

March 27, 2008

MEMORANDUM FOR: Robert Steed, Idaho Department of Environmental Quality
Paul Picket / Karin Baldwin, Washington Department of Ecology
Don Martin, Environmental Protection Agency
Michele Wingert, Kalispel Tribe of Indians

SUBJECT: COE reply to IDEQ Draft Comments for Pend Oreille River TMDL, Pre-Public Comments

The following memorandum contains comments from the Seattle District Corps of Engineers (Seattle District) regarding the February 24, 2008 *Draft Comments for Pend Oreille River TMDL, Pre-Public Comments* prepared by Idaho Department of Environmental Quality. Comments were provided by Kent Easthouse and Ed Zapel, Seattle District Corps of Engineers and Mike Schneider, U.S. Army Engineer Research and Development Center (ERDC).

1. Comment Index AC-1

IDEQ Draft Response:

Uncertainty and accuracy issues are common in the TMDL process. TMDLs are to be developed with the best available information, which are the model simulations as performed and reported on by Portland State University. Uncertainty and sensitivity analysis provided by Corps of Engineers was largely performed utilizing volume weighted model outputs to which cannot be compared to Idaho's numeric criteria. The modeling group discussed uncertainty and sensitivity analysis and determined that it was not very valuable to temperature modeling. IDEQ is open to additional uncertainty and sensitivity analysis during the 5 year review and will keep evaluation of uncertainty and sensitivity part of future modeling contracts. Modeling has been performed with conservative assumptions as part of the implicit margin of safety.

Seattle District Reply:

The original comment recommended that a sensitivity analysis should be performed to verify the range of uncertainty of simulated thermal properties to critical input parameters. Sensitivity analysis on input parameters to any numerical modeling exercise, including water quality modeling, is widely recognized as a necessary and valuable component of any modeling endeavor. As such it would seem imperative to include such analyses here. The Corps of Engineers strongly believes that performing a sensitivity analysis on various input parameters is a critical part of the CE-QUAL-W2 temperature modeling process and provides valuable information on the weight/importance of critical input parameters on the predicted temperatures. Additionally, a sensitivity analysis will provide insight as to why the current Pend Oreille River model is biased during the summer months by over predicting surface temperatures in the river.

The Seattle District respectfully disagrees with the modeling group's conclusion that sensitivity analysis "*was not very valuable to temperature modeling.*" A sensitivity analysis on critical

input parameters such as wind sheltering, roughness, lake elevation, forebay elevation, and channel bathymetry would provide valuable information on how these input parameters impact predicted temperatures. It should be noted that Portland State University (PSU; Idaho Department of Environmental Quality's contractor providing CE-QUAL-W2 modeling expertise) recommended sensitivity analysis be conducted on critical input parameters in a June 2007 review of the Boundary Model and a February 2005 review of the Rocky Reach Model. Moreover, PSU performed extensive sensitivity analysis on critical input parameters for the Willamette River CE-QUAL-W2 temperature model.

The statement "*Uncertainty and sensitivity analysis provided by Corps of Engineers was largely performed utilizing volume weighted model outputs to which cannot be compared to Idaho's numeric criteria*" is not entirely correct. The Seattle District performed a preliminary sensitivity analysis on lake elevation under the "natural" condition scenario. This sensitivity analysis presented the surface daily maximum temperatures, not volume weighted temperatures, as shown in the November 9, 2007 draft comment report. Moreover, an uncertainty analysis was presented as Attachment B in the November 9, 2007 draft comments. This analysis presented data on surface daily maximum, surface daily average, volume weighted daily maximum, and volume weighted daily average temperatures at the Riley Creek Station (Segment 107).

Please provide a reference for the statement that volume-weighted model output temperature data cannot be compared to Idaho Water Quality Standards. The Seattle District cannot find a specific reference or guideline in IDAPA 58.01.02.250.02 that states how to apply the temperature data calculated by a 2-dimensional water quality model to state standards. IDEQ approved the use of volume/flow weighted CE-QUAL-W2 and Mike 11 temperature data for the Snake River-Hells Canyon Complex TMDL. Also, IDEQ compared volume weighted Total Dissolved Gas data to water quality standards for the King Hill-CJ Strike reservoir TMDL. Moreover, any IDEQ temperature TMDL or 401 Certification using 1-D models such as Qual 2k, Mike 11, or Heat Source are inherently based on volume or flow weighted data. Models such as Mike 11 or Qual 2k are 1-dimensional and model an average water column temperature.

Engineer Research and Development Center Reply:

The COE did not participate in the modeling group discussion that concluded that model uncertainty and sensitivity analyses was not very valuable for temperature modeling. We disagree with this conclusion particularly when compliance is based on the comparison of the thermal response in a single cell at an instance in time. Could IDEQ provide the rationale used by the modeling group to arrive at this conclusion?

