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**Message:**

Attached are comments re the draft temperature TMDL for the Pend Oreille River. These are submitted on behalf of Ponderay Newsprint Company.

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10/17/07 9:30 AM (1)

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**Re: Pend Oreille River temperature TMDL issues**

Dear Robert and Paul:

I am writing 1) to question the determination that a TMDL is needed for the Idaho segment of the Pend Oreille River for temperature, 2) to question how the TMDL determined that a temperature violation occurs in the early May 2004 time frame, and 3) to point out that the TMDL is incorrect in setting allowable temperatures for the river based on the numeric criteria.

1) A TMDL for temperature is not needed for the Idaho segment of the Pend Oreille River.

The modeling of the Pend Oreille River on the Idaho side has determined that the temperature differences between the existing conditions and the natural conditions are essentially driven by the Albeni Falls dam. The modeling has also illustrated that the effect of the dam is that the existing conditions are cooler than the natural conditions in the Idaho portion of the Pend Oreille River during the summer months. The summer months are when the surface waters of Lake Pend Oreille reach temperatures in excess of Idaho's and Washington's and the Kalispel Tribe's numeric temperature criteria of 22°C, 20°C and 18°C. Both the State's and the Tribe's water quality standards for temperature include provisions that when the natural conditions exceed the numeric criteria, then human causes may not allow more than a 0.3°C increase above that which is natural. Washington's standards also include additional provisions that apply regardless of whether the natural temperature is above or below the numeric criteria, and those need to be understood and properly considered.

In 2002, I provided Washington Department of Ecology (WDOE) with a rationale for not 303(d) listing the Pend Oreille River for the station closest to the Idaho border. The rationale documented that the dam at Albeni Falls did not create a reservoir, but that it did control the height of Lake Pend Oreille such that in the summer it is as much as 11 feet higher than during low flows

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under natural conditions. The lake behaves the same as all lakes, becoming thermally stratified in the summer, gradually accumulating more and more heat as the summer progresses, and then cooling in the fall. Because the Pend Oreille River is the outlet of the lake, the water flowing to the outlet is necessarily water from the surface portion of the water column. Because the summer lake level is held higher by the Albeni Falls dam than under the natural condition, it must, by necessity, draw water from a greater depth range than occurred under natural conditions. The nature of thermal stratification in lakes and the increased depth of the outlet stream assures that because of the dam's existence and operation, the existing summer condition of the Pend Oreille River in Idaho, and in Washington near the outlet of Albeni Falls dam, must be cooler than the natural condition.

WDOE elected to list the Pend Oreille River and many other rivers on the 303(d) list on the sole basis of exceeding the numeric component of the temperature criteria, allowing for TMDL studies to sort out the natural and the human allowance components of the standards. Similarly, IDEQ 303(d) listed the river for temperature on its side of the border based solely on exceeding numeric components of their criteria. Neither listing was based on a determination that human causes were adding more than 0.3 °C to the naturally warm waters. The modeling confirmed that the temperatures in the Pend Oreille River in Idaho (and at the Washington border) are lower in the summer months under the existing condition than they were under the natural condition. For reasons unexplained, the modeling report avoided making any significant conclusions, but merely presented the analyses for many different situations.

IDEQ chose to parse the modeling results many different ways and identified that on August 8<sup>th</sup>, 2004, the model indicated a higher temperature in the downstream reach of the river than the natural condition, and therefore a TMDL was needed to solve the brief, apparent violation of the state's temperature standards. Note that for the numerous other means of evaluating the temperature effects employed by IDEQ, IDEQ recognizes that the modeling described higher summer temperatures for the natural condition compared to the existing condition. The problem with the August 8<sup>th</sup> analysis is that the model identified a time when a slug of cooler water briefly entered the river, due to "hypolimnion involvement" (translation, the thermocline in the lake tilted under wind forcing and/or seiching conditions, briefly presenting cooler water to the outlet). Since the dam deepened the outlet stream, the travel time for any particular slug of water is slower than under the natural conditions. The model then compared temperatures at a particular location in space and time, which effectively compared different parcels of water. If the comparison would have been with the same parcels of water when they arrived, then the perceived problem would not occur. IDEQ incorrectly concludes that fish were impacted. From the perspective of the fish, they do not watch a calendar, and they would not experience a temperature impairment because of the dam. The fish would experience warm water, then a slug of cooler water, then warm water, under both the natural and the existing conditions. The timing would be different but the temperatures for each of these parcels of water would be warmer under the natural condition than the existing condition. It is incorrect to say that the impact to fish is more significant than the impact under natural conditions.

Another way to evaluate IDEQ's position is to consider the consequences of a cure for the August 8<sup>th</sup> "problem". Since the dam is the cause of the impairment, then one cure for the one day impairment would be to remove the dam. Granted, that is a bit extreme, but the modeling allows us

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to see the effect of removing the cause of the temperature impairment. The result is that for the reach in question, the one day would be cooler, and for all the other summer scenarios evaluated by IDEQ, the temperature would be higher. Since the cure creates more temperature concerns than it solves, it makes no sense.

