

## **Addendum #1**

# **Modifications to North Coast Basin Temperature Waste Load and Load Allocations**

**for the**

**Tillamook Bay Watershed Total Maximum Daily Load (TMDL)  
(June 2001)**

**Nestucca Bay Watershed Total Maximum Daily Load (TMDL)  
(April 2002)**

**North Coast Subbasins Total Maximum Daily Load (TMDL)  
(June 2003)**



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State of Oregon  
Department of  
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**OVERVIEW**

The State of Oregon's Water Quality Standard for temperature was modified after the issuance of the Tillamook Bay Watershed (June 2001), Nestucca Bay Watershed (April 2002) and North Coast Subbasins (June 2003) Total Maximum Daily Loads (TMDLs). This standard modification, along with a pending reissuance of National Pollutant Discharge Elimination System (NPDES) permits for facilities in these watersheds in 2006, necessitates a recalculation of the wasteload allocation (WLA). The Department of Environmental Quality (DEQ) is modifying the waste load allocations for the following facilities (locations shown in Figure 1):

**Nestucca TMDL:**

Cloverdale Sanitary District, Nestucca River (RM 7.0), Permit File # 17318  
Hebo Joint Water & Sanitary Authority, Three Rivers (RM 0.75), Permit File # 100058

**North Coast TMDL:**

Fishhawk Lake Recreation Club, Inc., Fishhawk Creek (RM 3.8), Permit File # 29850  
City of Vernonia WWTP, Nehalem River (RM 90.3), Permit File # 92773

**Tillamook Bay TMDL:**

Pacific Campground, Wilson River (RM 0.9), Permit File # 66063  
City of Tillamook WWTP, Trask River (RM 1.9), Permit File # 88665  
Tillamook Creamery, Wilson River (RM 1.7), Permit File # 88729  
Tillamook Industrial Park WWTP, Trask (RM 5.2), Permit File # 70615

Certain facilities included in the aforementioned TMDLs will not have their WLAs modified at this time because additional data is required or the facility WLA will be included in the Lower Columbia Dissolved Oxygen TMDL which is due out at a later date. These facilities are listed below:

Additional data needed (these facilities are under general permits which are not scheduled for renewal in 2006):

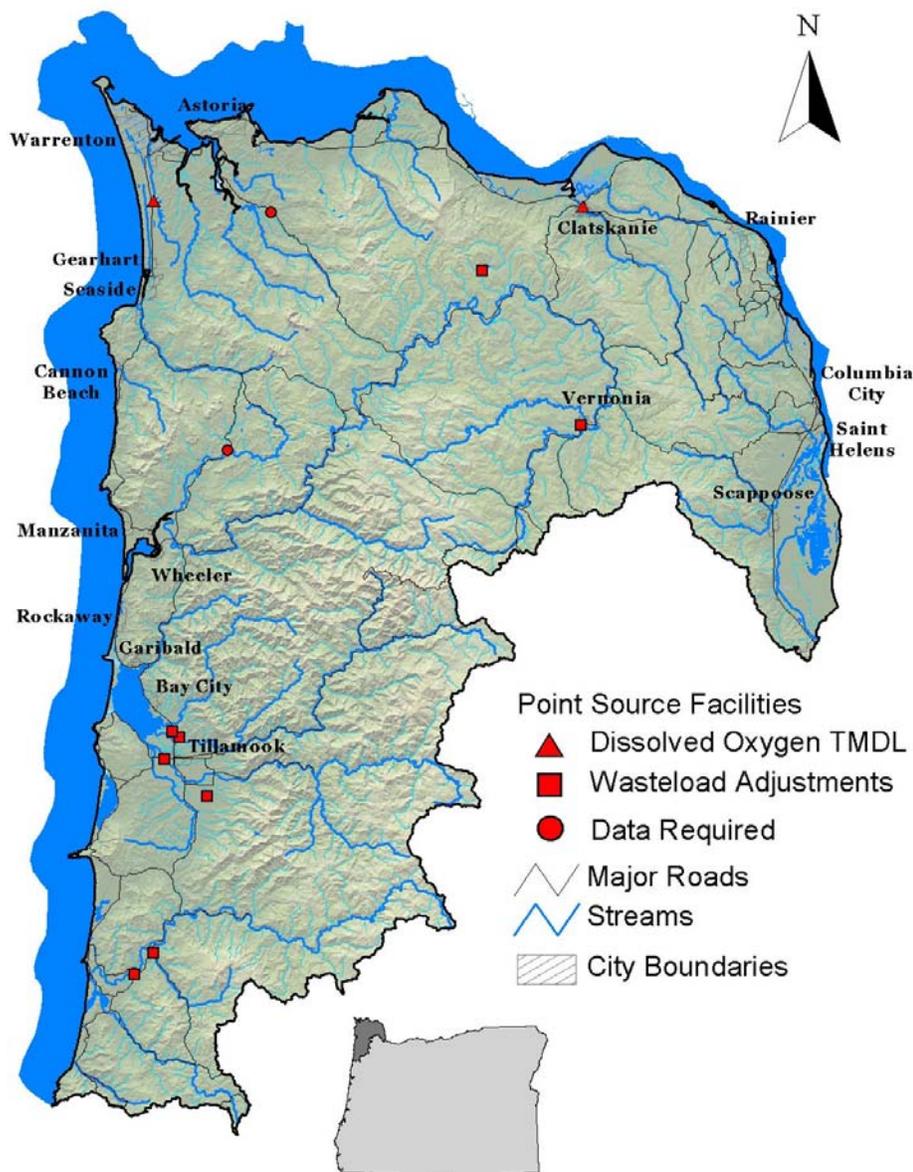
ODFW – Klaskanine Fish Hatchery, Klaskanine River (RM 4.6) North Coast TMDL,  
Permit File # 64475  
ODFW – North Fork Nehalem Fish Hatchery, N F Nehalem River (RM 10.5) North Coast  
TMDL, Permit File # 64510

**Lower Columbia Dissolved Oxygen TMDL**

Shoreline Sanitary District, Skipanon River (RM 8.0) North Coast TMDL,  
Permit File # 81118  
City of Clatskanie WWTP, Clatskanie River (RM 1.1) North Coast TMDL,  
Permit File # 16872

This addendum is to be attached to the North Coast Subbasins, Tillamook Bay, and Nestucca Bay Watershed TMDLs. It modifies the wasteload allocations for the facilities specific facilities in those TMDLs. The following discussion presents the information to support this modification.

**Figure 1 Point Source Facilities in North Coast Subbasins, Tillamook Bay, and Nestucca TMDLs**



**TEMPERATURE STANDARD CHANGES**

The United States Environmental Protection Agency (USEPA) approved Oregon’s new temperature standard on March 2, 2004. Several elements of the new standard differ from the standard addressed in the TMDLs. The differing elements having an impact on the Waste load Allocations covered in previously established TMDLs include:

1. A change in the applicable numeric criterion for salmon migration and rearing habitat from 17.8°C (64°F) to 18.0°C (64.4°F), spawning habitat from 12.8°C (55°F) to 13°C (55.4°F), and the inclusion of a core cold water habitat designation of 16°C (60.8°F);
2. Adjustments to spawning time periods; and
3. A change in the human use allowance from a maximum increase of 0.25°F at the edge of a facility’s mixing zone to a maximum cumulative impact of 0.3°C (0.54°F) for all sources after complete mixing in the water body, and at the point of maximum impact.

The specifics of the new standard and its impact on the waste load allocations are discussed below.

**Water Quality Standard Identification**

The applicable temperature water quality standard is included in OAR 340-041-0028, the full text of which is included at the end of this memo. Subsections (1), (2) and (3) of the standard give the background, policy and purpose of the rule.

Under subsection (4) of the new standard, the numeric criteria for a specific stream are to be based on the beneficial uses (unless superseded by natural conditions or site-specific criteria). For the North Coast Subbasins, the beneficial uses related to temperature are delineated in Figures 230A and 230B of the rule (both figures are attached to this memo). These figures show waterbodies supporting salmon and trout rearing and migration habitat (Figure 230A) and salmon and steelhead spawning use (Figure 230B).