The COE has evaluated uncertainty and model error on several input parameters of IDEQ's current Pend Oreille River CE-QUAL-W2 model, using both surface cell temperature metrics and volume weighted temperature metrics. Both analyses indicated that the daily maximum and average temperatures were sensitive to several input parameters, and in fact this sensitivity is in excess of the proposed 0.3°C compliance metric. Additionally, part of the uncertainty analyses presented by the COE used volume weighted temperature metrics because IDEQ had selected this metric in 3 different instances and the reliability of the model estimates of aggregate river temperatures are significantly better than estimates of surface or bottom cell properties.

2. Comment Index AC-2

IDEQ Draft Response:

Modeling error has not been evaluated when comparing modeling scenarios. The use of the model to predict relative effects is consistent with standard modeling practices. The absolute accuracy of the parameters and the modeling coefficients used in the model is always subject to some uncertainty. The absolute accuracy (AME) of the model is not critically important when comparing scenarios, because any error in the model results would be similar between scenarios. Most modeling protocols acknowledge this approach as a valid use of models.

Seattle District Response:

Seattle District respectfully disagrees with IDEQ's position on modeling error and the statement "*The absolute accuracy (AME) of the model is not critically important when comparing scenarios, because any error in the model results would be similar between scenarios. Most modeling protocols acknowledge this approach as a valid use of models.*" The Seattle District maintains that model errors between the "existing" and "natural" scenarios will not cancel each other out because of (1) the difference in travel time between the two scenarios, and (2) the difference in model structure between the two scenarios. The Seattle District clearly showed in the November 9, 2007 comments that an error in temperature introduced at the boundary condition in late April 2004 for both the "natural" and "existing" scenarios propagated down river at different rates resulting in an erroneous violation of Washington water quality standards at the state line in early May 2004. Moreover, the "natural" scenario model and the "existing" scenario model are not identical as they have different boundary conditions, channel configurations, model mesh set ups, hydrologic forcing functions and other differences in order to simulate the Pend Oreille River with and without Albeni Falls Dam. Consequently, comparison of model data from a single cell at an instant in time from two model runs with different travel times without accounting for model uncertainty and error is not valid because errors introduced into the model will not be the same at that instant in time for the two scenarios.

Engineer Research and Development Center Reply:

The statement that the accuracy of the model is not important when comparing scenarios because error in the model results would be similar between scenarios is not applicable in the current investigation of Pend Oreille River temperature particularly where much of the analysis is based on the properties of surface warming with and without Albeni Falls Dam. IDEQ has agreed that modeling errors introduced at the upstream boundary propagate at different rates and thus do not cancel out when comparing thermal conditions at specific points in space and time. The COE identified this source of error as being responsible for the apparent thermal impairments identified by the State of Washington at the border with Idaho in April/May of 2004. As a result, Washington has removed this thermal event as evidence of impairment. The model error in predicting surface temperatures has been identified to be very large relative to the 0.3 C threshold that is being used to determine temperature impairment. Surface temperature data collected in the Pend Oreille River near Riley Creek during the summer of 2004 shows that the IDEQ model predicted estimates of daily maximum surface temperatures for the existing condition overestimate actual observed conditions by an average of 1 C. It is virtually impossible for simulations of the Pend Oreille River without Albeni Falls Dam in place to

experience an error in surface temperature of this magnitude because of the additional vertical mixing that is inherent in shallow river systems that inhibits the development of a surface layer that remains significantly warmer than the water column.

3. Comment Index AC-3

IDEQ Draft Response:

IDEQ and Modeling Group agree that upstream boundary conditions may be better if coupled with an upstream model representing Lake Pend Oreille and Clark Fork River. This level of analysis is beyond the scope and resources of the current efforts. While the boundary conditions may be improved it is unclear how much they would be improved by. IDEQ believes additional modeling should be scoped during future efforts.

Seattle District Response:

The Seattle District agrees that the Pend Oreille River model needs to be coupled with an upstream model representing Lake Pend Oreille. However, The Seattle District believes that the lake model and the river model should be coupled together before the TMDL is finalized and decisions are made. The appropriate application of boundary conditions to this, and indeed any, modeling effort which will be used for regulatory purposes, must of necessity be de-coupled from the discussion of available resources dedicated to develop the model. Boundary conditions must be properly defined in any modeling work, and thus must be appropriately evaluated and resourced in both scope and budget before the modeling activity is commenced.

Engineer Research and Development Center Reply:

The determination of upstream boundary temperatures are a critical components to this TMDL analyses as evidenced by the short residence time in the study area of from 3 to 12 days. Clear evidence of a close coupling with flows and qualities of the Clark Fork has been demonstrated in Total Dissolved Gas studies conducted by Avista and Parametrix. The COE believes that the incorporation of the Clark Fork with Lake Pend Oreille is needed to identify the contribution of external thermal loading to the Pend Oreille River and improve model accuracy to a level commensurate with the 0.3 C temperature threshold that is being used to identify thermal impairment.

4. Comment Index AC-3b

IDEQ Draft Response:

Not addressed at this time.

Seattle District Response:

The Seattle District requests that IDEQ study Attachment B of the November 9, 2007 Draft Comments which outlines how the predictive errors of model estimates are greatest for the surface cells. This issue is critical to understanding why the Seattle District feels that model uncertainty is an important issue in the Pend Oreille River TMDL and needs to be addressed.

