald Eagle Management Guidelines:
http://www.fws.gov/pacific/eagle/

Here are some additional sites that might be useful

Oregon Explorer
http://oregonexplorer.info/wildlife (Some maps are better than others; watershed lists are better than county lists)

Oregon Natural Heritage Information Center (ORNHIC)
http://oregonstate.edu/ornhic
Highlights rare, threatened, and endangered species; 2007 document (with amendments) available. Not a complete list, but a start.

Oregon Department of Fish and Wildlife
http://www.dfw.state.or.us/wildlife/diversity/species
/threatened_endangered_candidate_list.asp

Wetlands
http://www.oregon.gov/DSL/WETLAND/swwi.shtml
http://oregonexplorer.info/Wetlands/mappingtools/maps.aspx?Res=21506

Important Birding Areas. An "Important Bird Area" (IBA) is a site that is of outstanding importance to bird conservation.
http://www.audubonportland.org/issues/statewide/iba/summary/

Liz Kelly
US Fish and Wildlife Service
Newport Field Office
2127 SE Marine Science Drive
Newport, OR 97365

Monday & Wednesday: 541-207-5248 (cell)
Tuesday & Thursday: 541-867-4558 x241(office)
fax: (541) 867-4551

Allen

From: "Loran Waldron" <lwaldron@landandwater.biz>
To: "Allen Liles" <aliles@landandwater.biz>
Sent: Monday, January 04, 2010 9:51 AM
Subject: Fw: Seal Rock and Yachats projects

----- Original Message -----
From: Lisa.Wright
To: LWaldron@landandwater.biz
Sent: Monday, January 04, 2010 9:22 AM
Subject: Seal Rock and Yachats projects

Loran-
I have recently reviewed your requests for information from NMFS regarding Biological Assessments you are preparing for projects in Seal Rock, OR, and Yachats, OR. I apologize for the delay in addressing your questions and hope the enclosed information is helpful.

According to the location information and maps provided to NMFS, the following ESA-listed species and their critical habitat, as well as Essential Fish Habitat (EFH) as defined under the Magnuson-Stevens Fishery Conservation & Management Act, occur in the project areas and may be affected by project activities:

Seal Rock Water District project:
- -Oregon Coast coho salmon + critical habitat
- - Southern DPS eulachon (aka Columbia River smelt) - proposed for ESA-listing, no designated critical habitat
- - EFH Pacific salmon

City of Yachats outfall project:
- -Oregon Coast coho salmon + critical habitat
- -Green sturgeon + critical habitat
- - Southern DPS eulachon (aka Columbia River smelt) - proposed for ESA-listing, no designated critical habitat
- - EFH Pacific salmon, groundfish, coastal pelagics

Here are some links to sites that may be helpful in your search for information for these and future projects.

ESA-listed species - *http://www.nwr.noaa.gov/Species-Lists.cfm*
Critical habitat maps for ESA-listed species - *http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm*
OC coho status, description and critical habitat - *http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Coho/COORC.cfm*
Mapping tool for Essential Fish Habitat (EFH): *http://www.nmfs.noaa.gov/habitat/habitatprotection/efh/index_GIS.htm*

I hope this helps in your preparation of reports for these projects. Please feel free to contact me if you have any further questions or need clarification.

Thanks and I hope you had a great holiday season,
Lisa

APPENDICES

APPENDIX A - Mutual Order and Agreement

APPENDIX

A

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

OF THE STATE OF OREGON

IN THE MATTER OF:	)	MUTUAL AGREEMENT AND ORDER
City of Yachats	)	NO. WQ/M-09-WR-133
	)	LINCOLN COUNTY

WHEREAS:

1. On June 12, 2003, the Department of Environmental Quality (Department or DEQ) last renewed National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit Number 100812 (Permit) to the City of Yachats (the City). The Permit authorized the City to construct, install, modify or operate wastewater treatment control and disposal facilities (facilities) and discharge adequately treated wastewaters into the Pacific Ocean, waters of the state, in conformance with the requirements, limitations and conditions set forth in the Permit. The Permit expired on December 31, 2007. Had the City applied for the renewal in a timely manner, the Permit would have been administratively extended until DEQ acted on the application.

2. After December 31, 2007, the City continued to operate the wastewater treatment plant under the conditions and requirements of the expired Permit and under the terms of its MAO with the Department (Case no. MAO WQ/M-WR-02-205). Operation of a wastewater treatment or disposal system without a permit violates Oregon Revised Statute (ORS) 468B.050.

3. DEQ and the City recognize that the City will continue to violate ORS 468B.050 until the City applies for, and is issued, a new NPDES permit for operation of the wastewater treatment facility.

4. The Department and the City recognize that the Environmental Quality Commission has the power to impose a civil penalty and to issue an abatement order for violations of Oregon law. Therefore, pursuant to ORS 183.745, the Department and the City wish to settle those past

violations referred to in Paragraph 2 and to limit and resolve the future violations referred to in Paragraph 3 in advance by this Mutual Agreement and Order (MAO).

5. This MAO is not intended to limit, in any way, the Department's right to proceed against the City in any forum for any past or future violations not expressly settled herein.

NOW THEREFORE, it is stipulated and agreed that:

6. The Environmental Quality Commission shall issue a final order:

A. Requiring the City to comply with the following schedule and conditions:

(1) The City must deliver a complete NPDES permit application package to the Department no later than thirty (30) days after this MAO is executed.

(2) The City must deliver a Mixing Zone study that satisfies the requirements in the Department's Regulatory Mixing Zone Internal Management Directive no later than one hundred fifty (150) days after this MAO is executed.

B. The City must comply with the limits and requirements of its expired NPDES permit with the following exceptions:

(1) Because the new wastewater treatment plant uses ultra-violet (UV) light rather than chlorine to disinfect its wastewater, there will be no limits placed on Total Residual Chlorine (TRC) and monitoring the amount of chlorine used and TRC will not be required.

(2) No chlorine or chlorine compounds may be used for disinfection purposes and no chlorine residual due to chlorine used for maintenance purposes will be allowed in the effluent.

(3) The City will monitor UV light intensity daily and report UV intensity on the monthly Discharge Monitoring Reports (DMRs). UV intensity must be reported as the average of all meter readings for each day.

C. Requiring the City, upon receipt of a written notice from the Department for any violations of this MAO, to pay:

(1) a civil penalty in the amount of $250 for each day of each violation of the

compliance schedule set forth in Paragraph 6A; and

(2) a civil penalty equal to the penalty that would apply under Oregon Administrative Rule (OAR) Division 340-012 if the Permit were in effect, for each day of each violation of the requirements set forth in Paragraph 6B, which requires the City to comply with all the requirements of the Permit.

