



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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August 26, 2011

(See Distribution List)

**RE: Pend Oreille Temperature TMDL Dispute**

Dear Mr. Cauchy, Mr. Geddes, Ms. Greene and Mr. Merrill:

Thank you for the thought and time you put into your written submittals and verbal testimony regarding the Pend Oreille Temperature Total Maximum Daily Load (TMDL). The issues raised emphasize the complexity of developing a TMDL and the coming challenges of implementing one. The Dispute Resolution Panel carefully considered the issues and forwarded its recommendations to me. This letter constitutes my decision, as required by the Washington State Department of Ecology's (Ecology) TMDL Dispute Resolution Policy.

The TMDL will be resubmitted to the Environmental Protection Agency (EPA) with the following changes:

1. The TMDL will clarify that the compliance path for the Pend Oreille Public Utilities District (PUD) will be the compliance path that we have outlined in our Water Quality Standards and is the same compliance path that we have used with all dams that are going through Federal Energy Resource Commission (FERC) re-licensing.
2. The temperature target reduction value for the Boundary Forebay reach will be 0.76°C as recommended by the Dispute Panel (Panel). However, the wasteload allocation values for each dam will remain unchanged at 0.12°C.

Enclosed is a list of each of the claims and the related decisions that I have made. In three instances, the Panel recommended that Ecology staff perform additional analyses, which I considered in making my decisions.

Sincerely,

*Ted Sturdevant by Polly Zehm*

Ted Sturdevant  
Director

Enclosure



Interested Parties  
August 26, 2011  
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Distribution List:

Mark Cauchy, Director, Regulatory and Environmental Affairs - Pend Oreille PUD No. 1

Bob Geddes, General Manager - Pend Oreille PUD No. 1

Barbara Greene, Boundary Licensing Project Manager - Seattle City Light

Ken Merrill, Water Resources Manager - Kalispel Tribe of Indians

cc: Jerry Boyd, Attorney - Pend Oreille PUD No. 1

Joan Marchioro, Attorney - Attorney General's Office

David Moore, WQ TMDL/Watershed Unit Supervisor - Ecology

Helen Rueda, TMDL Project Manager - U.S. Environmental Protection Agency

Kari Vander Stoep, Attorney - Seattle City Light

Matt Wells, Attorney - Seattle City Light

Laura White, Legal Secretary - Seattle City Light

Dispute claims:

**Dispute Claim SCL-1:** Maximum surface temperatures are not representative and should not be used to assess compliance.

**Decision-Do not change Total Maximum Daily Load (TMDL).** *Designated aquatic uses apply to the entire river and at all depths. With the exception of a water quality offset (or possibly mixing zones provided in permits), there is no exemption in the Surface Water Quality Standards to allow a violation of numeric criteria in portions of a waterbody simply because standards are met in other parts of the waterbody. All areas of the waterbody must meet the numeric criteria. Furthermore, the upper portion of the water column is critical habitat for many organisms due to a higher productivity occurring in the euphotic zone which encourages phytoplankton growth, and therefore provides food for the fish and other aquatic organisms being protected by the water quality standards. Fish and other aquatic organisms use this important habitat so it is important that the upper portions of the water column also meet water quality standards.*

*Also, the water quality standards require that when there is an exceedance of the temperature criteria, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3C. This provision of the Water Quality Standards applies when natural temperatures exceed the numeric criteria, as is the case with the Pend Oreille River.*

**Dispute Claim SCL-2:** The second part of the temperature criteria does not apply to the TMDL. The second part is correlated to a formula that applies to incremental temperature increases resulting from individual point source activities.

**Decision-Do not change TMDL.** *We disagree with this claim. Our Attorney General's December 28, 2009, legal opinion regarding the use of the incremental warming provisions for temperature in Washington's water quality standards during development of a TMDL clearly sets forth Ecology's position on this issue.*

**Dispute Claim SCL-3:** Load Allocation to the Boundary [Dam] facility should acknowledge the cumulative effect of Box Canyon [Dam] in the Boundary forebay reach.

**Decision-Do not change TMDL.** *The temperature reduction target listed for Part 1 of the criteria for the Boundary Dam forebay in Table 15 on Page 80 of the report will be changed from 0.88°C to 0.76 C. This will require a TMDL amendment.*

**Dispute Claim PUD -1:** Maximum surface temperatures are not representative of conditions in the river and should not be used to assess compliance.