Engineer Research and Development Center Reply:

The COE requests a response to this comment because we feel this is a critical issue.

5. Comment Index AC-4a,b

IDEQ Draft Response:

Travel Time and Lag Time issues are a concern for IDEQ. For determining whether or not an allocation is needed travel time should not be addressed. Operation of any facility which impounds water is going to result in waters with different temperatures. Idaho water quality temperature standards focus on a singular location and pulses of different temperature waters have no accounting mechanism. Under every hydroelectric development scenario where water is impounded it is likely that temperatures exceed Idaho Water Quality Standards, and Albeni Falls Dam is no different. IDEQ has more flexibility in approach when developing load allocations and suggests developing load allocations using load duration curves. Load duration curves may be developed from large enough amounts of time that Travel Time issues can be minimized.

Seattle District Response:

Lag time and pulses of cold water are critical to the Pend Oreille River TMDL and need to be addressed by IDEQ in the TMDL. The majority of exceedances of IDEQ temperature standards identified in IDEQ's model occur during times when the river is **cooling** due to either pulses of cold water from Lake Pend Oreille (seiching activity) or infrequent summertime cold fronts moving through the region resulting in a rapid cooling of the river as maximum daily air temperatures drop from about 85 degrees to 70/65 degrees (i.e. August 6-9 and August 24-30 time periods). IDEQ has specifically stated that they selected August 8th as a date for the longitudinal instantaneous compliance metric based on the fact that it is a period of hypolimnetic withdrawal (i.e. a cold pulse of water due to seiching activity) from the lake. The difference in travel time resulting from Albeni Falls Dam results in a shift in temperature when these cooler temperatures move downstream. IDEQ, has in previous TMDL developments, included travel time and lag time analysis, such as in the Snake River-Hells Canyon TMDL.

The Seattle District requests additional time to analyze the Load Duration Curve method being proposed by IDEQ. Currently the Seattle District believes that frequency analysis curves are a better way to address travel time issues. Frequency analysis was used by ODEQ on the Willamette River TMDL and has been sanctioned by the EPA. The Seattle District prepared a draft report titled *Frequency analysis of CE-QUAL-W2 modeled "existing" and "natural" surface daily maximum, average, and volume weighted temperatures in the Idaho section of the Pend Oreille River* which was sent to IDEQ, WDOE, EPA, and the Kalispell Tribe on February 21, 2008. IDEQ has stated that they will read the frequency analysis report and discuss the value of this method with the Seattle District and the WAG.

Engineer Research and Development Center Reply:

The issue with travel time involves the need to identify a human related influence for an increase in the thermal load of the Pend Oreille River as the basis for concluding that the river is

thermally impaired. Citing temperature differences between with and without dam scenarios at a point in space and time is not sufficient evidence that the thermal load has changed or has an anthropogenic source. The temperature difference between conditions at a point in space and time is primarily a function of the different flow conditions and not an indication of a change in the thermal load to the Pend Oreille River. The thermal comparison in this case simply identifies differences between two different parcels of water with different initial conditions when introduced to the Pend Oreille River and different exposure histories to atmospheric heat exchange processes.

5. Comment Index AC-4c,d,e

IDEQ Draft Response:

No response.

Seattle District Response:

The Seattle District requests that IDEQ respond to the comments pertaining to lag time and heat sources simulations conducted by the Corps of Engineers. These simulations were presented in the November 9, 2007 Comments Attachment A. Additionally, the Seattle District prepared a draft report titled *Frequency analysis of CE-QUAL-W2 modeled “existing” and “natural” surface daily maximum, average, and volume weighted temperatures in the Idaho section of the Pend Oreille River* which was sent to IDEQ, WDOE, EPA, and the Kalispell Tribe on February 21, 2008. Frequency analysis is another method for dealing with lag time.

Engineer Research and Development Center Reply:

The COE requests a response to these comments because we feel these are critical issues. The COE proposed an alternative analyses based on a frequency analyses of river temperatures simulated during the critical summer period as an alternative to the methodology used by IDEQ in assessing thermal impairment. This approach is consistent with IDEQ guidance documents, IDEQ water quality standards, and other Temperature TMDL’s approved by EPA. This example submitted for review involved the volume weighting of temperature properties in designated river reaches. This same approach can be applied with other temperature metrics.

6. Comment Index AC-5

IDEQ Draft Response:

The hydrologic budget has been corrected. Portland State University has re-run simulations and reported simulation runs. IDEQ has evaluated PSU findings and compared to Idaho Water Quality Standards.

Seattle District Response:

Response noted.

7. Comment Index AC-6

IDEQ Draft Response:

Calibration was evaluated by Portland State University and deemed unnecessary. The revised model performed better than the first edition. The revised model calibration statistics can be found in Appendix B: of the October 2007 Model Scenario Simulations Report.