7. If any event occurs that is beyond the City's reasonable control and that causes or may cause a delay or deviation in performance of the requirements of this MAO, the City shall immediately notify the Department verbally of the cause of delay or deviation and its anticipated duration, the measures that have been or will be taken to prevent or minimize the delay or deviation, and the timetable by which the City proposes to carry out such measures. The City shall confirm in writing this information within five (5) working days of the onset of the event. It is the City's responsibility in the written notification to demonstrate to the Department's satisfaction that the delay or deviation has been or will be caused by circumstances beyond the control and despite due diligence of the City. If the City so demonstrates, the Department shall extend times of performance of related activities under this MAO as appropriate. Circumstances or events beyond the City's control include, but are not limited to, acts of nature, unforeseen strikes, work stoppages, fires, explosion, riot, sabotage, or war. Increased cost of performance or consultant's failure to provide timely reports may not be considered circumstances beyond the City's control.

8. Regarding the violations set forth in Paragraph 2 and 3 above, which are expressly settled herein without penalty, the City and the Department hereby waive any and all of their rights to any and all notices, hearing, judicial review, and to service of a copy of the final order herein. The Department reserves the right to enforce this order through appropriate administrative and judicial proceedings.

9. The terms of this MAO may be amended by the mutual agreement of the Department and the City.

10. The Department may amend the compliance schedule and conditions in this MAO upon finding that such modification is necessary because of changed circumstances or to protect public health and the environment. The Department shall provide the City a minimum of thirty (30) days written notice prior to issuing an Amended Order modifying any compliance schedules or conditions. If the City contests the Amended Order, the applicable procedures for conduct of contested cases in such matters shall apply.

11. This MAO shall be binding on the parties and their respective successors, agents, and assigns. The undersigned representative of each party certifies that he or she is fully authorized to execute and bind such party to this MAO. No change in ownership or corporate or partnership status relating to the facility shall in any way alter the City's obligations under this MAO, unless otherwise approved in writing by DEQ.

12. All reports, notices and other communications required under or relating to this MAO should be directed to Mary Pfauth, DEQ Salem Regional Office, 750 Front St. NE #120, Salem, OR 97301, phone number (503) 378-4978. The contact person for the City shall be John McClintock, Public Works Director, PO Box 345, Yachats, OR 97498, phone number (541) 547-3565.

13. The City acknowledges that it has actual notice of the contents and requirements of the MAO and that failure to fulfill any of the requirements hereof would constitute a violation of this MAO and subject the City to payment of civil penalties pursuant to Paragraph 6C above.

14. Any stipulated civil penalty imposed pursuant to Paragraph 6C shall be due upon written demand. Stipulated civil penalties shall be paid by check or money order made payable to the "Oregon State Treasurer" and sent to: Business Office, Department of Environmental Quality, 811 SW Sixth Avenue, Portland, Oregon 97204. Within 21 days of receipt of a "Demand for Payment of Stipulated Civil Penalty" Notice from the Department, the City may request a hearing to contest the Demand Notice. At any such hearing, the issue shall be limited to the City's compliance or non-compliance with this MAO. The amount of each stipulated civil

penalty for each violation and/or day of violation is established in advance by this MAO and shall not be a contestable issue.

15. Providing the City has paid in full all stipulated civil penalties pursuant to Paragraph 14 above, this MAO shall terminate one year after it is executed or when the Department takes a final action on the NPDES permit application, whichever occurs first.

City of Yachats

October 2, 2009
Date

Ronald A. Dreon, Mayor
(Title)

DEPARTMENT OF ENVIRONMENTAL QUALITY

October 2, 2009
Date

Keith Andersen, Administrator – Western Region

FINAL ORDER

IT IS SO ORDERED:

ENVIRONMENTAL QUALITY COMMISSION

October 2, 2009
Date

Keith Andersen, Administrator – Western Region
Department of Environmental Quality
Pursuant to OAR 340-011-0136(1)

APPENDIX B - NPDES Permit

APPENDIX

B

ISSUED

Expiration Date: 12-31-2007
Permit Number: 100812
File Number: 99260

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT

Department of Environmental Quality
Western Region – Salem Office
750 Front Street NE, Suite 120, Salem, OR 97301-1039
Telephone: (503) 378-8240

Issued pursuant to ORS 468B.050 and The Federal Clean Water Act

ISSUED TO:

City of Yachats
P.O. Box 67
Yachats, OR 97498

SOURCES COVERED BY THIS PERMIT:

Type of Waste	Outfall Number	Outfall Location
Treated Wastewater	001	R.M. 214.5
Emergency Overflow	002	Main Pump Station

FACILITY TYPE AND LOCATION:

Activated Sludge
City of Yachats
500 West 7th Street
Yachats
Treatment System Class: Level II
Collection System Class: Level II

RECEIVING STREAM INFORMATION:

Basin: Mid Coast
Sub-Basin: Alsea
Receiving Stream: Pacific Ocean
LLID: 1240682445993
Hydro Code: 10-*PACI 214.5 D
County: Lincoln

EPA REFERENCE NO: OR-002029-0

Issued in response to Application No. 994165 received February 1, 1996.
This permit is issued based on the land use findings in the permit record.

Michael H. Kortenhof, Western Region Water Quality Manager — 6-13-2003 Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to construct, install, modify, or operate a wastewater collection, treatment, control and disposal system and discharge to public waters adequately treated wastewaters only from the authorized discharge point or points established in Schedule A and only in conformance with all the requirements, limitations, and conditions set forth in the attached schedules as follows:

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon Administrative Rule, any other direct or indirect discharge to waters of the state is prohibited, including discharge to an underground injection control system.

SCHEDULE A

1. **Waste Discharge Limitations not to be exceeded after permit issuance.**

a. Treated Effluent Outfall 001

(1) May 1 - October 31:

Parameter	Average Effluent Concentrations Monthly	Weekly	Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs
BOD_5	20 mg/L	30 mg/L	25	37	50
TSS	20 mg/L	30 mg/L	25	37	50

(2) November 1 - April 30:

Parameter	Average Effluent Concentrations Monthly	Weekly	Monthly* Average lb/day	Weekly* Average lb/day	Daily* Maximum lbs
BOD_5	30 mg/L	45 mg/L	37	56	75
TSS	30 mg/L	45 mg/L	37	56	75

* Average dry weather design flow to the facility equals 0.15 MGD. Mass load limits based upon average dry weather design flow to the facility. Schedule C, Condition 1 requires the permittee to select the basis for calculating winter time (November 1 through April 30 each year) mass load limits. Upon review and approval of the engineering study to determine the design average wet weather flow, pursuant to OAR 340-41-120 (9), and upon request of the permittee, the Department intends to modify this permit and include revised mass load limits.