Subsection (12) of the rule explains how the temperature criteria are to be implemented. The portion of this subsection that is pertinent to the TMDL modification states:

*OAR 340-041-0028 (12) Implementation of the Temperature Criteria*

*(b) Human Use Allowance. Insignificant additions of heat are authorized in waters that exceed the applicable temperature criteria as follows:*

*(B) Following a temperature TMDL or other cumulative effects analysis, waste load and load allocations will restrict all NPDES point sources and nonpoint sources to a cumulative increase of no greater than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria after complete mixing in the water body, and at the point of maximum impact.*

In addition to the pertinent elements of the temperature standard listed above, a “Temperature Thermal Plume Limitation” rule has been implemented (OAR 340-041-0053[2][d]). This rule will limit waste load allocations and will be further addressed in the NPDES Permit Evaluation Reports.

*340-041-0053 (2)(d) Mixing Zones*

*(C) Thermal shock caused by a sudden increase in water temperature is prevented or minimized by limiting potential fish exposure to temperatures of 25.0 degrees Celsius (77.0 degrees Fahrenheit) or more to less than 5 percent of the cross section of 100 percent of the 7Q10 low flow of the water body; the Department may develop additional exposure timing restrictions to prevent thermal shock; and*

*(D) Unless the ambient temperature is 21.0 degrees of greater, migration blockage is prevented or minimized by limiting potential fish exposure to temperatures of 21.0 degrees Celsius (69.8 degrees Fahrenheit) or more to less than 25 percent of the cross section of 100 percent of the 7Q10 low flow of the water body.*

**SUMMARY OF WASTELOAD ALLOCATION APPROACH**

Utilizing a similar methodology to that used in the original TMDLs, a revised wasteload allocation (WLA) in the form of allowable effluent temperature has been calculated for the facilities designated in the original TMDLs. This methodology takes into account river flow and temperature, effluent flow and temperature, and the human use allowance (temperature increase over the applicable criterion). In most cases where the Natural Thermal Potential of the receiving stream was determined, it was less than the biological criteria. The Trask and Wilson Rivers had Natural Thermal Potential above the biological criteria in the lower reaches.

A portion of the Human Use Allowance (HUA = 0.3°C) is allocated to nonpoint sources of heat (0.05°C) and a portion is allocated to Reserve Capacity (0.05°C) for future uses. This leaves up to 0.2°C for allocating to point sources in the waterbody. If there are multiple sources or if additional capacity is needed by a source an additional allocation could be made to the maximum of 0.2°C. Additional allocations could be made beyond

the 0.2°C maximum by taking from the Reserve Capacity allocation. If the maximum point source allocation is not used, the remainder would be added to the Reserve Capacity for future uses.

The initial step for calculating the waste load allocation assumes that the HUA (0.3°C) and 25% of the 7Q10 low flow in the receiving water body are used to calculate the allocation. This is the “pre-TMDL” limitation described under OAR340-041-0028(12)(b)(A) which states that no point source “*may cause the temperature of the water body to increase more than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria after mixing with either twenty five (25) percent of the stream flow, or the temperature mixing zone, whichever is more restrictive*”.

There is a relationship between the HUA and the 7Q10 flow, as demonstrated in Equation 1 below. When the  $T_{WLA}$  for the equation is held constant and the full 7Q10 is substituted for the 25 percent of the 7Q10, the HUA ( $Max\Delta T$ ) is changed because the flow is increased. The resultant temperature increase in fully mixed receiving water would be limited to approximately 0.08°C.

The portioning of the HUA may be altered due to growth or other circumstances and if the waterbody has the capacity to absorb additional heat within the HUA. The resulting temperature increase in this scenario depends on the proportion of flow allocated, but generally will not exceed 0.2°C for point sources over the entire waterbody, unless Reserve Capacity is allocated to the source. Generally, the WLAs calculated in this document do not exceed the 0.3°C HUA and the 25% of the 7Q10 low flow. The parameters used in the Tillamook Creamery’s calculation were 0.3°C HUC and 40% of the 7Q10 low flow. Following the description in the paragraph above, the resultant temperature increase in the fully mixed receiving water would be limited to approximately 0.12°C which is less than the allowable 0.3°C.

A modified form of the equation in the original TMDLs was used to determine the maximum allowable point source effluent temperature under critical conditions. The equations in the TMDLs were modified to correlate with the new standard. In particular, instead of using the upstream river flow through the zone of dilution, the modified equation uses a percentage of the 7Q10 flow and the maximum allowable change in river temperature is after full mixing.

The following equation was used to calculate the point source waste load allocation (allowable effluent temperature).

Equation 1:

$$T_{WLA} = \frac{[(Q_{PS} + Q_R^*) \cdot (T_R + Max\Delta T)] - (Q_R \cdot T_R)}{Q_{PS}}$$

In addition, a revised wasteload allocation (WLA) in the form of heat loading to the river ( $H_{WLA}$ ) has been calculated for the sources. The following equation was used for the heat loading WLA.

Equation 2:

$$H_{WLA} = (Q_{PS} + Q_R) \cdot (Max\Delta T (^{\circ}C)) \cdot \left(1/35.3 \left(\frac{m^3}{ft^3}\right)\right) \cdot \left(1000 \left(\frac{kg}{m^3}\right)\right) \cdot \left(86400 \left(\frac{sec}{day}\right)\right) \cdot \left(c \left(\frac{kcal}{kg^{\circ}C}\right)\right)$$

- $T_R$ : Upstream river temperature criterion
- $T_{WLA}$ : Maximum allowable point source effluent temperature
- $Max\Delta T$ : Maximum Allowable Change in river temperature after full mixing – up to 0.3°C for all sources
- $Q_R$ : Critical upstream river flow – \*percentage of the 7Q10 low flow statistic (cfs)
- $Q_{PS}$ : Point source effluent discharge (cfs)
- $H_{WLA}$ : Allowable heat from point source effluent received by river (kcal/day)

c: Specific heat of water (1 kcal/kg °C)

### **WASTELOAD ALLOCATIONS UNDER THE NEW STANDARD**

New WLA are shown in revised Tables 12, 8, and 7 (see below). The numbering reflects the WLA table number in the original TMDLs. These Tables can therefore replace the tables in the original TMDLs. The following is a discussion of the assumptions used in the revising the WLAs.

### **THE NORTH COAST SUBBASINS TMDL (Table 12)**

#### **Fishhawk Lake Recreation Club:**

DEQ has determined that adjustments to the Fishhawk Lake Recreation Club (Fishhawk) WLA are required based on the new temperature standard. The salmonid designation assigned by Oregon Department of Fish and Wildlife (ODF&W) has changed for Fishhawk Creek, the stream that receives discharge waters from the Fishhawk facility. The first change was to designate Fishhawk Creek as Core Cold-water habitat for salmon. In addition, the spawning time period was adjusted from October 15<sup>th</sup> through May 31<sup>st</sup> to October 15<sup>th</sup> through May 15<sup>th</sup>. The multiple use designations of Core Cold-water habitat and spawning require that two WLAs be calculated for the Fishhawk facility: the Core Cold-water WLA applicable from May 16<sup>th</sup> through October 14<sup>th</sup> and the spawning WLA applicable from October 15<sup>th</sup> through May 15<sup>th</sup>.

A revised WLA for the Fishhawk facility was calculated by using the equations given in the Summary of Approach section, along with the appropriate flow and temperature data. The facility discharge flow and effluent temperature were based on the maximum observed values for the appropriate time period. These data are as follows:

- $T_R$ , the upstream river temperature criterion, is 16°C Core Cold-water and 13°C for spawning.
- $Max\Delta T$ , the maximum allowable change in river temperature after full mixing ( °C), is allowed by the new rule to be up to 0.3°C for all sources. With a quarter (25%) of the 7Q10 stream flow used in the calculation the resultant temperature increase in fully mixed receiving water would be limited to approximately 0.08°C. (Refer to the Summary of Approach section for information regarding reserve capacity).
- $Q_R$ , the critical upstream river flow (7Q10 low flow statistic), has been determined to be 5 (cfs). Note: This is the same river flow given in the original TMDL.
- $Q_{PS}$ , the point source effluent discharge, is 0.11 cfs. Note: This is a decrease from the flow of 0.15 cfs given in the original TMDL.