Seattle District Response:

Since the error in hydrology only impacted the July, August, and September time period any calibration data that looked at the entire year for 2004 and 2005 would likely show very little difference. The Seattle District recommends that a recalibration be done because the model continues to have a large positive bias (over predicts temperatures), especially for the surface cells during the critical time period of June 21 to September 21, 2004. The data clearly show that the “existing” scenario surface daily maximum temperatures in July, August and September predicted by the revised model are greater than for the original model (See Figure 1), and that both models over predict surface temperatures for the 2004 season when directly compared to actual temperatures physically measured in 2004 (see Attachment B of the November 9, 2007 Review Comments). Sensitivity analysis on critical input parameters needs to be done by Portland State University to determine why the revised model continues to over predict temperatures during the critical June 21 to September 21 time period. The mean error for the Idaho section of the model near the boundary condition (Segment 7) and at Riley Creek (Segment 107) are considerably greater than any mean error calculated for the Box Canyon and Boundary sections of the model.

Engineer Research and Development Center Reply:

The recalibration of the model was deemed unnecessary by the IDEQ contracted modeler. Is the currently calibrated model adequate to identify differences in temperatures at a 0.3 C tolerance at a specific point in space (model cell 1m x 250 m) and time (10 second duration) between two scenarios with and without Albeni Falls Dam at a suitable confidence level? (reference Index AC-2 response).

8. Comment Index AC-7

IDEQ Draft Response:

The Pend Oreille Lake elevations used in the model were formed by removing the wedge of water held back by Albeni Falls Dam. Unfortunately the calculated lake elevations do not necessarily agree with those measured prior to the dam. The calculated lake elevations take into account modification (blasting) of the lake outlet, where the USGS data was collected prior to outlet modification. The calculated lake elevation is a reasonable approach, and is our available information. IDEQ will consider USGS data in future modeling as long as pre dam bathymetry can be ascertained.

Seattle District Response:

The Seattle District respectfully disagrees. The lake elevation prior to Albeni Falls Dam has a long historical record which is widely available from public sources and records. The lake is the boundary condition for the river model and as such the lake elevation is a critical input parameter for the model. To dismiss these data in favor of calculated, incorrect data is inappropriate under any tenable modeling scenario. Because the natural river was extremely shallow at the boundary with Lake Pend Oreille, modeling the correct lake elevation is critical for determining temperatures for the natural model. The “reasonable approach” suggested by IDEQ is not taking into consideration the Best Available Data and is modeling the natural condition based on a known error in the lake elevation and boundary condition. The historic lake elevation data exists and is one of the few input parameters for the natural condition model that is known and available. The TMDL should not be based on a model that has a known critical input parameter error and should be based on the best available data, not “reasonable” data. The model needs to be adjusted to better simulate the natural lake elevation. Currently, the “natural” scenario model has to add several fictitious cells to artificially increase the depth of the Pend Oreille River between Segments 2 and 14 to allow the model to run when lake elevations drop too low in August. This mesh modification does not change the surface area, cross sectional area, volume, or effective depth very much but it does change the maximum depth considerably.

The Seattle District is unaware of a modification or blasting of the lake outlet near Sandpoint that would account for the model calculating the incorrect lake elevation. Please provide a reference and we will follow up to determine what may or may not have occurred near Sandpoint. Modification and blasting of the channel at the original Albeni Falls site occurred during the construction of the project. Is this the modification being discussed? Pre-dam bathymetry is available from several public sources and records. The Seattle District can provide these maps.

Engineer Research and Development Center Reply:

The IDEQ states that TMDL’s are developed with the best available information (reference AC-1 response). The records of lake stage represent the best available information of conditions prior to the construction of Albeni Falls Dam. These conditions have a sustentative impact over the thermal regime in the natural river simulations and were available to the contractor throughout the model development period. Why have these conditions not be used to update model results? The COE is not aware of any “blasting” of the lake outlet and would appreciate any information on this perceived and supposed change in river bathymetry.