(3)

Other parameters (year-round)	Limitations
Fecal Coliform Bacteria	Shall not exceed 126 organisms per 100 mL monthly geometric mean. No single sample shall exceed 406 organisms per 100 mL.
pH	Shall be within the range of 6.0 - 9.0
BOD_5 and TSS Removal Efficiency	Shall not be less than 85% monthly average for BOD_5 and 85% monthly for TSS.
Total Residual Chlorine	Shall not exceed 0.65 mg/l daily maximum and 0.25 mg/l monthly average

(4) Except as provided for in OAR 340-45-080, no wastes shall be discharged and no activities shall be conducted which violate Water Quality Standards as adopted in OAR 340-41-0245 except in the following defined mixing zone:

The allowable mixing zone is that portion of the Pacific Ocean within a one hundred (100) foot radius of the outfall piping system. The Zone of Immediate Dilution (ZID) is that portion of the Pacific Ocean within a ten (10) foot radius of the outfall piping system.

b. Emergency Overflow Outfall 002 (Main Pump Station)

(1) No wastes shall be discharged from this outfall, unless the cause of the discharge is due to storm events as allowed under OAR 340-41-120 (13) or (14) as follows:

Raw sewage discharges are prohibited to waters of the State from May 22 through October 31, except during a storm event greater than the one-in-ten-year, 24-hour duration storm. If an overflow occurs between May 22 and June 1, and if the permittee demonstrates to the Department's satisfaction that no increase in risk to beneficial uses occurred because of the overflow, no violation shall be triggered if the storm associated with the overflow was greater than the one-in-five-year, 24-hour duration storm.

c. No activities shall be conducted that could cause an adverse impact on existing or potential beneficial uses of groundwater. All wastewater and process related residuals shall be managed and disposed in a manner that will prevent a violation of the Groundwater Quality Protection Rules (OAR 340-040).

SCHEDULE B

1. Minimum Monitoring and Reporting Requirements (unless otherwise approved in writing by the Department).

The permittee shall monitor the parameters as specified below at the locations indicated. The laboratory used by the permittee to analyze samples shall have a quality assurance/quality control (QA/QC) program to verify the accuracy of sample analysis. If QA/QC requirements are not met for any analysis, the results shall be included in the report, but not used in calculations required by this permit. When possible, the permittee shall re-sample in a timely manner for parameters failing the QA/QC requirements, analyze the samples, and report the results.

a. Influent

Item or Parameter	Minimum Frequency	Type of Sample
Total Flow (MGD)	Daily	Measurement
Flow Meter Calibration	Annually	Verification
BOD_5	Weekly	Composite
TSS	Weekly	Composite
pH	2/Week	Grab

b. Treated Effluent Outfall 001

Item or Parameter	Minimum Frequency	Type of Sample
BOD_5	Weekly	Composite
TSS	Weekly	Composite
pH	2/Week	Grab
Fecal Coliform	Weekly	Grab
Ammonia	Monthly	Grab (See Note 1)
Quantity Chlorine Used	Daily	Measurement
Chlorine Residual	Daily	Grab
Pounds Discharged (BOD_5 and TSS)	Weekly	Calculation
Average Percent Removed (BOD_5 and TSS)	Monthly	Calculation

c. Biosolids Management

Item or Parameter	Minimum Frequency	Type of Sample
Sludge analysis including: Total Solids (% dry wt.) Volatile solids (% dry wt.) Biosolids nitrogen for: NH_3-N; NO_3-N; & TKN (% dry wt.) Phosphorus (% dry wt.) Potassium (% dry wt.) pH (standard units) Sludge metals content for: As, Cd, Cu, Hg, Mo, Ni, Pb, Se & Zn, as total in mg/kg	Annually	Composite sample to be representative of the product to be land applied from the Digester withdrawal line (See Note 2)

Item or Parameter	Minimum Frequency	Type of Sample
Record of locations where biosolids are applied on each DEQ approved site. (Site location maps to be maintained at treatment facility for review upon request by DEQ)	Each Occurrence	Date, volume & locations where sludges were applied recorded on site location map.
Quantity and type of alkaline product used to stabilize biosolids (when required to meet federal pathogen and vector attraction reduction requirements in 40 CFR 503.32(b)(3) and 40 CFR 503.33(b)(6))	Each occurrence	Measurement
Initial time when solids that received alkaline agent ascended to pH >= 12	Each batch	Date, time, and actual pH measurement (corrected to standard at 25°C)
2 hours after initial alkaline addition and sustained at pH >= 12	Each batch	Date, time, and actual pH measurement (corrected to standard at 25°C)
24 hours after initial alkaline addition and pH >= 11.5 was sustained	Each batch	Date, time, and actual pH measurement (corrected to standard at 25°C)
Record of digestion days (mean cell residence time)	Monthly	Calculation (See Note 3)
Daily Minimum Sludge Temperature	Daily	Record

d. Emergency Overflow Outfall 002

Item or Parameter	Minimum Frequency	Type of Sample
Flow	Daily (during each occurrence)	Estimate duration and volume

e. Temperature Monitoring

Item or Parameter	Minimum Frequency	Type of Sample
Effluent Temperature, Daily Max (See Note 2)	2/Week	Grab at same time daily
Effluent Temperature, Average of Daily Maximums (See Note 2)	Weekly	Calculation

2. **Reporting Procedures**

a. Monitoring results shall be reported on approved forms. The reporting period is the calendar month. Reports must be submitted to the Department's Western Region - Salem office by the 15th day of the following month.

b. State monitoring reports shall identify the name, certificate classification and grade level of each principal operator designated by the permittee as responsible for supervising the wastewater collection and treatment systems during the reporting period. Monitoring reports shall also identify each system classification as found on page one of this permit.

c. Monitoring reports shall also include a record of the quantity and method of use of all sludge removed from the treatment facility and a record of all applicable equipment breakdowns and bypassing.

3. **Report Submittals**

a. The permittee shall have in place a program to identify and reduce inflow and infiltration into the sewage collection system. An annual report shall be submitted to the Department by February 1 each year which details sewer collection maintenance activities that reduce inflow and infiltration. The report shall state those activities that have been done in the previous year and those activities planned for the following year.

b. For any year in which biosolids are land applied, a report shall be submitted to the Department by February 19 of the following year that describes solids handling activities for the previous year and includes, but is not limited to, the required information outlined in OAR 340-50-035(6)(a)-(e).

NOTES:

1. After one full year of ammonia monitoring, and if approved in writing by the Department following a reasonable potential analysis for violating the water quality standard, monitoring may be discontinued.

2. After two full years of temperature monitoring, and if approved in writing by the Department, monitoring may be waived for those months when the effluent temperature does not exceed the stream temperature standard.

3. Composite samples from the digester withdrawal line shall consist of at least 4 aliquots of equal volume collected over an 8 hour period and combined.

   Inorganic pollutant monitoring must be conducted according to Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Second Edition (1982) with Updates I and II and third Edition (1986) with Revision I.

4. The days of digestion shall be calculated by dividing the effective digester volume by the average daily volume of sludge production.

SCHEDULE C

Compliance Schedules and Conditions

1. By June 13, 2004, the permittee shall submit either an engineering evaluation which demonstrates the design average wet weather flow, or a request to retain the existing mass load limits. The design average wet weather flow is defined as the average flow between November 1 and April 30 when the sewage treatment facility is projected to be at design capacity for that portion of the year. Upon acceptance by the Department of the design average wet weather flow determination, the permittee may request a permit modification to include higher winter mass loads based on the design average wet weather flow.