Temperature and flow data from 2003 and 2004 was analyzed for WLA updates. Data was only available from June through October. Maximum temperature and maximum flow during this time period was used to determine temperature WLA. Temperature and flow data are not available prior 2003 or in 2005. Receiving stream flow (7Q10) was not changed from the previous TMDL.

Two days of effluent temperature data exceed 24.4°C (76°F) degrees. These reading were believed to be anomalous and therefore excluded from the WLA calculation. The maximum temperature excluding those 2 days is 20.8°C (69.44°F). The lesser effluent temperature was chosen to represent Fishhawk effluent temperature. The 7Q10 flow is represented by a single flow volume possible taken on August 8th 2000.

**City of Vernonia:**

DEQ has determined that adjustments to the City of Vernonia's WLA are required based on the new temperature standard. The salmonid use designation assigned by ODF&W has changed for the section of the Nehalem River that receives discharge waters from the Vernonia facility. The first change was to designate Nehalem River as Core Cold-water habitat for salmon. In addition the spawning time period was adjusted from August 15<sup>th</sup> through May 31<sup>st</sup> to September 1<sup>st</sup> through May 15<sup>th</sup>. The multiple use designations of Core Cold-water habitat and spawning would normally require that two WLAs be calculated for the Vernonia facility: the Core Cold-water WLA applicable from May 16<sup>th</sup> through August 31<sup>st</sup> and the spawning WLA applicable from September 1<sup>st</sup> through May 15<sup>th</sup>. However, the City of Vernonia will not be discharging during the Core Cold-water season. Therefore a single WLA will be calculated for the spawning season.

A revised WLA for the Vernonia facility was calculated by using the equations given in the Summary of Approach section, along with the appropriate flow and temperature data. The facility discharge flow and effluent temperature were based on the maximum observed values for the appropriate time period. These data are as follows:

- $T_R$ , the upstream river temperature criterion, is 13°C for spawning.
- $Max\Delta T$ , the maximum allowable change in river temperature after full mixing (°C), is allowed by the new rule to be up to 0.3°C for all sources. With a quarter (25%) of the 7Q10 stream flow used in the calculation the resultant temperature increase in fully mixed receiving water would be limited to approximately 0.08°C. (Refer to the Summary of Approach section for information regarding reserve capacity).
- $Q_R$ , the critical upstream river flow (7Q10 low flow statistic), has been determined to be 43 (cfs) for the spawning period. Note: This is the same river flow given in the original TMDL.
- $Q_{PS}$ , the point source effluent discharge, is 1.5 (cfs) for the spawning period.

The City of Vernonia will be modifying its treatment facility which includes an increase holding capacity for the facility. The City of Vernonia will not discharge from May 16<sup>th</sup> through November 14<sup>th</sup>. Temperature data is only available for April and May of 2005. The maximum temperature from this data was used in the WLA calculation for the WWTP. Effluent flow data are recorded in DMRs whenever the WWTP is discharging. Maximum effluent flow data was used for WLA calculation as well. Effluent flow from April and May of 2005 and November, April, May, and June of 2004 was used to determine the maximum flow value. Receiving stream flow (7Q10) was not changed from the previous TMDL. Nehalem River 7Q10 flows were taken from the City of Vernonia Wastewater Facilities Plan, October 2002.

Vernonia's permitted flow is based on season monthly flows. Currently the permitted flow is from the calculated Monthly Maximum Dry Weather Flow MMDWF of .52 MGD or 0.8 cfs. The maximum flow recorded in the DMR data (1.5 cfs) was used to calculate the WLA for the facility.

**ODF&W North Fork Nehalem Fish Hatchery:**

The North Fork Nehalem Fish hatchery discharges under a general permit. The salmonid designation assigned by ODF&W has changed for the North Fork Nehalem River that receives discharge waters from the Nehalem Hatchery. The spawning time period was adjusted from October 1st through May 31st to October 15th through May 15th.

DEQ has determined that adjustments to the North Fork Nehalem Fish Hatchery WLA are necessary but not possible at this time given minimal data available. There was limited flow and temperature data for the Hatchery. For example, the 7Q10 flow was represented by a flow volume taken on August 8, 2000.

Supplemental flow and temperature data from the Hatchery discharge will need to be collected prior to a waste load allocation calculation can be determined. DEQ will coordinate with the Nehalem Hatchery to establish a monitoring plan to meet data needs for the facility.

### **Shoreline Sanitary District:**

The salmonid designation assigned by ODF&W has changed for the Skipanon River that receives discharge waters from the Shoreline Facility. A spawning designation was added to the Skipanon River for October 15<sup>th</sup> through May 15<sup>th</sup>. DEQ has determined that any adjustment to the temperature WLA for the Shoreline Sanitary District based on the new temperature standard will be included in the Lower Columbia Dissolved Oxygen TMDL. Water temperature influences both the concentration of oxygen in water at saturation and the biological requirements for oxygen. Temperature and dissolve oxygen WLA will be part of the Lower Columbia Dissolved Oxygen TMDL.

### **ODF&W Klaskanine Fish Hatchery:**

The Klaskanine Fish hatchery discharges under a general permit. The salmonid designation assigned by ODF&W has changed for the Klaskanine River that receives discharge waters from the Klaskanine Hatchery. The spawning time period was adjusted from September 15th through June 30th to October 15th through May 15th.

DEQ has determined that adjustments to the Klaskanine Fish Hatchery WLA are necessary but not possible at this time given the minimal data available. In order to make the appropriate adjustments based on the new temperature standard, additional facility data (flow and temperature) will need to be acquired. DEQ will coordinate with the Klaskanine Hatchery to establish a monitoring plan to meet data needs for the facility.

### **City of Clatskanie:**

DEQ has determined that any adjustment to the temperature WLA for the City of Clatskanie WWTP based on the new temperature standard be included in the Lower Columbia Dissolved Oxygen TMDL. Water temperature influences both the concentration of oxygen in water at saturation and the biological requirements for oxygen. Because temperature has an influence on dissolve oxygen levels, temperature WLA for the Clatskanie WWTP will be considered as part of the Lower Columbia Dissolved Oxygen TMDL.

### **TILLAMOOK BAY TMDL (Table 8)**

#### **Pacific Campground:**

DEQ has determined that adjustments to the Pacific Campground waste load allocations (WLA) are required based on the new temperature standard. The salmonid designation assigned by ODF&W has remained the same for the Wilson River, the waterbody that receives discharge from the Pacific Campground facility. ODF&W has not designated the Wilson River as spawning habitat in the location of the facility's discharge.

A revised WLA for the Pacific Campground was calculated by using the equations given in the Summary of Approach section, along with the flow and temperature data from the Tillamook Bay TMDL. These data are as follows:

- $T_R$ , the upstream river temperature criterion, is 18°C for rearing and migration.
- $Max\Delta T$ , the maximum allowable change in river temperature after full mixing, is allowed by the new rule to be up to 0.3°C for all sources. With a quarter (25%) of the 7Q10 stream flow used in the calculation the resultant temperature increase in fully mixed receiving water would be limited to

approximately  $0.08^{\circ}\text{C}$ . (Refer to the Summary of Approach section for information regarding reserve capacity).

- $Q_R$ , the critical upstream river flow (7Q10 low flow statistic), has been determined to be 48 (cfs). Note: This is the same river flow given in the original TMDL.
- $Q_{PS}$ , the point source effluent discharge, is 0.08 cfs. Note: This is the same effluent flow given in the original TMDL.

Effluent temperature and flow data was not updated because there was little to no impact from the source. Receiving stream flow (7Q10) was not changed from the previous TMDL. The 7Q10 flow is based on gage data, page 118 in the Tillamook Bay TMDL.

### **Tillamook Creamery:**

DEQ has determined that adjustments to the Tillamook Creamery WLA are required based on the new temperature standard. The salmonid Migration and Rearing designation assigned by ODF&W has remained the same for the section of the Wilson River that ultimately receives discharge waters from the Creamery via the wetland system. ODF&W has not designated the Wilson River as spawning habitat in the location of the facility's discharge.