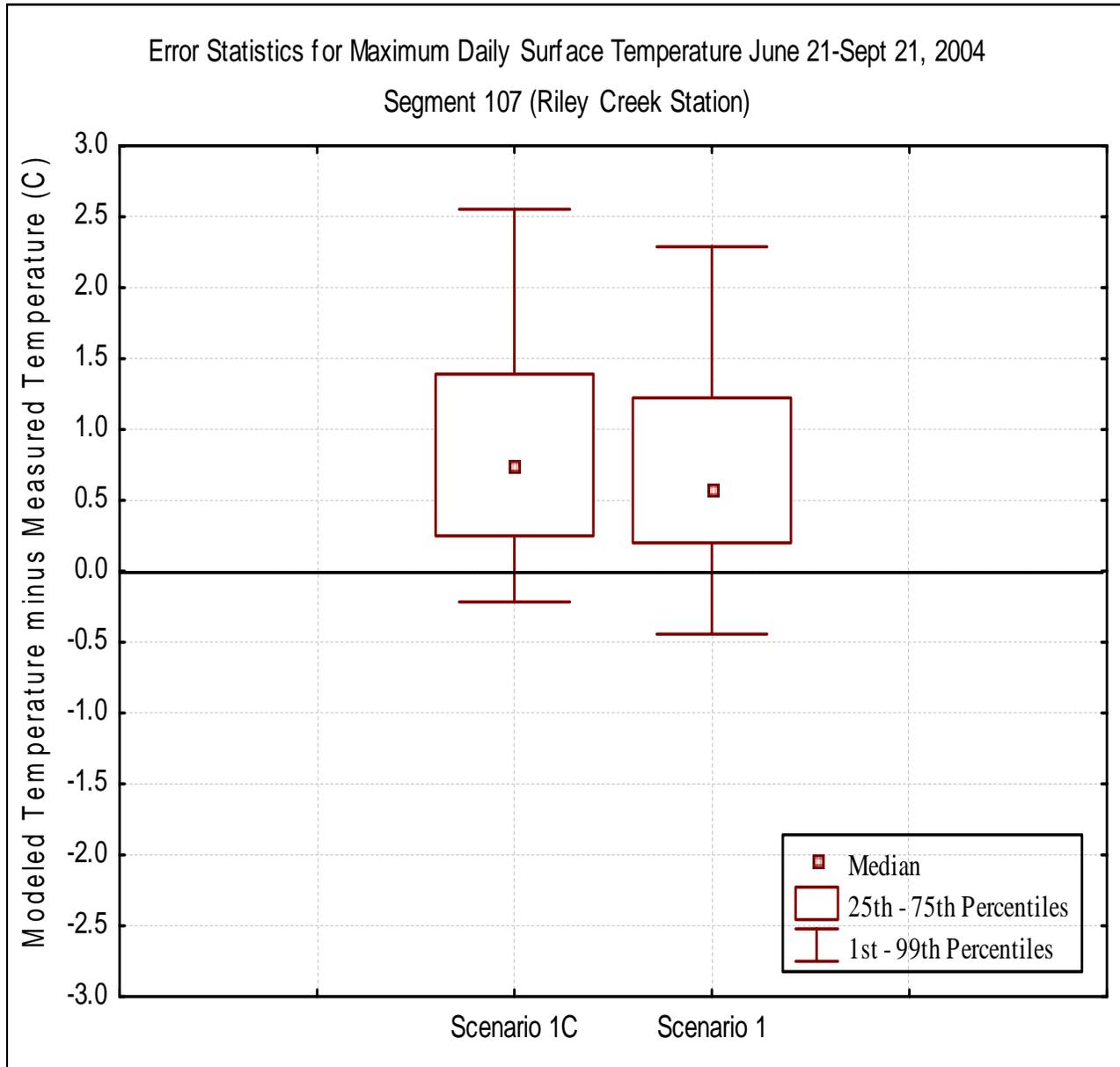


Figure 1. Error statistics for maximum daily surface temperatures measured at Segment 107 (Riley Creek Station) for the critical time period June 21 to Sept 21, 2004. Scenario 1 represents the original model “existing” condition and Scenario 1C represents the revised model “existing” condition. A positive temperature indicates that surface daily maximum temperatures predicted by the model are warmer than actual measured surface daily maximum temperatures at Segment 107.

9. Comment Index AC-8

IDEQ Draft Response:

IDEQ agrees that the selection of the absolute bottom cell in the water column for a compliance area may not have been the best area. IDEQ agrees that circulation in the deep pools may be more is modeled. It is suggested that bottom compliance areas have lower priority for allocations than other compliance areas. DEQ disagrees with the use of surface cells, largely because surface cells well calibrate – line up with monitoring data. While using volume-weighted or flow-weighted temperatures for determining compliance, DEQ is willing to discuss the development of allocations using weighted temperatures.

Seattle District Response:

The Seattle District believes that stakeholders and agencies in the WAG are in agreement that the use of the bottom cell is extremely unreliable, should not be used in the TMDL and is really an indefensible compliance location that detracts from the overall TMDL. Specifically, the bottom cells at the 10 km and 35km compliance locations are isolated cells with little flow. Diffusion is the main transport mechanism available in the model for water quality constituents of interest in these isolated cells. IDEQ should remove the bottom cell compliance location from the TMDL based on the fact that model results show these compliance points represent isolated bottom cells that have unreliable results and produce erroneous temperatures. The Pend Oreille River Temperature TMDL is setting precedents and the use of an isolated bottom cell as a compliance location, even if it is given a lower priority, would be poor scientific judgment and would make the TMDL unacceptable to the Seattle District. The Seattle District recommends that IDEQ remove the bottom cell compliance locations and requests that this issue be brought up to the WAG.

The Seattle District disagrees with IDEQ's statement that surface cells calibrate well with the monitoring data. PSU acknowledges in the model calibration report that there is a positive bias to nearly all calibration locations. Attachment B of the November 9, 2007 comments presented data showing that surface cells at Segment 107 (Riley Creek) significantly over predict water temperatures during the critical period from June 21 to September 21. Similarly, surface cells near the boundary condition at Segment 7 (Long Bridge Station) significantly over predict water temperatures. A simple sensitivity analysis on temperature input parameters would provide information on why the model over predicts temperatures.