2. Within 180 days of permit modification to include higher winter mass load limits as specified in Condition 1 of this Schedule, the permittee shall submit to the Department for review and approval a proposed program and time schedule for identifying and reducing inflow. Within 60 days of receiving written Department comments, the permittee shall submit a final approvable program and time schedule. The program shall consist of the following:

   a. Identification of all overflow points and verification that sewer system overflows are not occurring up to a 24-hour, 5-year storm event or equivalent;

   b. Monitoring of all pump station overflow points;

   c. A program for identifying and removing all inflow sources into the permittee's sewer system over which the permittee has legal control; and

   d. If the permittee does not have the necessary legal authority for all portions of the sewer system or treatment facility, a program and schedule for gaining legal authority to require inflow reduction and a program and schedule for removing inflow sources.

3. By September 11, 2003, the permittee shall submit to the Department a report which either identifies known sewage overflow locations and a plan for estimating the frequency, duration and quantity of sewage overflowing, or confirms that there are no overflow points. The report shall also provide a schedule to eliminate the overflow(s), if any.

4. The permittee is expected to meet the compliance dates which have been established in this schedule. Either prior to or no later than 14 days following any lapsed compliance date, the permittee shall submit to the Department a notice of compliance or noncompliance with the established schedule. The Director may revise a schedule of compliance if he determines good and valid cause resulting from events over which the permittee has little or no control.

SCHEDULE D

Special Conditions

1. Prior to increasing thermal load (flow or temperature) beyond the current permit limitations, the Permittee shall notify the Department and apply for and be issued a permit modification allowing the increase.

2. All biosolids shall be managed in accordance with the current, DEQ approved biosolids management plan, and the site authorization letters issued by the DEQ. Any changes in solids management activities that significantly differ from operations specified under the approved plan require the prior written approval of the DEQ.

   All new biosolids application sites shall meet the site selection criteria set forth in OAR 340-50-0070 and must be located within Lincoln County. All currently approved sites are located in Lincoln County. No new public notice is required for the continued use of these currently approved sites. Property owners adjacent to any newly approved application sites shall be notified, in writing or by any method approved by DEQ, of the proposed activity prior to the start of application. For proposed new application sites that are deemed by the DEQ to be sensitive with respect to residential housing, runoff potential or threat to groundwater, an opportunity for public comment shall be provided in accordance with OAR 340-50-0030.

3. This permit may be modified to incorporate any applicable standard for biosolids use or disposal promulgated under section 405(d) of the Clean Water Act, if the standard for biosolids use or disposal is more stringent than any requirements for biosolids use or disposal in the permit, or controls a pollutant or practice not limited in this permit.

4. The permittee shall comply with Oregon Administrative Rules (OAR), Chapter 340, Division 49, "Regulations Pertaining To Certification of Wastewater System Operator Personnel" and accordingly:

   a. The permittee shall have its wastewater system supervised by one or more operators who are certified in a classification and grade level (equal to or greater) that corresponds with the classification (collection and/or treatment) of the system to be supervised as specified on page one of this permit.

Note: A "supervisor" is defined as the person exercising authority for establishing and executing the specific practice and procedures of operating the system in accordance with the policies of the permittee and requirements of the waste discharge permit. "Supervise" means responsible for the technical operation of a system, which may affect its performance or the quality of the effluent produced. Supervisors are not required to be on-site at all times.

   b. The permittee's wastewater system may not be without supervision (as required by Special Condition 4.a. above) for more than thirty (30) days. During this period, and at any time that the supervisor is not available to respond on-site (i.e. vacation, sick leave or off-call), the permittee must make available another person who is certified in the proper classification and at grade level I or higher.

   c. The permittee is responsible for ensuring the wastewater system has a properly certified supervisor available at all times to respond on-site at the request of the permittee and to any other operator.

   d. The permittee shall notify the Department of Environmental Quality in writing within thirty (30) days of replacement or redesignation of certified operators responsible for supervising wastewater system operation. The notice shall be filed with the Water Quality Division, Operator Certification Program,

811 SW 6th Ave, Portland, OR 97204. This requirement is in addition to the reporting requirements contained under Schedule B of this permit.

e. Upon written request, the Department may grant the permittee reasonable time, not to exceed 120 days, to obtain the services of a qualified person to supervise the wastewater system. The written request must include justification for the time needed, a schedule for recruiting and hiring, the date the system supervisor availability ceased and the name of the alternate system supervisor(s) as required by 4.b. above.

6. An adequate contingency plan for prevention and handling of spills and unplanned discharges shall be in force at all times. A continuing program of employee orientation and education shall be maintained to ensure awareness of the necessity of good inplant control and quick and proper action in the event of a spill or accident.

7. The permittee shall notify the DEQ Western Region - Salem Office (phone: (503) 378-8240) in accordance with the response times noted in the General Conditions of this permit, of any malfunction so that corrective action can be coordinated between the permittee and the Department.

NPDES GENERAL CONDITIONS
(SCHEDULE F)

SECTION A. STANDARD CONDITIONS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of Oregon Revised Statutes (ORS) 468B.025 and is grounds for enforcement action; for permit termination, suspension, or modification; or for denial of a permit renewal application.

2. Penalties for Water Pollution and Permit Condition Violations

Oregon Law (ORS 468.140) allows the Director to impose civil penalties up to $10,000 per day for violation of a term, condition, or requirement of a permit.

In addition, a person who unlawfully pollutes water as specified in ORS 468.943 or ORS 468.946 is subject to criminal prosecution.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. In addition, upon request of the Department, the permittee shall correct any adverse impact on the environment or human health resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and have the permit renewed. The application shall be submitted at least 180 days before the expiration date of this permit.

The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

5. Permit Actions

This permit may be modified, suspended, revoked and reissued, or terminated for cause including, but not limited to, the following:

a. Violation of any term, condition, or requirement of this permit, a rule, or a statute;

b. Obtaining this permit by misrepresentation or failure to disclose fully all material facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

The filing of a request by the permittee for a permit modification or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. Toxic Pollutants

The permittee shall comply with any applicable effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

7. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege.

8. Permit References

Except for effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act, all rules and statutes referred to in this permit are those in effect on the date this permit is issued.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls, and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Duty to Halt or Reduce Activity

For industrial or commercial facilities, upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Bypass of Treatment Facilities

a. Definitions

(1) "Bypass" means intentional diversion of waste streams from any portion of the treatment facility. The term "bypass" does not include nonuse of singular or multiple units or processes of a treatment works when the nonuse is insignificant to the quality and/or quantity of the effluent produced by the treatment works. The term "bypass" does not apply if the diversion does not cause effluent limitations to be exceeded, provided the diversion is to allow essential maintenance to assure efficient operation.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities or treatment processes which causes them to become inoperable, or

substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Prohibition of bypass.