The Creamery has added a cooling tower to the facility since adoption of the initial temperature TMDL. Based on effluent temperature data, the cooling tower has reduced effluent temperatures. In addition, the Creamery no longer discharges directly to the Wilson River but to the head of a wetland system. The wetland drains to the Wilson River. DEQ has decided to allocate a larger portion of the HUA to the Creamery. The Creamery could meet the initial WLA based on the  $0.3^{\circ}\text{C}$  and 25% of the 7Q10 but it was dependent on the cooling tower working at maximum efficiency. The decision was based on the fact that the cooling towers effectiveness to reduce effluent temperature is dependent on humidity and ambient air temperature. As these factors change so does the efficiency of the cooling tower. Consequently, in order to have a sound compliance position, the Department has decided to allocate more waste load to the Creamery.

A revised WLA for the Tillamook Creamery was calculated by using the equations given in the Summary of Approach section, along with the current maximum flow and temperature data. These data are as follows:

- $T_R$ , the upstream river temperature criterion, is  $18^{\circ}\text{C}$  for rearing and migration.
- $\text{Max}\Delta T$ , the maximum allowable change in river temperature after full mixing ( $^{\circ}\text{C}$ ), is allowed by the new rule to be up to  $0.3^{\circ}\text{C}$  for all sources. With two fifths (40%) of the 7Q10 stream flow used in the calculation the resultant temperature increase in fully mixed receiving water would be limited to approximately  $0.12^{\circ}\text{C}$ . (Refer to the Summary of Approach section for information regarding reserve capacity).
- $Q_R$ , the critical upstream river flow (7Q10 low flow statistic), has been determined to be 48 (cfs). Note: This is the same river flow given in the original TMDL.
- $Q_{PS}$ , the point source effluent discharge, is 0.83 cfs.

Effluent temperature and flow data were available for 2005 from January through October. Wetland temperature data from 2005 was also available for the upper and low wetland. The maximum temperature and flow data from June through October was used in the WLA calculation for the Creamery. The 7Q10 flow is based on gage data, page 118 in the Tillamook Bay TMDL.

**City of Tillamook:**

DEQ has determined that adjustments to the City of Tillamook WLA are required based on the new temperature standard. The salmonid Migration and Rearing designation assigned by ODF&W has remained the same for the section of the Trask River that receives discharge waters from the Tillamook facility. ODF&W has not designated the Trask River as spawning habitat in the location of the facility's discharge.

A revised WLA for the Tillamook was calculated by using the equations given in the Summary of Approach section, along with the appropriate flow and temperature data. These data are as follows:

- **T<sub>R</sub>**, the upstream river temperature criterion, is 18°C for rearing and migration.
- **MaxΔT**, the maximum allowable change in river temperature after full mixing (°C), is allowed by the new rule to be up to 0.3°C for all sources. With a quarter (25%) of the 7Q10 stream flow used in the calculation the resultant temperature increase in fully mixed receiving water would be limited to approximately 0.08°C. (Refer to the Summary of Approach section for information regarding reserve capacity).
- **Q<sub>R</sub>**, the critical upstream river flow (7Q10 low flow statistic), has been determined to be 54 (cfs). Note: This is the same river flow given in the original TMDL.
- **Q<sub>PS</sub>**, the point source effluent discharge, is 2.6 cfs. Note: Effluent discharge based on summer of 2004 and 2005 DMR data, this is an increase in flow from 1.64 cfs given in the original TMDL.

The City of Tillamook DMR data show 8 days with effluent flow 1.4 MGD (2.17 cfs) or greater from April through October 2004 and April and July 2005. The same time period was used to determine maximum effluent temperature. The 7Q10 flow is based on gage data, page 118 in the Tillamook Bay TMDL.

**Tillamook Industrial Park WWTP:**

DEQ has determined that adjustments to the Tillamook Industrial Park WLA are required based on the new temperature standard. The salmonid designation assigned by ODF&W has remained the same for the section of the Trask River that receives discharge waters from the Tillamook Industrial Park. The spawning time period was adjusted to September 1<sup>st</sup> through June 14<sup>th</sup>. ODF&W has designated the Trask River as spawning habitat in the location of the facility's discharge. DEQ will calculate a single spawning WLA for the facility because it does not discharge from June 1<sup>st</sup> through October 31<sup>st</sup>.

A revised WLA for the Tillamook Industrial Park was calculated by using the equations given in the Summary of Approach section, along with the appropriate flow and temperature data. These data are as follows:

- **T<sub>R</sub>**, the upstream river temperature criterion, is 13°C for spawning.
- **MaxΔT**, the maximum allowable change in river temperature after full mixing (°C), is allowed by the new rule to be up to 0.3°C for all sources. With a quarter (25%) of the 7Q10 stream flow used in the calculation the resultant temperature increase in fully mixed receiving water would be limited to approximately 0.08°C. (Refer to the Summary of Approach section for information regarding reserve capacity).
- **Q<sub>R</sub>**, the critical upstream river flow (7Q10 low flow statistic), has been determined to be 54 (cfs). Note: This is the same river flow given in the original TMDL.
- **Q<sub>PS</sub>**, the point source effluent discharge, is 0.46 cfs. Note: This is the maximum allowable discharge given in the NPDES permit.

Tillamook Industrial Park does not discharge between June 1<sup>st</sup> and October 31<sup>st</sup>. The Park has never discharged but holds an NPDES permit. Effluent temperature data was not updated because there was little to no impact from the source. Effluent flow was based on maximum allowable discharge given in the NPDES permit.

### **THE NESTUCCA TMDL (Table 7)**

#### **Hebo Joint Water and Sewer Authority:**

DEQ has determined that adjustments to the Hebo Joint Water and Sewer Authority (Hebo) WLA are required based on the new temperature standard. The salmonid designation assigned by ODF&W for the section of the Three River that receives discharge waters from the Hebo facility has been designated as Core Cold-water habitat for salmonids. In addition the section of the Three Rivers has spawning time period of September 15<sup>th</sup> through June 15<sup>th</sup>. The multiple use designations of Core Cold-water habitat and spawning require that two WLAs be calculated for the Hebo facility: the Core Cold-water WLA applicable from June 16<sup>th</sup> through September 14<sup>th</sup> and the spawning WLA applicable from September 15<sup>th</sup> through June 15<sup>th</sup>.

A revised WLA for the Hebo facility was calculated by using the equations given in the Summary of Approach section. These data are as follows:

- **T<sub>R</sub>**, the upstream river temperature criterion, is 16°C Core Cold-water and 13°C for spawning.
- **MaxΔT**, the maximum allowable change in river temperature after full mixing (°C), is allowed by the new rule to be up to 0.3°C for all sources. With a quarter (25%) of the 7Q10 stream flow used in the calculation the resultant temperature increase in fully mixed receiving water would be limited to approximately 0.08°C. (Refer to the Summary of Approach section for information regarding reserve capacity).
- **Q<sub>R</sub>**, the critical upstream river flow (7Q10 low flow statistic), has been determined to be 10.2 (cfs). Note: This is taken from a draft version of the original TMDL.
- **Q<sub>PS</sub>**, the point source effluent discharge, is 0.04 cfs for all periods.

Hebo's WLA are based of average dry weather design flow and maximum temperature for the appropriate time period. The 7Q10 flow values for each site were estimated as relative levels from values collected at the USGS Gage on the Nestucca River near Beaver (#143030000).

#### **Cloverdale Sanitary District:**

DEQ has determined that adjustments to the Cloverdale Sanitary District (Cloverdale) WLA are required based on the new temperature standard. The salmonid designation assigned by ODF&W for the section of the Nestucca River that receives discharge waters from the Cloverdale facility has been designated as Core Cold-water habitat for salmonids. In addition, the section of the Nestucca Rivers has spawning time period of September 15<sup>th</sup> through June 15<sup>th</sup>. The multiple use designations of Core Cold-water habitat and spawning require that two WLAs be calculated for the Cloverdale facility: the Core Cold-water WLA applicable from June 16<sup>th</sup> through September 14<sup>th</sup> and the spawning WLA applicable from September 15<sup>th</sup> through June 15<sup>th</sup>.