**Decision-Do not change TMDL.** *Department of Ecology's (Ecology) Water Quality staff reviewed the model and met with Environmental Assessment Program staff that were responsible for the modeling. Summer-period water column temperatures measured late-July and mid-August (2004) indicate distinct differences in comparison to those predicted by the TMDL model (refer to figure below). Measured*

water column temperatures observed during monitoring events indicate only slight temperature variation whereas the model output displayed a consistent pattern of increased heating with decreasing depth (comparisons retained same location and times). This surface “flare” pattern was most pronounced for depths less than approximately 4-meters. Though segment 334 is displayed in the figure, this pattern was common among the 14 monitoring locations examined within the section of the river between the Washington/Idaho state-line and the Box Canyon facility. Ecology agrees that this relationship could be a concern because the TMDL analysis used daily maximum temperatures which occur within the very upper portion of the water column. In addition, the model-predicted temperatures were consistently greater than those observed during monitoring at the majority of the monitored locations again with the greatest differences occurring at shallower depths suggesting model bias.

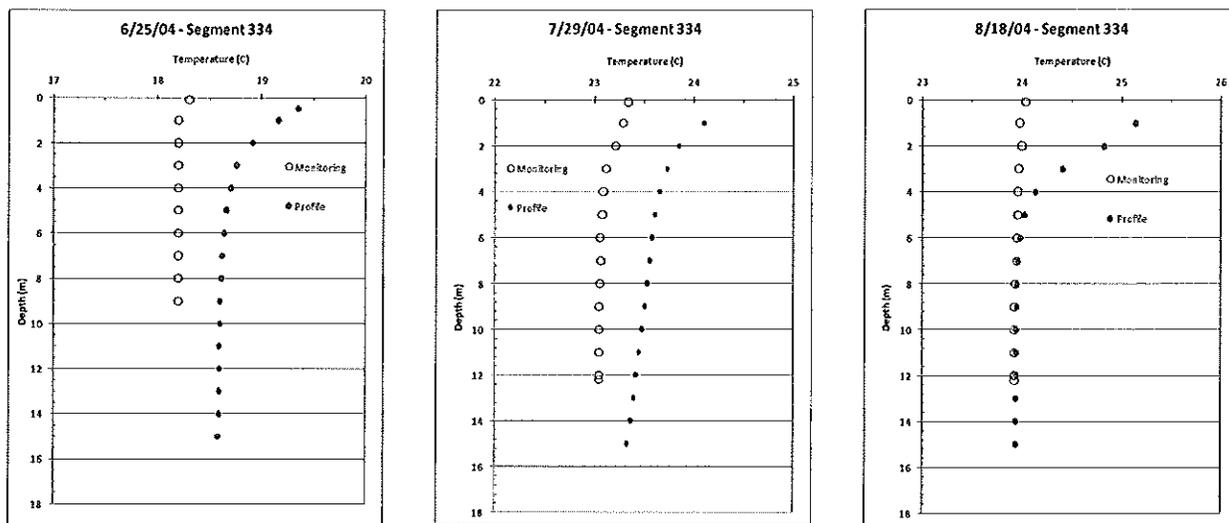


Figure. Relationship between measured (monitoring) and model-predicted (profile) temperatures for model segment 334 (river mile 38).

However, in examining differences between monitoring and modeled temperatures it is important to note that the monitoring events are only a “snapshot” of temperature variation. For instance, among the monitoring events undertaken only two occurred when water temperatures were above 20°C (defining the critical period) and did not coincide with times when the daily maximum temperature occurred. A more comprehensive perspective of the relationship between the model and measured temperatures was determined for segment 334 (river mile 38 within the Tiger reach) at 3-meters depth by comparing the daily maximum temperatures based on TidBit data logger measurements and model output (refer to figure below). As observed, there is a relatively close relationship between the measured (TidBit) and model. The mean error for the data depicted is  $-0.01^{\circ}\text{C}$  indicating insignificant bias with the root mean squared error of  $0.64^{\circ}\text{C}$ , indicating a good fit between the measured and predicted temperatures. Overall, these numbers are indicative of a well calibrated model. Similar numbers were found at the other monitoring locations. (TidBits were set at 7 locations within the Box Canyon section of the river.)

Importantly, there is not the systematic model bias present suggested by the comparison of “snapshot” measured and modeled vertical temperature profiles. In fact, referring to the figure below, for segment 334 on July 29, the model-predicted temperatures are slightly higher than measured by the TidBit while on August 18 they’re close in magnitude, similar to the relationship presented in the figure above. This indicates the importance of taking a longer-term perspective when making these types of comparisons to account for overall variability. The TMDL was not based on one day rather it considered when temperatures were above 20°C a situation which, in 2004, occurred over an approximately 60-day period (below figure).