(1) Bypass is prohibited unless:

(a) Bypass was necessary to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and

(c) The permittee submitted notices and requests as required under General Condition B.3.c.

(2) The Director may approve an anticipated bypass, after considering its adverse effects and any alternatives to bypassing, when the Director determines that it will meet the three conditions listed above in General Condition B.3.b.(1).

c. Notice and request for bypass.

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior written notice, if possible at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in General Condition D.5.

4. Upset

a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operation error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of General Condition B.4.c are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the causes(s) of the upset;

(2) The permitted facility was at the time being properly operated;

(3) The permittee submitted notice of the upset as required in General Condition D.5, hereof (24-hour notice); and

(4) The permittee complied with any remedial measures required under General Condition A.3 hereof.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

5. Treatment of Single Operational Event

For purposes of this permit, A Single Operational Event which leads to simultaneous violations of more than one pollutant parameter shall be treated as a single violation. A single operational event is an exceptional incident which causes simultaneous, unintentional, unknowing (not the result of a knowing act or omission), temporary noncompliance with more than one Clean Water Act effluent discharge pollutant parameter. A single operational event does not include Clean Water Act violations involving discharge without a NPDES permit or noncompliance to the extent caused by improperly designed or inadequate treatment facilities. Each day of a single operational event is a violation.

6. Overflows from Wastewater Conveyance Systems and Associated Pump Stations

a. Definitions

(1) "Overflow" means the diversion and discharge of waste streams from any portion of the wastewater conveyance system including pump stations, through a designed overflow device or structure, other than discharges to the wastewater treatment facility.

(2) "Severe property damage" means substantial physical damage to property, damage to the conveyance system or pump station which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of an overflow.

(3) "Uncontrolled overflow" means the diversion of waste streams other than through a designed overflow device or structure, for example to overflowing manholes or overflowing into residences, commercial establishments, or industries that may be connected to a conveyance system.

b. Prohibition of overflows. Overflows are prohibited unless:

(1) Overflows were unavoidable to prevent an uncontrolled overflow, loss of life, personal injury, or severe property damage;

(2) There were no feasible alternatives to the overflows, such as the use of auxiliary pumping or conveyance systems, or maximization of conveyance system storage; and

(3) The overflows are the result of an upset as defined in General Condition B.4. and meeting all requirements of this condition.

c. Uncontrolled overflows are prohibited where wastewater is likely to escape or be carried into the waters of the State by any means.

d. Reporting required. Unless otherwise specified in writing by the Department, all overflows and uncontrolled overflows must be reported orally to the Department within 24 hours from the time the permittee becomes aware of the overflow. Reporting procedures are described in more detail in General Condition D.5.

7. Public Notification of Effluent Violation or Overflow

If effluent limitations specified in this permit are exceeded or an overflow occurs, upon request by the Department, the permittee shall take such steps as are necessary to alert the public about the extent and nature of the discharge. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

8. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in such a manner as to prevent any pollutant from such materials from entering public waters, causing nuisance conditions, or creating a public health hazard.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling

Sampling and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and shall be taken, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Director.

2. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than ± 10 percent from true discharge rates throughout the range of expected discharge volumes.

3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

4. Penalties of Tampering

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person, punishment is a fine not more than $20,000 per day of violation, or by imprisonment of not more than four years or both.

5. Reporting of Monitoring Results

Monitoring results shall be summarized each month on a Discharge Monitoring Report form approved by the Department. The reports shall be submitted monthly and are to be mailed, delivered or otherwise transmitted by the 15th day of the following month unless specifically approved otherwise in Schedule B of this permit.

6. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report. Such increased frequency shall also be indicated. For a pollutant parameter that may be sampled more than once per day (e.g., Total Chlorine Residual), only the average daily value shall be recorded unless otherwise specified in this permit.

7. Averaging of Measurements

Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean, except for bacteria which shall be averaged as specified in this permit.

8. Retention of Records

Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records of all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

9. Records Contents

Records of monitoring information shall include:

a. The date, exact place, time and methods of sampling or measurements;

b. The individual(s) who performed the sampling or measurements;

c. The date(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses.

10. Inspection and Entry

The permittee shall allow the Director, or an authorized representative upon the presentation of credentials to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by state law, any substances or parameters at any location.

SECTION D. REPORTING REQUIREMENTS

1. Planned Changes

The permittee shall comply with Oregon Administrative Rules (OAR) 340, Division 52, "Review of Plans and Specifications". Except where exempted under OAR 340-52, no construction, installation, or modification involving disposal systems, treatment works, sewerage systems, or common sewers shall be commenced until the plans and specifications are submitted to and approved by the Department. The permittee shall give notice to the Department as soon as possible of any planned physical alternations or additions to the permitted facility.

2. Anticipated Noncompliance

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.

3. Transfers

This permit may be transferred to a new permittee provided the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of the permit and the rules of the Commission. No permit shall be transferred to a third party without prior written approval from the Director. The permittee shall notify the Department when a transfer of property interest takes place.

4. Compliance Schedule

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements.

5. Twenty-Four Hour Reporting

The permittee shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally (by telephone) within 24 hours, unless otherwise specified in this permit, from the time the permittee becomes aware of the circumstances. During normal business hours, the Department's Regional office shall be called. Outside of normal business hours, the Department shall be contacted at 1-800-452-0311 (Oregon Emergency Response System).

A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. If the permittee is establishing an affirmative defense of upset or bypass to any offense under ORS 468.922 to 468.946, and in which case if the original reporting notice was oral, delivered written notice must be made to the Department or other agency with regulatory jurisdiction within 4 (four) calendar days. The written submission shall contain:

a. A description of the noncompliance and its cause;

b. The period of noncompliance, including exact dates and times;

c. The estimated time noncompliance is expected to continue if it has not been corrected;

d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and

e. Public notification steps taken, pursuant to General Condition B.7.

The following shall be included as information that must be reported within 24 hours under this paragraph:

a. Any unanticipated bypass which exceeds any effluent limitation in this permit.

b. Any upset which exceeds any effluent limitation in this permit.

c. Violation of maximum daily discharge limitation for any of the pollutants listed by the Director in this permit.

The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

6. Other Noncompliance

The permittee shall report all instances of noncompliance not reported under General Condition D.4 or D.5, at the time monitoring reports are submitted. The reports shall contain:

a. A description of the noncompliance and its cause;

b. The period of noncompliance, including exact dates and times;

c. The estimated time noncompliance is expected to continue if it has not been corrected; and

d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

7. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information that the Department may request to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

Other Information: When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Department, it shall promptly submit such facts or information.

8. Signatory Requirements

All applications, reports or information submitted to the Department shall be signed and certified in accordance with 40 CFR 122.22.

9. Falsification of Information

A person who supplies the Department with false information, or omits material or required information, as specified in ORS 468.953 is subject to criminal prosecution.