A revised WLA for the Cloverdale facility was calculated by using the equations given in the Summary of Approach section. The facility discharge flow is the dry weather design flow and the effluent temperature was based on the maximum observed values for the appropriate time period. These data are as follows:

- **T<sub>R</sub>**, the upstream river temperature criterion, is 16°C Core Cold-water and 13°C for spawning.

- **MaxΔT**, the maximum allowable change in river temperature after full mixing (°C), is allowed by the new rule to be up to 0.3°C for all sources. With a quarter (25%) of the 7Q10 stream flow used in the calculation the resultant temperature increase in fully mixed receiving water would be limited to approximately 0.08°C. (Refer to the Summary of Approach section for information regarding reserve capacity).
- **Q<sub>R</sub>**, the critical upstream river flow (7Q10 low flow statistic), has been determined to be 48.9 (cfs). Note: This is taken from a draft version of the original TMDL.
- **Q<sub>PS</sub>**, the point source effluent discharge, is 0.06 cfs for all periods.

Cloverdale’s WLA are based of average dry weather design flow and maximum temperature. The 7Q10 flow is based on gage data for the Nestucca River near Beaver, page 18 in the Nestucca TMDL.

**ATTAINMENT OF WATER QUALITY STANDARD**

As detailed in the original TMDLs, the temperature TMDL and the temperature water quality standards are achieved when (1) nonpoint source solar radiation loading is representative of a riparian vegetation condition without human disturbance and potential channel morphology and (2) point source discharges cause no measurable temperature increases (as defined in the temperature standard) in surface waters.

Based in these inputs and equations, the waste load allocations given in the form of the maximum allowable point source effluent temperature (T<sub>WLA</sub>) and the waste load allocation in the form of heat loading to the river (H<sub>WLA</sub>) is presented in Table 12. Waste load allocations given in the form of the maximum allowable point source effluent temperature (T<sub>WLA</sub>) are presented in Table 7 and 8. Table numbers are those used in the original TMDLs.

The nonpoint source portion of the TMDL will reflect the change in WLA described in this approach. While modifications to the facility WLAs ensure that the point source discharge is consistent with the new standard’s definition of no measurable combine temperature increase above (0.2°C), a portion of the HUA is allocated to nonpoint sources of heat (0.05°C) and a portion is allocated to Reserve Capacity (0.05°C) for future uses. The division of the HUA is presented in the table below and takes the place of North Coast TMDL Table 11, Tillamook Bay TMDL Table 7, and Nestucca Bay Watershed TMDL Table 8.

Source	Human Use Allowance
Nonpoint Source and Background	0.05°C
NPDES Point Source	0.3°C allowing 25% of 7Q10 low flow for mix, or represented as a range of 0.08°C to 0.2°C with full stream mix
Reserve Capacity	0.05°C; or any unallocated portion of the Point Source Allocation is considered part of the reserve capacity

**CONCLUSION AND SPECIFIC CHANGES TO THE WLA TABLES IN THE TMDLs**

This memo presents a modification to the North Coast Subbasins, Tillamook Bay, and Nestucca Bay Watershed TMDLs. Specifically, the wasteload allocations for the facilities mentioned in the TMDLs have been modified to address the new temperature standard. The rationale for this modification is presented above. The modified WLAs are presented below in a revised TMDL Tables.

**North Coast Subbasins TMDL Revised Table 12 (page 56 of the original North Coast Subbasins TMDL).**

**Revised Table 12. Allocations for Point sources that discharge to freshwater. These sources are allocated specific effluent temperatures that ensure they do not violate water quality criteria.**

Legal Name (Common Name)	River Flow Rate <sup>1</sup>	Facility Flow	Critical Effluent Temp. <sup>4</sup>	Criterion	Period	Numeric Criterion or System Potential	Load Allocation kcal/day	Allowable Effluent Temp.
	(cfs)	(cfs)	(°C)			(°C)		(°C)
Fishhawk Lake Recreation Club, INC.	5	0.11	20.8	Core Cold	May 16-Oct 14	16	9.99E+05	19.7
	5	0.11	14.5	Spawn	Oct 15-May 15	13	9.99E+05	16.7
City of Vernonia WWTP	No discharge							
	43	1.5	17	Spawn	Sept 1-May 15	13	8.99E+06	15.5
ODFW – NF Nehalem Fish Hatchery	30.6	13.4	20.4	M&R	May 16-Oct 14	18	More data is required <sup>2</sup>	
	30.6	15.3	14.2	Spawn	Oct 15-May 15	13	More data is required <sup>2</sup>	
Shoreline Sanitary District	2.5	0.05	22	M&R	May 16-Oct 14	18	Lower Columbia <sup>3</sup>	
	2.5	0.077	16	Spawn	Oct 15-May 15	13	Lower Columbia <sup>3</sup>	
ODFW – Klaskanine Fish Hatchery	5.4	2.4	19.1	M&R	May 16-Oct 14	18	More data is required <sup>2</sup>	
	87	5.2	15.1	Spawn	Oct 15-May 15	13	More data is required <sup>2</sup>	
City of Clatskanie WWTP	12.2	0.82	22	M&R	Year round	18	Lower Columbia <sup>3</sup>	

M&R = Migration and Rearing Criterion;

Spawn = Spawning Criterion

<sup>1</sup> The values shown in this column are the full 7Q10. For calculation 25% of these values were used.

<sup>2</sup> Temperature Waste load Allocation will not be altered at this time. Additional data must be acquired prior to modification.

<sup>3</sup> Temperature Waste load Allocation will not be altered at this time but will be in the Lower Columbia Dissolved Oxygen TMDL.

<sup>4</sup> Critical Effluent Temperature is the maximum temperature recorded by the facility during the receiving stream’s critical summer high temperatures. Allowable effluent temperatures ensure attainment of temperature waste load allocations when critical effluent flows also occur. Warmer effluent temperatures may be allowed if effluent flows are less than shown in Table 12 and total heat loads to the receiving stream do not exceed allowable daily load allocations.

**Tillamook Bay TMDL Revised Table 8 (page 46 of the original Tillamook Bay Watershed TMDL).**

**Revised Table 8. Temperature Waste load Allocations for Point Sources at System Potential (SP).**

Facility Name/Flow Conditions	Q <sub>R</sub> <sup>1</sup>	Q <sub>E</sub>	T <sub>E</sub>	T <sub>C</sub>	ΔT	T <sub>A</sub>
	River Flow Rate (cfs)	Facility Flow (cfs)	Critical Condition Effluent Temp °C	Numeric Criterion °C	Allowable Temp. Increase °C	Load Allocation Allowable Effluent Temp. °C
<b>Pacific Campground</b>	<b>Wilson River</b>					
Year round Low Flow -- 7Q10	48	0.08	21.1	18	0.3	25.0 <sup>2</sup>
Other River and Effluent Flow Rates	<b>See Equation 1</b>					
<b>Tillamook Creamery</b>	<b>Wilson River</b>					
Year round Low Flow - 7Q10	48	0.83	22.4	18	0.3	25.0 <sup>2,3</sup>
Other River and Effluent Flow Rates	<b>Equation 1 until System Potential achieved, then Equation 2</b>					
<b>City of Tillamook STP</b>	<b>Trask River</b>					
June through September Low Flow - 7Q10	54	2.6	23.2	18	0.3	19.8
Other River and Effluent Flow Rates	<b>See Equation 1</b>					
<b>Tillamook Ind. Park STP</b> (No Discharge June 1-October 31)	<b>Trask River</b>					
November 1 through May 31 Low Flow	54	0.46	21.7	13	0.3	22.1
Other River and Effluent Flow Rates	<b>See Equation 1</b>					

<sup>1</sup> The values shown in this column are the full 7Q10. For calculation a percentage of these values were used.

<sup>2</sup> Effluent temperatures should not exceed 25°C or the “Temperature Thermal Plume Limitation” rule whichever more conservative.

<sup>3</sup> Value is for the location where wetland discharges to the Wilson River.