While the examination of temperatures at 3-meters indicates the model provides a reasonably good fit between measured and predicted temperatures what about for shallower depths? Unfortunately, there were no TidBit data-loggers set for depths shallower than 3-meters in reaches the TMDL found to be the most impacted by the Box Canyon facility (Tiger and Forebay). So there is no means to confirm the increased heating the model predicts for shallower depths.

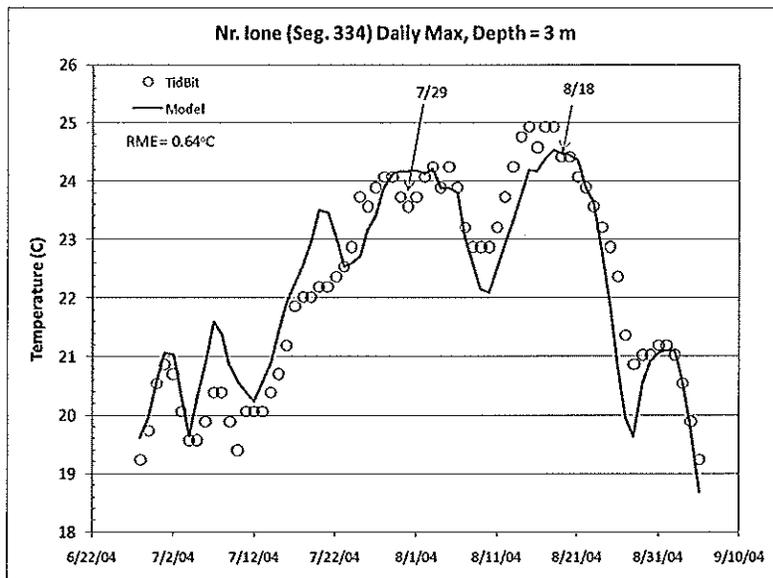


Figure. Relationship between measured (TidBit) and model-predicted daily maximum temperatures for segment 334 (Tiger reach, river mile 38.3).

A temperature impairment is still found for the Box Canyon forebay reach when the daily maximum temperatures at 3-meters are used, as opposed to the water column daily maximum (TMDL approach), though predictably the level of impairment is considerably lower (refer to figure below).

**Summary:**

- The temperature model applied in the Pend Oreille River TMDL, based on a longer-term relationship between predicted and measured daily maximum temperatures (seven locations) within the Box Canyon affected section of the river, appears well calibrated.

- For the majority of the monitoring locations, this assessment of calibration occurs at a depth of 3-meters. This depth is approximately the inflection point that model-predicted temperatures were found to increase at a higher rate for shallower depths in comparison to those measured during routine water column monitoring.
- Temperature data-loggers were not set for depths shallower than 3-meters in the sections of the river found to be most affected by the Box Canyon facility (Box Canyon forebay and Tiger reaches). For this reason, there is no means to either directly confirm or deny that the model found to be well calibrated at 3-meters is also well-calibrated for shallower depths. Violations of the criteria exist 3 meters below and the model is valid for the purpose of moving forward with the TMDL. However further sampling and analysis will be helpful as part of the 10 year evaluation.

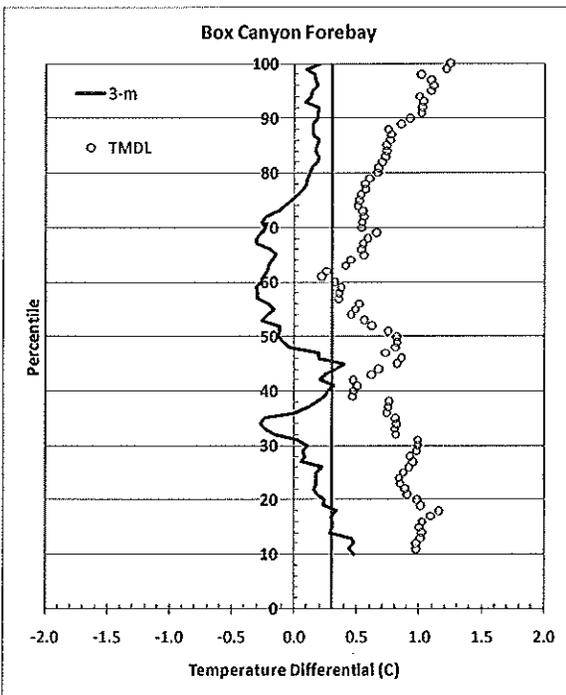


Figure. Temperature differentials based on the TMDL in comparison to daily maximum temperatures at 3-meters. (Differentials greater than 0.3°C (vertical red line) indicate a temperature impairment.)