10. Changes to Indirect Dischargers - **[Applicable to Publicly Owned Treatment Works (POTW) only]**

The permittee must provide adequate notice to the Department of the following:

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants and;

b. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

c. For the purposes of this paragraph, adequate notice shall include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

11. Changes to Discharges of Toxic Pollutant - **[Applicable to existing manufacturing, commercial, mining, and silvicultural dischargers only]**
The permittee must notify the Department as soon as they know or have reason to believe of the following:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:

(1) One hundred micrograms per liter (100 µg/L);

(2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

(3) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or

(4) The level established by the Department in accordance with 40 CFR 122.44(f).

b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) Five hundred micrograms per liter (500 µg/L);

(2) One milligram per liter (1 mg/L) for antimony;

(3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or

(4) The level established by the Department in accordance with 40 CFR 122.44(f).

SECTION E. DEFINITIONS

1. BOD means five-day biochemical oxygen demand.
2. TSS means total suspended solids.
3. mg/L means milligrams per liter.
4. kg means kilograms.
5. m^3/d means cubic meters per day.
6. MGD means million gallons per day.
7. Composite sample means a sample formed by collecting and mixing discrete samples taken periodically and based on time or flow.
8. FC means fecal coliform bacteria.
9. Technology based permit effluent limitations means technology-based treatment requirements as defined in 40 CFR 125.3, and concentration and mass load effluent limitations that are based on minimum design criteria specified in OAR 340-41.
10. CBOD means five day carbonaceous biochemical oxygen demand.
11. Grab sample means an individual discrete sample collected over a period of time not to exceed 15 minutes.
12. Quarter means January through March, April through June, July through September, or October through December.
13. Month means calendar month.
14. Week means a calendar week of Sunday through Saturday.
15. Total residual chlorine means combined chlorine forms plus free residual chlorine.
16. The term "bacteria" includes but is not limited to fecal coliform bacteria, total coliform bacteria, and E. coli bacteria.
17. POTW means a publicly owned treatment works.

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Ste. 120
Salem, OR 97301-1039
(503) 378-8240
(503) 378-3684 TTY

May 27, 2003

Mayor Lee Corbin
City of Yachats
PO Box 345
Yachats, OR 97498

RE: NPDES Permit and MAO
File No. 99260
EPA Number: OR002029-0
Facility: Yachats WTP, 500 W. 7th St, Yachats
Lincoln County

Dear Mayor Corbin:

Thank you for your comments on the proposed NPDES permit for the City of Yachats wastewater treatment plant. In your comment letter, you requested that the requirement contained in Schedule C.4. of the permit be removed. The condition required submission of a mixing zone/dilution study to determine whether the acute and chronic water quality standards for toxicity were being met at the edge of the mixing zone and the ZID. You indicated that completion of such a study would not be feasible due to the rocky nature of the location of the outfall. DEQ staff had concurred with the City staff assessment of these conditions.

The condition has been eliminated from the permit. Instead, we have included an effluent limitation for chlorine residual based on conservative estimates of dilution and effluent data from the DMR's submitted by the City. The City will likely not be able to meet this limitation until the planned upgrades at the plant are completed. Therefore, an interim limit which the City should be able to meet is included in the Mutual Agreement and Order (MAO).

Enclosed is the MAO for your signature. Please read the MAO cover sheet and return to Eugene Office. After final signatures, the MAO and permit will be issued and mailed to you.

If you have any questions regarding the permit, please contact me at (541) 686-7838 extension 234.

Sincerely,

Julie M. Berndt
Water Quality Permit Writer
Western Region, Eugene Office

enclosures
cc: Ruben Kretzschmar, Water Quality Specialist
Julie Berndt, Water Quality Permit Writer

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

OF THE STATE OF OREGON

IN THE MATTER OF:	)	MUTUAL AGREEMENT AND ORDER
City of Yachats, Permittee	)	NO. WQ WQ/M-WR-02-205 Lincoln County

WHEREAS:

1. On August 9, 1991, the Department of Environmental Quality (Department or DEQ) issued National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit Number 100812, (Permit) to the City of Yachats (Permittee). The Permit authorizes the Permittee to construct, install, modify or operate wastewater treatment control and disposal facilities (facilities) and discharge adequately treated wastewater into the Pacific Ocean, waters of the state, in conformance with the requirements, limitations and conditions set forth in the Permit. The Permit has remained in effect since issuance. Permittee made timely application for renewal prior to the June 30, 1996 expiration date and remains in effect. A permit renewal is being issued concurrently with the signing of the MAO.

2. Schedule A, Condition 1, of the Permit does not allow Permittee to exceed the following waste discharge limitations after the Permit issuance date:

Outfall Number 001:

May 1 to October 31:

	AVERAGE EFFLUENT CONCENTRATIONS		EFFLUENT LOADINGS		
Parameter	Monthly	Weekly	Monthly Average Lbs/day	Weekly Average lbs/day	Daily Maximum Lbs
BOD	20 mg/l	30 mg/l	25	37.5	50
TSS	20 mg/l	30 mg/l	25	37.5	50
Fecal coliform	200	400			

November 1 to April 30:

	AVERAGE EFFLUENT CONCENTRATIONS		EFFLUENT LOADINGS		
Parameter	Monthly	Weekly	Monthly Average Lbs/day	Weekly Average lbs/day	Daily Maximum Lbs
BOD	30 mg/l	45 mg/l	37.5	56	75
TSS	30 mg/l	45 mg/l	37.5	56	75
Fecal coliform	200	400			

Year Round:

Parameter	Average Effluent Concentration
Total Residual Chlorine	Shall not exceed 0.65 mg/l daily maximum and 0.25 mg/l monthly average.

3. During the time period the previous permit was in effect, Permittee has not been able to consistently meet the above effluent limitations. The Department sent Notices of Noncompliance (NON) to Permittee for violations of the NPDES effluent limitations on the following dates: April 2, 2001, for BOD and fecal exceedances in December 1999 and June 2000; July 26, 2001, for pH violations in May 2001; August 15, 2002, for fecal exceedances on June 2002; and August 27, 2002, for BOD exceedances in July 2002. The Department and the Permittee agree that most of these violations relate to the treatment plant no longer having adequate capacity to consistently treat the wastewater flows in accordance with the Permit discharge limitations.

4. The permittee uses chlorine as a disinfecting agent for killing pathogenic organisms living in the wastewater effluent. Condition 1 of Schedule A of the new Permit does not allow Permittee to exceed the waste discharge limitations for total residual chlorine at Outfall 001 after the Permit issuance date. The limitations are 0.25 mg/L monthly average and 0.6 mg/L daily maximum.

5. DEQ and the Permittee recognize that until new or modified facilities are constructed and put into full operation, Permittee will continue to violate the permit effluent limitations for BOD, total chlorine residual and fecal coliform bacteria at times.