**Nestucca Bay Watershed TMDL Revised Table 7 (page 39 of the original Nestucca Bay Watershed TMDL).**

**Revised Table 7. Temperature Allocation Summary for point sources in the Nestucca Bay Watershed.**

Legal Name (Common Name)	River Flow Rate <sup>1</sup> (cfs)	Facility Flow (cfs)	Critical Effluent Temp.	Criterion	Period	Numeric Criterion or System Potential (°C)	Allowable Effluent Temp. (°C)
Hebo JWSA	10.2	0.04	25	Core Cold	June 16-Sept 14	16	25.0 <sup>2</sup>
	10.2	0.04	25	Spawn	Sept 15-June 15	13	25.0 <sup>2</sup>
Cloverdale Sanitary District	48.9	0.06	22	Core Cold	June 16-Sept 14	16	25.0 <sup>2</sup>
	48.9	0.06	22	Spawn	Sept 15-June 15	13	25.0 <sup>2</sup>

<sup>1</sup> The values shown in this column are the full 7Q10. For calculation 25% of these values were used.

<sup>2</sup> Effluent temperatures should not exceed 25 degrees Celsius or the “Temperature Thermal Plume Limitation” rule whichever more conservative.

As noted in the original TMDL, the loading and effluent temperatures presented under the Tables are based on a defined set of conditions. However, as the permits are renewed, WLAs may be recalculated using the equations if flow rates or effluent temperatures differ. Therefore, the maximum temperature allowed in the permit may be different from the values expressed here and will be determined at the time of permit renewal to determine no measurable increase above the criterion using the equations presented.



## Appendices

Original TMDL Waste load Allocation Tables

OAR 340-041-0028 Temperature Standard

Oregon Department of Fish and Wildlife Use Designation Maps

**Original TMDL Waste load Allocation Tables**

North Coast Subbasin TMDL

Table 12. Allocations for Point sources that discharge to freshwater. These sources are allocated specific effluent temperatures that ensure they do not violate water quality criteria.

Legal Name (Common Name)	River Flow Rate	Facility Flow (cfs)	Critical Effluent Temp.	Criterion	Period	Numeric Criterion or System Potential	Load Allocation kcal/day	Allowable Effluent Temp.
Fishhawk Lake Recreation Club, INC.	5	0.15	71°F	M&R	Year round	64°F	4.25 x10 <sup>5</sup>	66.3
				Spawn	Oct 15-May 31	55°F		57.3
City of Vernonia <sup>6</sup> No Discharge May 1-Oct 31	14	0	NA	SP	NA	58°F	0 No Discharge	NA No Discharge
								November 1 – April 30
ODFW – NF Nehalem Fish Hatchery	30.6 <sup>7</sup>	20.0 <sup>8</sup>	69.8 <sup>9</sup>	SP	Year round	57.4	2.60 x10 <sup>6</sup>	57.7
				Spawn	Oct 1-May 31	55°F		55.3
Shoreline Sanitary District	2.5	0.077	71°F	M&R	Year round	64°F	2.13 x10 <sup>5</sup>	66.3
ODFW – Klaskanine Fish Hatchery	ND	ND	ND	M&R	Year round	64°F	ND	64.25
				Spawn	Sept 15-Jun 30	55°F		55.25
City of Clatskanie STP	5.6	0.77	71°F	M&R	Year round	64°F	4.77 x10 <sup>5</sup>	64.7

SP= System potential based on modeling of temperature in the subbasin with anthropogenic heating minimized.

M&R= Migration and Rearing Criterion;

Spawn= Spawning Criterion

NA= Not Applicable; ND= No Data

<sup>6</sup> City of Vernonia does not discharge effluent from May 1 through October 31.

<sup>7</sup> Due to lack of data, 7Q10 low flows are not available for the North Fork Nehalem River. The figure presented is the measured flow volume on August 8, 2000. Actual 7Q10 low flow values may vary.

<sup>8</sup> Permitted water right rate (Certificate #41085, Permit #S31450).

<sup>9</sup> This effluent temperature is estimated by DEQ from FLIR data. The WLA may be re-calculated during the permitting process if effluent temperature data differs from this TMDL.

Tillamook Bay TMDL

**Table 8.** Temperature Waste load Allocations for Point Sources at System Potential (SP).

Facility Name/Flow Conditions	Q <sub>R</sub>	Q <sub>E</sub>	T <sub>E</sub>	T <sub>c</sub>	ΔT	T <sub>A</sub>
	River Flow Rate	Facility Flow (cfs)	Critical Condition Effluent Temp.	Numeric Criterion	Allowable Temp. Increase	Load Allocation Allowable Effluent Temp.
<b>Pacific Campground</b>	<b>Wilson River</b>					
June through September Low Flow -- <b>7Q10</b>	48 cfs	0.08 cfs	70 °F	64 °F	0.25°F	77°F <sup>2</sup>
June through September Average Flow <sup>1</sup>	110 cfs	0.08 cfs	70 °F	64 °F		77°F <sup>2</sup>
October through May <b>7Q10</b>	48 cfs	0.08 cfs	70 °F	55 °F		77°F <sup>2</sup>
Other River and Effluent Flow Rates	<b>See Equation 1</b>					
<b>Tillamook Creamery</b>	<b>Wilson River</b>					
June through September Low Flow - <b>7Q10</b>	48 cfs	0.75 cfs	92 °F	64°F	0.25°F	68.25 °F
June through September Average Flow <sup>1</sup>	110 cfs	0.75 cfs	92 °F	64°F		73.4 °F
October through May <b>7Q10</b>	48 cfs	0.75 cfs	92 °F	55 °F		59.25°F
June through September Low Flow at SP- <b>7Q10</b>	48 cfs	0.75 cfs	92 °F	62.5°F		74.5 °F <sup>3</sup>
Other River and Effluent Flow Rates	<b>Equation 1 until System Potential achieved, then Equation 2</b>					
<b>City of Tillamook STP</b>	<b>Trask River</b>					
June through September Low Flow <b>7Q10</b>	54 cfs	1.64 cfs	71 °F	64°F	0.25°F	66.3 °F
June through September Average Flow <sup>1</sup>	108 cfs	1.64 cfs	71 °F	64°F		68.4 °F
October through May <b>7Q10</b>	54 cfs	1.64 cfs	71 °F	55°F		57.3 °F
Other River and Effluent Flow Rates	<b>See Equation 1</b>					
<b>Tillamook Ind. Park STP No Discharge June 1-October 31</b>	<b>Trask River</b>					
June through September Low Flow <sup>4</sup> <b>7Q10</b>	54 cfs	No Data	71 °F <sup>4</sup>	64°F	0.25°F	64°F
June through September Average Flow <sup>1</sup>	108 cfs	No Data	71 °F <sup>4</sup>	64°F		64°F
October through May <b>7Q10</b>	54 cfs	No Data	71 °F <sup>4</sup>	55°F		55°F
Other River and Effluent Flow Rates	<b>See Equation 1</b>					

1=Average Flows for August, which are typically lowest of the year.

2= Maximum allowable effluent temperature based on incipient lethality to salmonids (see Table 2).

3= Based on one-half of allocable assimilative capacity or one-eighth of total assimilative capacity.

4= Assumed temperature – no monitoring data available

Nestucca Bay Watershed TMDL

**Table 7 Temperature Allocation Summary for point sources in the Nestucca Bay Watershed. These allocations are in effect throughout the year.**

Facility Name	Receiving Water	Waste load Allocation Allowable Effluent Temperature
Hebo Joint Water and Sewer Authority STP	Three Rivers	77°F
Cloverdale Sanitary District STP	Nestucca River	77°F
Future Sources	Any Surface Waters in River	No Measurable Increase Outside of Mixing Zone

**OAR 340-041-0028**  
**Temperature**

(1) Background. Water temperatures affect the biological cycles of aquatic species and are a critical factor in maintaining and restoring healthy salmonid populations throughout the State. Water temperatures are influenced by solar radiation, stream shade, ambient air temperatures, channel morphology, groundwater inflows, and stream velocity, volume, and flow. Surface water temperatures may also be warmed by anthropogenic activities such as discharging heated water, changing stream width or depth, reducing stream shading, and water withdrawals.