The modeling demonstrates that in the summer, when the natural temperature of the lake, and its outlet river exceeds the numeric criteria, the effect of the dam is to make the water in the outlet river cooler than the natural condition. That is a demonstration of compliance with Idaho's, Washington's and the Kalispel Tribe's temperature standards. IDEQ should declare that the Pend Oreille River in Idaho meets the temperature standards, remove the river from the 303(d) list, and move on to other concerns in the state. A TMDL for temperature in Idaho is not needed and the modeling provides the basis for the state to remove the Pend Oreille River from the state's 303(d) list of impaired waters in accordance with 40 CFR 130.7(b)(6)(iv).

"...each State must demonstrate good cause for not including a water or waters on the list. Good cause includes, but is not limited to, more recent or accurate data; **more sophisticated water quality modeling; flaws in the original analysis that led to the water being listed** in the categories in §130.7(b)(5); or changes in conditions, e.g., new control equipment, or elimination of discharges." (emphasis added)

The state now has the benefits of sophisticated water quality modeling, whereas at the time of 303(d) listing the state had no modeling. The original analysis that led to the 303(d) listing by the state was flawed because it did not consider the natural conditions and the human caused allowance in the standards. The modeling demonstrates that the effect of the Albeni Falls dam operations is to decrease, not increase the temperature during the summer months when the numeric criteria are exceeded and the 0.3 degrees C human caused allowance applies. Decreasing the temperature effectively creates a benefit which should apply as a credit beyond the 0.3 degrees C allowance.

I note from the August 16, 2007 WAG meeting notes that Bob Steed of IDEQ and Don Martin of EPA made the following comments (as reflected in the meeting notes):

"Bob responded [to a question from Lori Blau about the need for the TMDL] that it is the way the TMDL process is set up: If a waterbody is on the state's impaired list and standards are exceeded, then a TMDL must be done. So, even though the dam has overall helped with temperature in the river in Idaho, because the river is listed for temperature and there are two points out of compliance, then a TMDL is required."

"Don added that we are too far down the road now, given the agreement between the states, tribe and EPA, to talk about de-listing the river for temperature. The river has been listed in Idaho since 1994."

The modeling results provide an overwhelming weight of evidence that the summer temperatures in the Pend Oreille River in Idaho, and at the outlet of the Albeni Falls dam, are cooler under the existing conditions because of the dam, than under the natural conditions. The modeling results validate the conceptual analysis that I provided to WDOE in 2002. The modeling results show

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that the operations of the Albeni Falls dam account for the temperature differences that exist. The history of the 303(d) listings shows that the listings were based solely on the numeric criteria exceedances. In Washington, WDOE made the decision to list solely on the basis of numeric criteria, and stated that they will rely on the TMDL studies to evaluate the other components of the temperature standards to determine whether the river can be removed from the 303(d) list or if a TMDL is needed.

The argument put forward by Don Martin of EPA that we are too far down the road now to talk about delisting the river for temperature is not supported by any regulatory requirement and makes no sense. The fact that it was listed for many years, based on no modeling and inadequate (and therefore flawed) analysis that failed to consider the human caused allowance in the temperature standards, is not a reason to preclude delisting now.

IDEQ should de-list the Pend Oreille River in Idaho because it not only meets the temperature standards, but the human causes cool the river in the summer. A temperature TMDL is not necessary in Idaho. Better information is available now than was available at the time of the 303(d) listings in the past. EPA's 303(d) guidance allows delisting of waters when better information such as modeling, is available. There is nothing in state or federal regulations or guidance that says the state must continue down the TMDL path when it isn't needed. There is no need to impose allocations to Idaho dischargers, and no benefit to them in doing so.

- 2) IDEQ and WDOE have misinterpreted Washington's temperature standards with regard to the model results from early May 2004. Furthermore, the model results from early May 2004 need an explanation as to what mechanism could produce the modeled changes.

The Washington standards include additional provisions that the modeling and the TMDL effort have not interpreted correctly. Consequently, there is a perceived problem around the first week of May 2004 from the model runs. The model somehow calculates an existing condition more than a degree warmer than the natural condition. First off, before declaring that a violation has occurred and justifying a TMDL, the agencies, and the modelers need to offer an explanation for how this difference could come to be. I can't think of any possible explanation, and I think one is needed. Absent an ability to provide an explanation, it is imperative that the model results around the first week of May 2004 should be re-evaluated and either explained, corrected or rejected.

The questionable and unexplained model results are presented as demonstrating a violation of a 1.68°C human caused allowance. Where does the 1.68°C allowance come from in the standards, and has the TMDL properly interpreted the allowance?