6. Permittee presently is capable of treating its effluent so as to meet the following interim

effluent limitations, measured as specified in the Permit:

	AVERAGE EFFLUENT CONCENTRATIONS		EFFLUENT LOADINGS		
Parameter	Monthly	Weekly	Monthly Average lbs/day	Weekly Average lbs/day	Daily Maximum lbs
BOD	35 mg/l	45 mg/l	37.5	56	No limit
TSS	35 mg/l	45 mg/l	37.5	56	No limit
Fecal Bacteria	200 colonies				
Total Residual Chlorine	Shall not exceed 2.2 mg/l daily maximum and 1.8 mg/l monthly average.				

7. The Department and Permittee recognize that the Environmental Quality Commission has the power to impose a civil penalty and to issue an abatement order for violations of conditions of the Permit. Therefore, pursuant to ORS 183.415(5), the Department and Permittee wish to settle those past violations referred to in Paragraph 3 and to limit and resolve the future violations referred to in Paragraph 4 in advance by this Mutual Agreement and Order (MAO).

8. This MAO is not intended to settle any violation of any interim effluent limitations set forth in Paragraph 6 above. Furthermore, this MAO is not intended to limit in any way, the Department's right to proceed against Permittee in any forum for any past or future violations not expressly settled herein.

NOW THEREFORE, it is stipulated and agreed that:

9. The Environmental Quality Commission shall issue a final order:

A. Requiring Permittee to comply with the following schedule for sewage collection system and treatment plant upgrades:

(1) By no later than 60 days after the effective date of this MAO, Permittee shall submit Inflow/Infiltration (I&I) Rehabilitation plans and schedules to the Department for approval. Upon Department approval of the plans, Permittee will implement plans in accordance with the approved schedules.

(2) By no later than six months after the effective date of this MAO, Permittee shall submit to the Department, an Operation Optimization Study. The study shall include

interim operational and/or mechanical improvements that can feasibly be made to the wastewater treatment facility, an implementation schedule for same, and an estimate of the additional capacity that might be achieved by these improvements.

(3) By no later than 18 months after the effective date of this MAO, the Permittee shall submit to the Department a completed final Facilities Plan for approval.

(4) By no later than one year after Departmental approval of the Facilities Plan, Permittee shall secure funding for the project.

(5) By no later than 18 months after Department approval of the Final Facilities Plan, Permittee shall submit to the Department for approval Plans and Specifications for construction of the wastewater treatment facility upgrades.

(6) By no later than three months after Department approval of the final plans and specifications, the construction bids shall be awarded.

(7) By no later than 18 months after Department approval of the Plans and Specifications, the, Permittee shall complete construction of the wastewater treatment plant upgrades.

B. Requiring Permittee to meet the interim effluent limitations set forth in Paragraph 6 above until achieving compliance with Paragraph 9.A. above.

C. Prohibiting Permittee from allowing any new connections, based upon Equivalent Dwelling Units (EDUs), to the Permittee' sewage collection system after the effective date of this MAO, unless otherwise authorized in writing by the Department. Exceptions to this prohibition may be authorized in writing by the Department provided Permittee achieves and maintains the corrective schedules outlined in Paragraph 9.A. above in accordance with the following items:

(1) Permittee may allow connection of up to 10 EDUs upon the effective date of this MAO.

(2) Permittee may allow connection of additional EDUs upon completion of the Inflow/Infiltration Reduction Plan corrections. Additional EDUs may not exceed the estimated reduction in flow and may not exceed 10 EDUs in total..

(3) Permittee may allow connection of up to 10 EDUs upon submittal of a completed Facilities Plan.

(4) Permittee may allow connection of up to 10 EDUs upon submission of documentation demonstrating that funding arrangements have been completed as required in Paragraph 9.A. (4) above.

(5) Permittee may allow connection of up to 10 EDUs upon submission of Plans and Specifications for construction of the wastewater treatment facility upgrades.

(6) Permittee may also submit for Department approval a plan for interim capacity improvements. Upon Department approval of the plan, and completion of the improvements, Permittee may request authorization for additional EDU connections.

(7) In the event Permittee fails to comply with the corrective schedule in Paragraph 9.A. above, the Department may rescind authorization for any EDU connections not yet completed until the Permittee complies with the schedule in Paragraph 9.A. For the purposes of this MAO, an EDU is defined as equivalent to a single-family residence. For EDUs of other types of establishments, the flow shall be calculated as specified in OAR Chapter 340 Division 71 Table 2 Column 1, and divided by 250 gallons per day. Permittee shall submit quarterly reports on the number of EDUs connected in the previous quarter. Reports shall be submitted no later than 15th of the month following the quarter.

D. Requiring Permittee, upon receipt of a written Penalty Demand Notice from the Department, to pay the following stipulated civil penalties:

(1) $250 for each day of each violation of the compliance schedule set forth in Paragraph 9.A.

(2) $100 for each violation of each weekly average waste discharge limitation set forth in Paragraph 6.

(3) $500 for each violation of each monthly average waste discharge limitation set forth in Paragraph 6.

(4) $10,000 for any EDU connection not authorized by the Department pursuant to the terms and conditions of this MAO.

10. If any event occurs that is beyond Permittee's reasonable control and that causes or may cause a delay or deviation in performance of the requirements of this MAO, Permittee shall immediately notify the Department verbally of the cause of delay or deviation and its anticipated duration, the measures that have been or will be taken to prevent or minimize the delay or deviation, and the timetable by which Permittee proposes to carry out such measures. Permittee shall confirm in writing this information within five (5) working days of the onset of the event. It is Permittee's responsibility in the written notification to demonstrate to the Department's satisfaction that the delay or deviation has been or will be caused by circumstances beyond the control and despite due diligence of Permittee. If Permittee so demonstrates, the Department shall extend times of performance of related activities under this MAO as appropriate. Circumstances or events beyond Permittee's control include, but are not limited to, acts of nature, unforeseen strikes, work stoppages, fires, explosion, riot, sabotage, or war. Increased cost of performance or consultant's failure to provide timely reports may not be considered circumstances beyond Permittee's control.

11. Regarding the violations set forth in Paragraphs 4 and 5 above, which are expressly settled herein without penalty, Permittee and the Department hereby waive any and all of their rights to any and all notices, hearing, and judicial review, and to service of a copy of the final order herein. The Department reserves the right to enforce this MAO through appropriate administrative and judicial proceedings.

12. Permittee acknowledges that Permittee is responsible for complying with the schedule set forth in Paragraph 9.A. above regardless of the availability of any federal or state grant monies.

13. The terms of this MAO may be amended by the mutual agreement of the Department and Permittee.

14. The Department may amend the compliance schedule and conditions in this MAO upon finding that such modification is necessary because of changed circumstances or to protect public

health and the environment. The Department shall provide Permittee a minimum of thirty (30) days written notice prior to issuing an Amended Order modifying any compliance schedules or conditions. If Permittee contests the Amended Order, the applicable procedures for conduct of contested cases in such matters shall apply.