(2) Policy. It is the policy of the Commission to protect aquatic ecosystems from adverse warming and cooling caused by anthropogenic activities. The Commission intends to minimize the risk to cold-water aquatic ecosystems from anthropogenic warming, to encourage the restoration and protection of critical aquatic habitat, and to control extremes in temperature fluctuations due to anthropogenic activities. The Commission recognizes that some of the State's waters will, in their natural condition, not provide optimal thermal conditions at all places and at all times that salmonid use occurs. Therefore, it is especially important to minimize additional warming due to anthropogenic sources. In addition, the Commission acknowledges that control technologies, best management practices and other measures to reduce anthropogenic warming are evolving and that the implementation to meet these criteria will be an iterative process. Finally, the Commission notes that it will reconsider beneficial use designations in the event that man-made obstructions or barriers to anadromous fish passage are removed and may justify a change to the beneficial use for that water body.

(3) Purpose. The purpose of the temperature criteria in this rule is to protect designated temperature-sensitive, beneficial uses, including specific salmonid life cycle stages in waters of the State.

(4) Biologically Based Numeric Criteria. Unless superseded by the natural conditions criteria described in section (8) of this rule, or by subsequently adopted site-specific criteria approved by EPA, the temperature criteria for State waters supporting salmonid fishes are as follows:

(a) The seven-day-average maximum temperature of a stream identified as having salmon and steelhead spawning use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B, 300B, 310B, 320B, and 340B, may not exceed 13.0 degrees Celsius (55.4 degrees Fahrenheit) at the times indicated on these maps and tables;

(b) The seven-day-average maximum temperature of a stream identified as having core cold water habitat use on subbasin maps set out in OAR 340-041-101 to 340-041-340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 16.0 degrees Celsius (60.8 degrees Fahrenheit);

(c) The seven-day-average maximum temperature of a stream identified as having salmon and trout rearing and migration use on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit);

(d) The seven-day-average maximum temperature of a stream identified as having a migration corridor use on subbasin maps and tables OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 151A, 170A, and 340A, may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit). In addition, these water bodies must have coldwater refugia that are sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body. Finally, the seasonal thermal pattern in Columbia and Snake Rivers must reflect the natural seasonal thermal pattern;

(e) The seven-day-average maximum temperature of a stream identified as having Lahontan cutthroat trout or redband trout use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 120B, 140B, 190B, and 250B, and Figures 180A, 201A, and 260A may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit);

(f) The seven-day-average maximum temperature of a stream identified as having bull trout spawning and juvenile rearing use on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130B, 151B, 160B, 170B, 180A,

201A, 260A, 310B, and 340B, may not exceed 12.0 degrees Celsius (53.6 degrees Fahrenheit). From August 15 through May 15, in bull trout spawning waters below Clear Creek and Mehlhorn reservoirs on Upper Clear Creek (Pine Subbasin), below Laurance Lake on the Middle Fork Hood River, and below Carmen reservoir on the Upper McKenzie River, there may be no more than a 0.3 degrees Celsius (0.5 Fahrenheit) increase between the water temperature immediately upstream of the reservoir and the water temperature immediately downstream of the spillway when the ambient seven-day-average maximum stream temperature is 9.0 degrees Celsius (48 degrees Fahrenheit) or greater, and no more than a 1.0 degree Celsius (1.8 degrees Fahrenheit) increase when the seven-day-average stream temperature is less than 9 degrees Celsius.

(5) Unidentified Tributaries. For waters that are not identified on the fish use maps and tables referenced in section (4) of this rule, the applicable criteria for these waters are the same criteria as is applicable to the nearest downstream water body depicted on the applicable map.

(6) Natural Lakes. Natural lakes may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the ambient condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life.

(7) Oceans and Bays. Except for the Columbia River above river mile 7, ocean and bay waters may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the ambient condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life.

(8) Natural Conditions Criteria. Where the department determines that the natural thermal potential of all or a portion of a water body exceeds the biologically-based criteria in section (4) of this rule, the natural thermal potential temperatures supersede the biologically-based criteria, and are deemed to be the applicable temperature criteria for that water body.

(9) Cool Water Species. Waters that support cool water species may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the ambient condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life. Cool waters of the State are described on subbasin tables set out in OAR 340-041-0101 to 340-041-0340: Tables 140B, 180B, 201B, and 250B.

(10) Borax Lake Chub. State waters in the Malheur Lake Basin supporting the borax lake chub may not be cooled more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) below the ambient condition.

(11) Protecting Cold Water.

(a) Except as described in subsection (c) of this rule, waters of the State that have summer seven-day-average maximum ambient temperatures that are colder than the biologically based criteria in section (4) of this rule, may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the colder water ambient temperature. This provision applies to all sources taken together at the point of maximum impact where salmon, steelhead or bull trout are present.

(b) A point source that discharges into or above salmon & steelhead spawning waters that are colder than the spawning criterion, may not cause the water temperature in the spawning reach where the physical habitat for spawning exists during the time spawning through emergence use occurs, to increase more than the following amounts after complete mixing of the effluent with the river:

(A) If the rolling 60 day average maximum ambient water temperature, between the dates of spawning use as designated under subsection (4)(a) of this rule, is 10 to 12.8 degrees Celsius, the allowable increase is 0.5 Celsius above the 60 day average; or

(B) If the rolling 60 day average maximum ambient water temperature, between the dates of spawning use as designated under subsection (4)(a) of this rule, is less than 10 degrees Celsius, the allowable increase is 1.0 Celsius above the 60 day average, unless the source provides analysis showing that a greater increase will not significantly impact the survival of

salmon or steelhead eggs or the timing of salmon or steelhead fry emergence from the gravels in downstream spawning reach.

(c) The cold water protection narrative criteria in subsection (a) does not apply if:

(A) There are no threatened or endangered salmonids currently inhabiting the water body;

(B) The water body has not been designated as critical habitat; and

(C) The colder water is not necessary to ensure that downstream temperatures achieve and maintain compliance with the applicable temperature criteria.

(12) Implementation of the Temperature Criteria.

(a) Minimum Duties. There is no duty for anthropogenic sources to reduce heating of the waters of the State below their natural condition. Similarly, each anthropogenic point and nonpoint source is responsible only for controlling the thermal effects of its own discharge or activity in accordance with its overall heat contribution. In no case may a source cause more warming than that allowed by the human use allowance provided in subsection (b) of this rule.

(b) Human Use Allowance. Insignificant additions of heat are authorized in waters that exceed the applicable temperature criteria as follows:

(A) Prior to the completion of a temperature TMDL or other cumulative effects analysis, no single NPDES point source that discharges into a temperature water quality limited water may cause the temperature of the water body to increase more than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria after mixing with either twenty five (25) percent of the stream flow, or the temperature mixing zone, whichever is more restrictive; or

(B) Following a temperature TMDL or other cumulative effects analysis, waste load and load allocations will restrict all NPDES point sources and nonpoint sources to a cumulative increase of no greater than 0.3 degrees Celsius (0.5 Fahrenheit) above the applicable criteria after complete mixing in the water body, and at the point of maximum impact.

(C) Point sources must be in compliance with the additional mixing zone requirements set out in OAR 340-041-0053(2)(d).

(D) A point source in compliance with the temperature conditions of its NPDES permit is deemed in compliance with the applicable criteria.

(c) Air Temperature Exclusion. A water body that only exceeds the criteria set out in this rule when the exceedance is attributed to daily maximum air temperatures that exceed the 90th percentile value of annual maximum seven-day average maximum air temperatures calculated using at least 10 years of air temperature data, will not be listed on the section 303(d) list of impaired waters and sources will not be considered in violation of this rule.

(d) Low Flow Conditions. An exceedance of the biologically-based numeric criteria in section (4) of this rule, or an exceedance of the natural condition criteria in section (8) of this rule will not be considered a permit violation during stream flows that are less than the 7Q10 low flow condition for that water body.

(e) Forestry on State and Private Lands. For forest operations on State or private lands, water quality standards are intended to be attained and are implemented through best management practices and other control mechanisms established under the Forest Practices Act (ORS 527.610 to 527.992) and rules there under, administered by the Oregon Department of Forestry. Therefore, forest operations that are in compliance with the Forest Practices Act requirements are (except for the limits set out in ORS 527.770) deemed in compliance with this rule. DEQ will work with the Oregon Department of Forestry to revise the Forest Practices program to attain water quality standards.