Engineer Research and Development Center Reply:

The IDEQ intends to retain simulated temperatures in bottom cells as evidence of thermal impairment in the Pend Oreille River in spite of the highly unreliable nature of these estimates. It has been noted that this temperature TMDL is a precedence setting analyses that will likely be used as a model in other basins. The use of highly unreliable temperature estimates in determining temperature compliance is not consistent with past IDEQ policy or guidance and it detracts from the credibility of this assessment. The COE finds it somewhat inconsistent that the use of a volume weighted metric for daily average/maximum river temperatures was identified as not appropriate for this analyses, while the highly unreliable use of bottom cells temperatures

was retained. The issue of reliability of surface temperatures was addressed in previous comments.

10. Comment Index AC-9

IDEQ Draft Response:

IDEQ is proposing the use of Load Duration Curves for the development of allocations.

Seattle District Response:

The Seattle District feels that IDEQ did not respond to the correct comment and requests that they respond to the original comment. The original comment was on the use of an instantaneous metric for compliance as shown below:

Comment: *The use a metric requiring no measurable increase in temperature above natural conditions when it is the applicable criteria, at any location and at any instance in time is not valid and has not been used in previous TMDL analyses by Idaho DEQ. When the model is used to simulate temperatures in the river with and without Albeni Falls Dam there is typically a difference in travel time of about 3 days or greater between the two scenarios from the entrance to the dam. Temperatures introduced at the entrance will travel down river at different rates and generate instantaneous differences in temperature between the two cases. These temperature gradients in most cases are caused by the differential transport of externally generated temperature loads. To have an instantaneous point and time compliance metric for two modeling scenarios that have significantly different travel times is not justified and has little merit in characterizing the thermal budget of the Pend Oreille River.*

Recommendation: *The Seattle District recommends that the TMDL remove the instantaneous point and time compliance metric. Use of the daily maximum and daily average temperatures are a more accurate and comprehensive metric for assessments of compliance.*

The Seattle District maintains that IDEQ has never used such a stringent compliance metric before in a TMDL and questions why they are using the instantaneous compliance metric of any cell at any time at any location in the river for this TMDL. Use of a daily maximum and daily average temperature at a singular location is acceptable under IDEQ water quality standards and has been used in other IDEQ TMDLs and 401 Certifications. Use of an instantaneous compliance metric at any location and time would set a precedent for TMDLs. Please explain/justify the use of an instantaneous compliance metric in addition to the daily maximum and daily average compliance metrics.

Engineer Research and Development Center Reply:

It is inaccurate to base a loading allocation for the entire river for the summer months on a surface temperature difference determined at a specific model cell with a duration of less than one-minute. This temperature allocation ignores the model results that demonstrate temperatures

with the dam in place are overwhelming cooler than thermal conditions simulated for natural conditions. An appropriate loading allocation must be specific to the conditions upon which the impairment was identified meaning place, time, and flow/meteorological conditions.

11. Comment Index AC-10a

IDEQ Draft Response:

IDEQ has reviewed mentioned documents and does not see an inconsistency between our publications and the approach we are taking in this TMDL. IDEQ has much experience dealing with temperature within Wadeable streams, and much of our findings have been based on these Wadeable streams. IDEQ's direction and progress with the Pend Oreille River temperature TMDL has been shared with the authors of such documents for internal review. IDEQ cautions readers that there are statements within these documents that can easily be removed from context.

Seattle District Response:

The Seattle District contends that documents such as the Watershed Basin Assessment Guidance (WBAG II) and the 2008 303d/305b Integrated Report provide considerable information on methods for the analysis of temperature and beneficial uses during the TMDL process. The Seattle District is concerned that all guidance principles used to assess water bodies for other TMDLs are not being applied to the Pend Oreille River TMDL. For example, the temperature exemption rule was not being applied in this TMDL until the Seattle District brought up this issue. The Seattle District believes that the TMDL must present the WBAG II information about temperature guidance, beneficial uses, and criteria to support beneficial use similar to what was presented in the King Hill-CJ Strike Reservoir TMDL.

Engineer Research and Development Center Reply:

Has the current working definition of temperature impairment based on a model's predicted increase of river temperatures above applicable numerical standards (warmer of numeric standards for daily maximum and average or natural conditions) at any point in the water column throughout the entire river reach of interest at any time or duration, been applied in any other temperature TMDL in Idaho? Will this definition be consistently applied in other basin assessments currently or formerly on the 303D list?

12. Comment Index AC-10b

IDEQ Draft Response:

IDEQ has provided a more rigorous analysis of model outputs. Please see newest version of IDEQ evaluation of Model Scenario Simulations.

Seattle District Response:

The Seattle District will review the newest version of the IDEQ model evaluation and provide comments in a separate document.

Engineer Research and Development Center Reply:

It will be important for the load allocation definition that the timing and magnitude of temperature impairment be clearly summarized. Why were results from the 2005 simulation not reported? Conditions during 2004 were anything but normal with both highly unusual hot and cold air temperatures and record summer flow conditions at the end of August and beginning of September. When will this assessment be made available for detailed review?