15. This MAO shall be binding on the parties and their respective successors, agents, and assigns. The undersigned representative of each party certifies that he or she is fully authorized to execute and bind such party to this MAO. No change in ownership or corporate or partnership status relating to the facility shall in any way alter Permittee's obligations under this MAO, unless otherwise approved in writing by DEQ.

16. All reports, notices and other communications required under or relating to this MAO should be directed to Ruben Kretzschmar, DEQ Coos Bay Regional Office, 340 Front, Coos Bay, Oregon 97420, phone number (541) 269-2721, ext. 23. The contact person for Permittee shall be Mayor, City of Yachats, PO Box 345, Yachats, Oregon 97498, phone number (541) 547-3565.

17. Permittee acknowledges that it has actual notice of the contents and requirements of the MAO and that failure to fulfill any of the requirements hereof would constitute a violation of this MAO and subject Permittee to payment of stipulated civil penalties pursuant to Paragraph 9.E. above.

18. Any stipulated civil penalty imposed pursuant to Paragraph 9.D. shall be due upon written demand. Stipulated civil penalties shall be paid by check or money order made payable to the "Oregon State Treasurer" and sent to: Business Office, Department of Environmental Quality, 811 S.W. Sixth Avenue, Portland, Oregon 97204. Within 21 days of receipt of a "Demand for Payment of Stipulated Civil Penalty" Notice from the Department, Permittee may request a hearing to contest the Demand Notice. At any such hearing, the issue shall be limited to Permittee's compliance or non-compliance with this MAO. The amount of each stipulated civil penalty for each violation and/or day of violation is established in advance by this MAO and shall not be a contestable issue.

19. Providing Permittee has paid in full all stipulated civil penalties pursuant to Paragraph 18 above, this MAO shall terminate 60 days after Permittee demonstrates full compliance with the

requirements of the schedule set forth in Paragraph 9.A. and 9.B. above.

PERMITTEE

6/6/03
Date

Mayor, City of Yachats

DEPARTMENT OF ENVIRONMENTAL QUALITY

Date

Kerri L. Nelson, Administrator

FINAL ORDER

IT IS SO ORDERED:

ENVIRONMENTAL QUALITY COMMISSION

Date

Kerri L. Nelson, Administrator
Department of Environmental Quality
Pursuant to OAR 340-011-0136(1)

APPENDIX C -
DEQ Correspondence

APPENDIX

C

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Ste. 120
Salem, OR 97301-1039
(503) 378-8240
(503) 378-3684 TTY

DATE: July 17, 2009

TO: Mr. John McClintock, Director
City of Yachats Public Works
PO Box 345
Yachats, OR 97498

Re: Mixing Zone study requirements
File no. 99260
Lincoln County

John:

Attached to this letter is a copy of a memo from Steve Schnurbusch, the mixing zone expert in our Salem office, which summarizes what the City needs to include in a Mixing Zone Study. Please forward a copy on to the City's engineering consultant on this project. If anyone has questions on the mixing zone study requirements, they can contact Steve by telephone at (503) 378-8306 or by e-mail at *Schnurbusch.Stephen@deq.state.or.us*. You can, of course, get in touch with me with questions as well.

Sincerely,

Mary Pfauth
Water Quality Specialist
DEQ – Salem

cc: Honorable Ronald Brean, Mayor
City of Yachats
PO Box 345
Yachats, OR 97498

Memorandum

To: Mary Pfauth **Date:** July 16, 2009

From: Steve Schnurbusch

Subject: City of Yachats Mixing Zone Study

Below is a summary of the mixing zone requirements the City will need to submit to the Department. I would suggest you include this memo in a letter to the City.

Dilution Analysis
The City will need to submit a dilution analysis providing the estimated dilutions achieved at the edge of the zone of initial dilution and at the edge of the mixing zone. The location of the outfall makes this difficult to perform using traditional methods. According to the Department's Regulatory Mixing Zone Internal Management Directive (RMZ IMD), this facility is required to perform a level 1 mixing zone study. A level 1 is the least intensive study with a level 3 being the most intensive. For a level 1, reasonable estimates of ambient conditions may be used to model the discharge. This is discussed in more detail in the Departments RMZ IMD, Part 2 (see web link below). With the unique outfall situation, a contracted consultant may develop a different method for estimating dilution. This should be discussed with the Department prior to proceeding.

Environmental Mapping/Ocean Discharge Criteria
Attached is a summary/checklist of what will be required to perform the environmental mapping exercise portion of the mixing zone study and to satisfy the federal rules regarding ocean discharge criteria? An example of a level 1 environmental map is illustrated in Figure 4-1 of the RMZ IMD. Additional information about threatened and endangered species presence and persistent bioaccumulative toxics will be necessary to satisfy the ocean discharge criteria findings.

The City or their consultant may contact me at anytime to discuss the mixing zone study requirements. Typically a consultant will prepare a mixing zone study plan for the Department's review. The Department will review the plan and provide any needed comments. Then the City can move forward with the study. Often times it is helpful to arrange a meeting to discuss the study plan. I am available to meet with them if necessary.

Here are the links to the Department's RMZ IMD documents. The first one provides a discussion of the Department's policies, rules, and background regarding mixing zones and the second one is more of a technical resource for conducting and reviewing mixing zone studies.

Regulatory Mixing Zone IMD, Part 1 (Policy)
http://www.deq.state.or.us/wq/pubs/imds/rmz/RMZIMDpart1.pdf

Regulatory Mixing Zone IMD, Part 2 (Technical aspects of MZ studies)
http://www.deq.state.or.us/wq/pubs/imds/rmz/RMZIMDpart2.pdf

Mixing Zone Environmental Mapping Data Needs
for
NPDES facilities having ocean discharges

Plan view map of area within ½ mile of ocean outfall showing:

- known commercial shellfish areas
- known recreational shellfish areas
- known commercial finfishing areas
- known recreational finfishing areas
- fish spawning/rearing habitat
- cold water refugia for fish
- physical structures expected to attract fish (e.g., piers, intakes, outfalls, etc.)
- public access areas (e.g., boat ramps, public beaches, etc.)
- drinking water intakes
- other NPDES discharges

Threatened and endangered (T & E) species, especially salmonids:

- Present or Absent?
- If present, list T & E species
- If present, then describe habitat with uses by T &E species including spawning sites, nursery/forage areas, migratory pathways, other critical life stages.

Plan view map of area within 1mile of ocean outfall showing:

- marine sanctuaries
- marine refuges
- marine parks
- marine national parks
- marine historic monuments
- national seashores
- wilderness areas
- coral reefs

Note: if any of the above are between 1 and 5 miles of the outfall, make mention of them in narrative.

Evaluate potential impacts on human health via direct or indirect pathways (e.g., public access to site, measures taken to mitigate public exposure)

Evaluate potential for bioaccumulation or persistence of pollutants to be discharged.

Evaluate potential transport of bioaccumulative or persistent pollutants to be discharged.

Note: Department can add additional data needs.