(f) Agriculture on State and Private Lands. For farming or ranching operations on State or private lands, water quality standards are intended to be attained and are implemented through the Agricultural Water Quality Management Act (ORS 568.900 to 568.933) and rules there under, administered by the Oregon Department of Agriculture. Therefore, farming and ranching operations that are in compliance with the Agricultural Water Quality Management Act requirements will not be subject to DEQ enforcement under this rule. DEQ will work with the Oregon Department of Agriculture to revise the Agricultural Water Quality Management program to attain water quality standards.

(g) Agriculture and Forestry on Federal Lands. Agriculture and forestry activities conducted on federal land must meet the requirements of this rule and are subject to the department's jurisdiction. Pursuant to Memoranda of Agreement with the U.S. Forest Service and the Bureau of Land Management, water quality standards are expected to be met through the development and implementation of water quality restoration plans, best management practices and aquatic conservation strategies. Where a Federal Agency is a Designated Management Agency by the Department, implementation of these plans, practices and strategies is deemed compliance with this rule.

(h) Other Nonpoint Sources. The department may, on a case-by-case basis, require nonpoint sources (other than forestry and agriculture), including private hydropower facilities regulated by a 401 water quality certification, that may contribute to warming of State waters beyond 0.3 degrees Celsius (0.5 degrees Fahrenheit), and are therefore designated as water-quality limited, to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or an applicable load allocation in a TMDL pursuant to OAR 340-042-0080.

(A) Each plan must ensure that the nonpoint source controls its heat load contribution to water temperatures such that the water body experiences no more than a 0.3 degrees Celsius (0.5 degree Fahrenheit) increase above the applicable criteria from all sources taken together at the maximum point of impact.

(B) Each plan must include a description of best management practices, measures, effluent trading, and control technologies (including eliminating the heat impact on the stream) that the nonpoint source intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure.

(C) The Department may periodically require a nonpoint source to revise its temperature management plan to ensure that all practical steps have been taken to mitigate or eliminate the temperature effect of the source on the water body.

(D) Once approved, a nonpoint source complying with its temperature management plan is deemed in compliance with this rule.

(i) Compliance Methods. Anthropogenic sources may engage in thermal water quality trading in whole or in part to offset its temperature discharge, so long as the trade results in at least a net thermal loading decrease in anthropogenic warming of the water body, and does not adversely affect a threatened or endangered species. Sources may also achieve compliance, in whole or in part, by flow augmentation, hyporheic exchange flows, outfall relocation, or other measures that reduce the temperature increase caused by the discharge.

(ii) Release of Stored Water. Stored cold water may be released from reservoirs to cool downstream waters in order to achieve compliance with the applicable numeric criteria. However, there can be no significant adverse impact to downstream designated beneficial uses as a result of the releases of this cold water, and the release may not contribute to violations of other water quality criteria. Where the Department determines that the release of cold water is resulting in a significant adverse impact, the Department may require the elimination or mitigation of the adverse impact.

(13) Site-Specific Criteria. The Department may establish, by separate rulemaking, alternative site-specific criteria for all or a portion of a water body that fully protects the designated use.

(a) These site-specific criteria may be set on a seasonal basis as appropriate.

(b) The Department may use, but is not limited by the following considerations when calculating site-specific criteria:

- (A) Stream flow;
  - (B) Riparian vegetation potential;
  - (C) Channel morphology modifications;
  - (D) Cold water tributaries and groundwater;
  - (E) Natural physical features and geology influencing stream temperatures; and
  - (F) Other relevant technical data.
- (c) DEQ may consider the thermal benefit of increased flow when calculating the site-specific criteria.
- (d) Once established and approved by EPA, the site-specific criteria will be the applicable criteria for the water bodies affected.

Stat. Auth.: ORS 468.020, 468B.030, 468B.035, 468B.048

Stats. Implemented: ORS 468B.030, 468B.035, 468B.048

Hist.: DEQ 17-2003, f. & cert. ef. 12-9-03

Figure 230A: Fish Use Designations\*  
North Coast Basin, Oregon

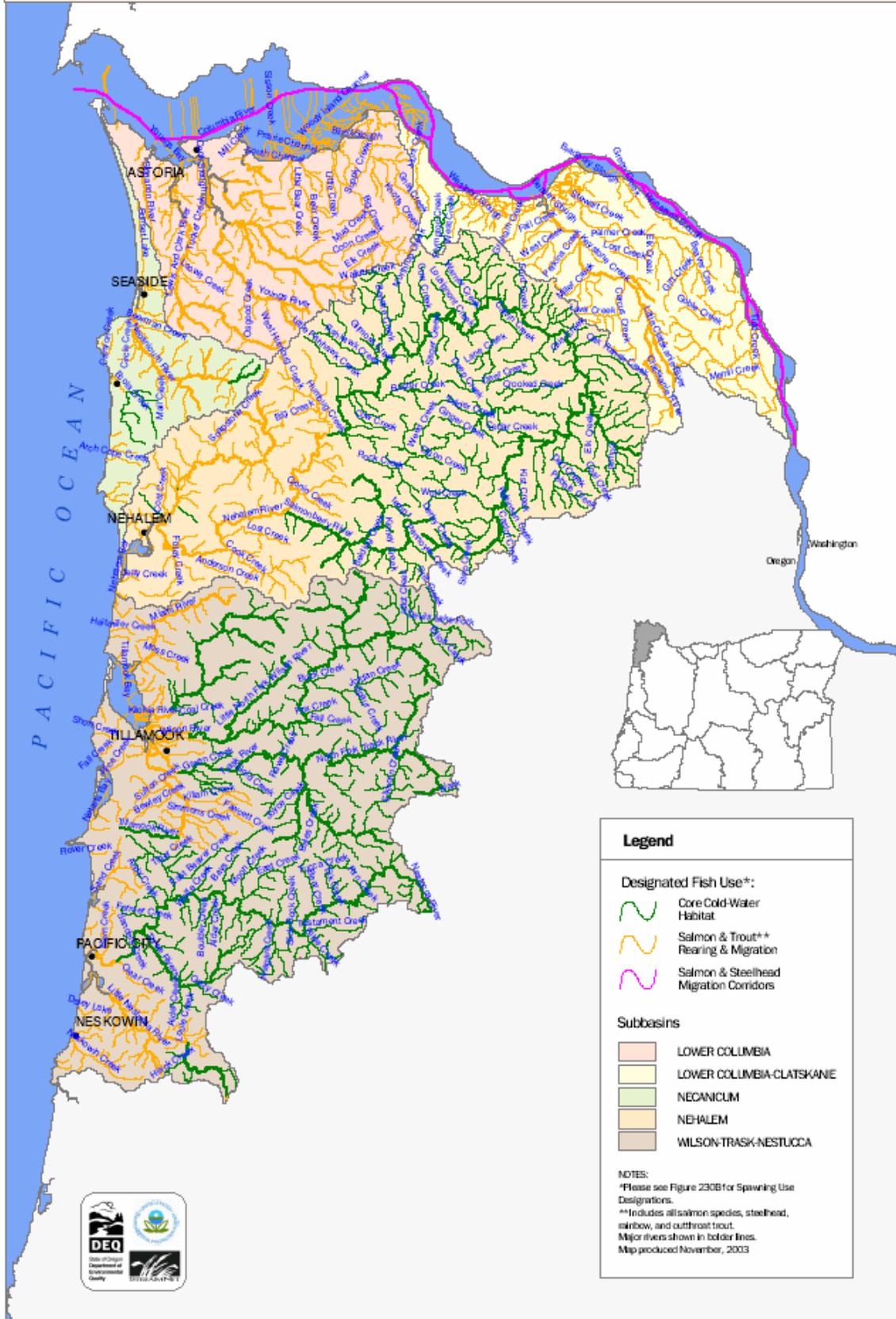


Figure 230B: Salmon and Steelhead Spawning Use Designations\*  
North Coast Basin, Oregon