Dispute Claim PUD -2 & Dispute Claim PUD-3: Ecology has no clear plan for judging success of future implementation measures employed toward meeting water temperature allocations. The TMDL establishes temperature goals that are unachievable by any reasonable means.

Decision: We disagree with this claim, but will revise the TMDL to clearly articulate the following compliance pathway.

*In 2003 Ecology developed a regulatory pathway to issue Clean Water Act Section 401 certifications for existing dams. At that time we recognized that it would be a challenge to show that existing dams were not having an impact on water quality. We developed rule language that would have dam operators develop a Water Quality Attainment Plan to identify actions they can implement to address pollution. The Water Quality Attainment Plan will include monitoring after activities are implemented and adaptive management steps. The dams are given a 10 year compliance schedule and after the Water Quality Attainment Plan has been implemented Ecology and the dam operator will decide what the next steps are (completed actions meet water quality standards, another compliance schedule is appropriate, or surface water quality standards should be changed.*

*In this TMDL there are two dam operators and we are on the following paths to bring them into compliance with the dam compliance language in the Water Quality Standards:*

**Seattle City Light- Boundary Dam:** *Seattle City Light has a settlement agreement that was signed on March 23, 2010, by Bureau of Indian Affairs, National Park Service, United States Fish and Wildlife Service, United States Department of Agriculture Forest Service, Washington Department of Fish and Wildlife, Washington Department of Ecology, Kalispel Tribe, Public Utility District No. 1 of Pend Oreille County, Washington, American Whitewater, Selkirk Conservation Alliance, and the Lands Council. Seattle City Light has just recently (within the last 2 months) developed a Temperature Water Quality Attainment Plan that Ecology has approved. We have worked extensively with them and the plan will rely on all actions in the settlement agreement that may improve temperatures in the mainstem and tributaries. These will be the actions for the first 10 years of the 401 compliance schedule and include the following activities:*

- *Mill Pond Dam Removal and Stream Channel Restoration*
- *Stream and Riparian Improvements in Sullivan Creek North Fork Sullivan Creek*
- *Large Woody Debris placement and Road improvements in Sullivan Creek and Selected tributaries upstream of the confluence with Outlet Creek*
- *Habitat protection, riparian improvement, and stream channel enhancement in Sullivan Creek*
- *Cold Water Release Structure at Sullivan Dam*
- *Mainstem Large Woody Debris at tributary deltas; two at Sullivan, one at Sweet, Slate, and Linton Creeks*
- *Mainstem erosion control measures and riparian plantings*

*Monitoring will be required in the tributaries where we expect to see improvements and we will also include monitoring stations in the mainstem of the river. This additional monitoring component is required by the Dam Compliance Provision in the Water Quality Standards WAC 173-201A-510(5).*

#### **Pend Oreille PUD Box Canyon Dam**

*Pend Oreille PUD reached a settlement agreement and amended their FERC license on February 19, 2010. The settlement agreement was between the Department of Interior, United States Forest Service, the Kalispel Tribe of Indians, and Ponderay Newsprint. Article 406 of the FERC License requires Pend Oreille PUD to implement a Trout Habitat Restoration Program (THRP). The THRP calls for the restoration and maintenance of 164 miles of tributary habitat of which 66 miles will occur in the first 10 years, 66 in the second 10 years and 32 in the remaining 5 year period. THRP will include a combination*

*(some or all) of the following measures that will also make up parts of the Pend Oreille PUD's Temperature Water Quality Attainment Plan:*

- *Channel improvements (limited to geomorphologic improvements and barrier removal)*
- *Floodplain restoration*
- *Riparian corridor restoration*
- *Conservation easements and/or purchases*

*Similar to Seattle City Light's Water Quality Attainment Plan, we will use current actions from Pend Oreille PUD settlement agreement as evidence demonstrating that the PUD is moving toward meeting applicable temperature criteria. We will also require monitoring to inform us on what steps need to take place at the end of the 10 year compliance schedule.*

**Dispute Claim PUD - 4:** The TMDL does not take into account normal water temperatures, flows, seasonal variation, and existing sources of heat required by 33 U.S.C. 1313(d)(1)(D).

**Decision:** *We disagree with this claim. The TMDL, as written, takes into account normal water temperatures, flows, seasonal variation, and existing sources of heat. The use of the dynamic model to simulate multiple years (and seasons) using existing river flows and other environmental conditions exceeds the technical expectations or requirements for conducting a temperature TMDL study and assessment of the Pend Oreille River system. The use of the cumulative frequency distribution to assess changes in maximum temperatures within a reach between scenarios is technically appropriate, because using other methods would not account for spatial and temporal differences that are expected when comparing two different hydraulic systems (i.e., existing vs. natural).*