The answer is that the standards found at WAC 173-201A-602(2) for the Pend Oreille River include the following:

“...nor shall such temperature increases, at any time, exceed  $t = 34/(T + 9)$ .”

How is the formula supposed to be interpreted? The answer is admittedly not easy to trace. WAC 173-201A-602(2) designated the Pend Oreille River as supporting the “Spawning/Rearing”

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aquatic life uses. WAC 173-201A-200(1)(c) describes temperature criteria for the various aquatic life uses. Applicable to all the uses (including the spawning/rearing use) are provisions found in WAC 173-201A-200(1)(c)(ii and iii). It is in WAC 173-201A-200(1)(c)(ii) that the term "T" is defined, and it is in earlier versions of the water quality standards regulation that the term "t" is defined. From WAC 173-201A-200(1)(c)(ii),

"Incremental temperature increases resulting from individual **point source activities** must not, at any time, exceed  $28/(T+7)$  as measured at the edge of a mixing zone boundary (where "T" represents the **background temperature** as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge);" (emphasis added)

The provision in the present regulation is a carry over from the Class A water quality standard from the earlier regulations. The earlier regulation had different formulas for Class AA, A, B and C waters, and the site specific adoption for the Pend Oreille River used the formula associated with Class B waters. The new regulation continued the site specific temperature standard for the Pend Oreille River. The wording for the temperature provision for Class B waters in the 1997 version of the water quality standards at WAC 173-201A-030(3)(c)(iv) was worded similar to the new wording, as follows.

"For purposes hereof, "t" represents the maximum permissible temperature increase measured at a mixing zone boundary; and "T" represents the **background temperature** as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge." (emphasis added)

The wording of the present regulation, and its connection to the earlier regulation, shows that the " $t = 34/(T + 9)$ " formula is applicable for evaluation of maximum allowable temperature increases at the edge of a mixing zone, resulting from a point source. It is based on a comparison with background temperatures, and not a comparison with natural conditions. Note that in the June 25, 2007 WAG meeting summary, Paul Pickett says that "T" represents the natural temperature. There is nothing in regulation that supports that claim.

The formula that WDOE has used to assert a problem in early May of 2004 is not applicable to a dam. The formula applies to point sources and mixing zones and comparisons with the highest background temperatures. The dam is not a point source for temperature, and even if it were treated as such, the formula would be used to compare the downstream temperature with the upstream temperature, and not the modeled results.

There is another provision in Washington's temperature standards that does apply. WAC 173-201A-200(1)(c)(iii) is the applicable provision. That provision states:

"Incremental temperature increases resulting from the combined effect of all nonpoint source activities in the water body must not, at any time, exceed 2.8 °C (5.04 °F)."

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The relevant comparison for early May 2004 is the 2.8 °C difference. The modelers and WDOE still need to offer a mechanism to explain the modeled temperature differences in early May 2004, but maybe the modeled difference isn't an issue when compared to the 2.8 °C allowance.

Note also that figures 25 and 26 in the TMDL document mistakenly present the loading capacity as based on the  $t = 34/(T+9)$  formula. Those figures should be corrected to reflect the 2.8 degrees allowance and technically should even include an additional small allowance based on the mixing zone specific application of the  $t = 34/(T+9)$  formula, but, for simplicity, the formula application can probably be left out, recognizing that the water quality standards still will require its usage in assessing individual NPDES permittees in Washington, regardless of the TMDL.

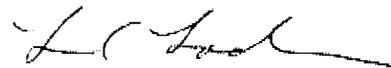
3. The TMDL incorrectly asserts that the allowable temperatures for the Pend Oreille River in Washington are essentially the numeric criteria in the summer, and therefore sets incorrect reduction requirements.

Table 23 on page 81 asserts that the allowable temperature for 8/24/04 at river mile 34.6 is 20 degrees C. The table ignores the natural provision of the water quality standards and also ignores the reality that the natural condition of the Pend Oreille River is going to be warmer than 20 degrees C for much of the summer. Consequently, the prescribed reduction is unattainable by any form of allocation. Similarly the table prescribes even slightly lower temperature allowances for 8/25/04 at river miles 17.7 and 16.8.

Inexplicably, the natural temperature conditions have simply vanished from the TMDL considerations. Washington's standards do not support such a requirement. The TMDL must consider and allow for the natural condition component of the standards and the human caused allowance of 0.3 degrees centigrade above the natural condition.

Table 23 on page 81 also asserts that the allowable temperature for 5/7/04 is 12.85°C. This is also incorrect because the TMDL document misunderstands the applicable provisions of the temperature standards as described in item 2 above. It may also be a product of some modeling error, since the differences reported by the model around the first week of May, 2004 lack any logical explanation.

Very truly yours,



Lincoln C. Lochr  
Environmental Analyst