13. Comment Index AC-11

IDEQ Draft Response:

When determining beneficial use support status, IDEQ may allow a 10% exceedance provision that gives less weight to departures from water quality criteria for infrequent (<10%) exceedance of the temperature criteria. This provision only applies for determination of beneficial use support status; it does not apply when determining whether a particular discharge or activity violates water quality standards, and it is only admissible IF aquatic habitat and biological data indicate that aquatic life beneficial use are otherwise supported (IDAPA 58.01.02.053.03). The 10% exceedance provision is typically only applied during consideration of listing status and requires that biological parameters indicate full support. The 10% exceedance provision is not intended to increase compliance benchmarks. The beneficial use support status for the Pend Oreille River had been previously determined, and listed. There are no biological parameters indicating full support; therefore, the analysis herein is a determination of water quality standards exceedance and the 10% exceedance provision is not being applied.

Seattle District Response:

The Seattle District understands that the 10% exceedance policy is not used to determine compliance with IDEQ temperature standards and only applies for determination of beneficial use support status. The Seattle District believes that important information contained in the WBAG II document and the 303d/305b integrated report pertaining to temperature, the 10% exceedance provision, and beneficial use should be included in the TMDL similar to the CJ Strike-King Hill TMDL. For example, the 303d/305b integrated report states:

Temperature

DEQ has a weight of evidence policy for pH, dissolved oxygen, temperature, and turbidity. In part, this policy allows deference to biological health in judging whether a water supports cold water aquatic life use when exceedance of numeric temperature criteria is infrequent (<10%). This policy applies to 303(d) listing and de-listing decisions only, and is not for determining compliance with the WQS for other purposes. While necessary to target the current water quality criteria in drafting a TMDL, if the frequency of exceedance of the temperature criteria is less than 10%, and there is no other evidence of thermal impairment, then it is possible to propose de-listing. If a temperature TMDL is established, then, during implementation of the TMDL, the water will be reassessed. In that reassessment, the goal for temperature would be considered met if frequency of criteria exceedances

falls below 10% for a 90 percentile air temperature of a yearly series of the maximum weekly maximum air temperature (MWMT) calculated over the historic record measured at the nearest weather reporting station (WQS §058.01.02.80.04).

The Seattle District believes that information about the beneficial use support status and aquatic evaluations used to justify the beneficial use should be included in the TMDL. The Seattle District can find very little aquatic evaluation information to determine the biological health of the Pend Oreille River. The Seattle District recommends that evaluations of biological health of the Pend Oreille River should be reassessed because of new temperature data from the CE-QUAL-W2 model that indicates that the predicted temperatures for the natural river were very warm and very similar to the “existing” condition predicted temperatures. For example, at the 10km and 35km areas surface maximum temperatures during the critical time period from June 21 to September 21 exceeded the IDEQ 22°C standard on about 45 days out of the possible 93 days for both the “natural” and “existing” conditions. Therefore, the Seattle District believes that further aquatic analysis is needed of the Pend Oreille River between Albeni Falls Dam and Lake Pend Oreille to better determine the biological health of the river. The “natural” condition CE-QUAL-W2 model results suggest that any changes/reductions in population strengths of cold water fisheries or aquatic insects in the Pend Oreille River may not be due to increased water temperatures resulting from Albeni Falls Dam but may instead be due to changes in river flow and elevation due to Albeni Falls Dam.

Engineer Research and Development Center Reply:

Please provide a reference to the report detailing the Pend Oreille River beneficial use status? The 2001 assessment for the Pend Oreille River reported that biological assessment remained inconclusive and that no evidence of further impairment of cold water biota has been found since 1975. The EPA allows new evidence to be used in determining 303D listing status including new information based on modeling results. Without a conclusive biological assessment, revisiting the 303D listing status is an appropriate outcome from this investigation and the 10% rule is allowed by IDEQ statutes.

14. Comment Index AC-12

IDEQ Draft Response:

Air temperature exemption provision: Idaho Water Quality Standards allow for exceedances of the temperature criteria when the air temperature of a given day is extremely high (temperature must exceed the ninetieth percentile of a yearly series of the maximum weekly maximum air temperature data calculated over the historic record measured at the nearest weather reporting station) (IDAPA 58.01.02.080.03). IDEQ obtained air temperature records for a thirty-year record (1974-2004) at the Sandpoint Experiment Station of the National Climatic Data Center (48°18' N, 116°33' W) to determine the temperature at which the air temperature exemption provision is in effect on the Pend Oreille River during the summer of 2004. The Sandpoint Experiment Station is one of 10 climate divisions in Idaho set by the National Climatic Data Center. Climate divisions are standardized regions within each state that designate areas of similar climate regimes (NCDC, 2000). From the 30 year record, IDEQ calculated the 90th percentile of the annual series of maximum weekly maximum water temperatures. This

temperature threshold is 97.0 °F (33.9 °C). The dates in 2004 when this temperature exemption is in effect are July 17, 26 and August 2, 3,13,16,17.

Seattle District Response:

The temperature threshold is calculated wrong for Fahrenheit and should be 93.0°F (33.9°C) and not 97.0°F (33.9°C). The Seattle District reviewed the temperature data from 2004 collected at the Sandpoint Experiment Station of the National Climatic Data Center and noted that temperatures for August 14th and 15th, 2004 are missing from the data set. Temperatures from surrounding weather stations in the Idaho Panhandle indicate that the 14th and 15th of August were very hot. For example, the temperature at the Priest River Experiment Station of the National Climatic Data Center on August 14th was 98°F and on August 15th was 94°F, while the temperature at the Newport Station of the National Climatic Data Center on August 14th was 99°F and on August 15th was 97°F. Temperature at the Sandpoint Airport (Station KSZT) for August 14th was 96.8 °F and for August 15th was 91.4°F. The Seattle District requests clarification on the IDEQ protocol to deal with missing air temperature data.

15. Comment Index AC-13

IDEQ Draft Response:

Evaluation areas were determined and reviewed by the technical modeling team, with members from EPA, IDEQ, Washington Department of Ecology, and the Kalispel Tribe. In a March 20, 2007 WAG meeting, IDEQ explained the evaluation areas selected. Evaluation areas were selected to represent relatively deep areas in both the upper and lower portions of the Pend Oreille River. Evaluation areas at 10 km and at 35 km downstream from Railroad Bridge include surface, bottom and volume-weighted temperatures. Another evaluation area is the outflow of Albeni Falls Dam. Additional evaluation areas include longitudinal surface temperatures, and longitudinal cross sections. Ultimately, 13 areas were selected to evaluate whether existing temperatures exceed Idaho water quality standards.

Seattle District Response:

Response noted.

Engineer Research and Development Center Reply:

Why were the volume-weighted compliance areas included in the March 20, 2007 WAG meeting and used in the initial model evaluations by IDEQ but removed at the February 25, 2008 WAG meeting and excluded from the revised model evaluations. If volume-weighted metrics can be removed from the TMDL why not also reconsider the highly unreliable nature of using surface and bottom cells as compliance metrics?

16. Comment Index AC-14

IDEQ Draft Response:

The TMDL should reference the material prepared by IDEQ which addresses this issue. Please see revised evaluation of Model Scenario Simulations.

Seattle District Response:

Response noted. The Seattle District will review the revised model evaluation and provide comments.

17. Comment Index AC-15

IDEQ Draft Response:

The TMDL should reference the material prepared by IDEQ which addresses this issue. Please see revised evaluation of Model Scenario Simulations.

Seattle District Response:

Response noted. The Seattle District will review the revised model evaluation and provide comments.

18. Comment Index AC-16a,b

IDEQ Draft Response:

While IDEQ acknowledges that Albeni Falls Dam for the most part provides cooler water than we would have had prior to the dam, IDEQ is not considering Pend Oreille River temperature as a tradable pollutant.

Seattle District Response:

The Seattle District never made a comment that requested IDEQ to consider Pend Oreille River temperature as a tradable pollutant. The Comment Stated:

***Comment:** Analysis of the temperature data shows that the existing water temperatures in the Pend Oreille River exhibit a net cooling when compared to the hypothetical natural conditions. However, the Draft TMDL does not mention the overall thermal enhancement of Albeni Falls Dam to the Pend Oreille River and instead focuses on the few simulated non-compliance locations. Any rigorous assessment of risk to aquatic life caused by changes in the thermal loading of the Pend Oreille River would need to address all the thermal impacts, positive and negative, to the aquatic environment.*

The Seattle District recommends that IDEQ needs to state both the positive and negative thermal impacts to the Pend Oreille River by Albeni Falls Dam. As currently written, the TMDL only states negative impacts of the dam and never mentions the net cooling when compared to hypothetical conditions.

Engineer Research and Development Center Reply:

The COE does not understand why the temperature TMDL does not quantify the amount of cooling that has resulted from the existence and operation of Albeni Falls Dam as part of a comprehensive thermal budget analyses and associated biological assessment of river temperatures.

19. Comment Index AC-17

IDEQ Draft Response:

Agreed, future load allocations will only apply to portions of the water column, if appropriate.

Seattle District Response:

Response noted.

20. Comment Index AC-18

IDEQ Draft Response:

This has been addressed.

Seattle District Response:

Response noted

21. Comment Index AC-19

IDEQ Draft Response:

This has been addressed.

Seattle District Response:

Response noted.

22. Comment Index AC-20

IDEQ Draft Response:

IDEQ is not suggesting that Albeni Falls Dam is discharging heat and causing the water to heat up. IDEQ is suggesting that Albeni Falls Dam impounds water and causes it's physical parameters like; width, depth, and flow rate to change. The entire heat load is coming from external sources. Albeni Falls Dam is not regulated under NPDES, and is being treated as a non-point source with voluntary reductions.

Engineer Research and Development Center Reply:

The TMDL analyses does not identify what component of the Pend Oreille river thermal load is caused by the impoundment and operation of Albeni Falls Dam. Without clearly identifying the cause and effect relationship of internal sources (Dam impacts) and external sources (heat loads from tributaries and LPO/Clark Fork), the determination of thermal impairment is rendered incomplete. The COE proposed alternative methodology (See Attachment A from the November 9, 2007 Comments) for making this determination and requests comments regarding this proposal.