

Draft Comments for Pend Oreille River TMDL, Pre-Public Comment

Index	X-ref	Commenter	Comment	Draft Response
AC1		Corps of Engineers	Level of Uncertainty: there is potential for significant uncertainty in the model accurately predicting temperatures in the Pend Oreille River. A quantitative analysis of model uncertainty should be conducted and applied to assessments of compliance. A sensitivity analysis should be performed to evaluate the detection tolerance of the model. Clear justification, along with confidence limits assumed, should be used for using a 0.3 °C detection tolerance. A sensitivity analysis should also be performed to determine the impacts of the simulation of pre-dam parameters on model results.	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.
AC2		Corps of Engineers	Level of Uncertainty: It is unreasonable to state that model error and uncertainty is not important when comparing two model scenarios.	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.
AC3		Corps of Engineers	Level of Uncertainty: the location of the upstream boundary condition excludes the interaction of Lake Pend Oreille and the Clark Fork River with flow into the Pend Oreille River. ACOE suggests that PDO River model should be coupled together with a Lake PDO model to provide greater accuracy at the boundary condition.	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.

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AC3b		Corps of Engineers	The prediction errors of model estimates of temperature at a specific point in time and space can be much larger than prediction errors of simulated temperatures averaged over time and space. ACOE conducted an analysis quantifying the prediction errors of daily maximum surface temperatures, daily maximum depth-integrated temperatures, and daily average depth integrated temperatures in the Pend Oreille River at Riley Creek during June 21 - september 21, 2004. The prediction errors of model estimates of surface temperatures were much larger than errors of simulated daily average depth-integrated temperatures and daily maximum depth-integrated temperatures.	Not addressed at this time
AC4a	SL4	Corps of Engineers	Travel Time and Lag Time: Differences in travel times are not accounted for and should be evaluated.	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 not 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.
AC4b	SL4	Corps of Engineers	Travel Time and Lag Time: differences in water quality metrics between the two model scenarios does not account for the source or significance of these differences. The model shows a differential transport of thermal loads external to the Pend Oreille River, and the temperature differences have nothing to do with changes to the thermal loading of the Pend Oreille River by Albeni Falls Dam. The differences in temperature have been inappropriately designated as non-compliance events caused by Albeni Falls Dam.	
AC4c	SL4	Corps of Engineers	Travel and lag time and importance of distinguishing source of heat load: ACOE ran a simulation excluding the influence of heat exchange processes for 2004 and 2005 where the total amount of thermal energy was conserved. The time history of temperatures at Albeni Falls Dam simply lagged the response at the upstream boundary by the travel time between these two locations. This comparison of conservative transport of external thermal sources resulted in long periods of time where the existing conditions are warmer than natural conditions by over 0.3 °C and warmer than the applicable numeric criteria of 19 °C for daily average conditions.	

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AC4d	SL4	Corps of Engineers	Travel and lag time and importance of distinguishing source of heat load: ACOE ran simulations with, and without the influence of heat exchange between the Pend Oreille River and the atmosphere to provide a means of estimating the internal thermal loading during transport. A series of time history simulations were ran on calculated daily average volume-weighted temperatures of existing and natural conditions with and without heat exchange at Albeni Falls Dam. In general, the change in temperatures for existing and natural conditions ranged from 0.1 to 0.3 °C, which falls below the detection threshold of the model.	
AC4e	SL4	Corps of Engineers	Travel and Lag Time: ACOE ran a simulation comparing daily average volume-weighted temperatures lagged by the difference in travel time to provide a means of estimating the change in temperature of a parcel of water entering the river at the same time for both natural and existing scenarios. A total of eight days in the period of June 21 - September 21, 2004 where the existing temperature is warmer than 19 °C and is warmer than natural conditions by at least 0.3°C. This is about 9 percent of the total days in the critical time period, which falls below the threshold identified as a thermal impairment in Appendix D of the WBAG II. It should be noted that external sources of temperature contribute to many of these daily average temperature differences.	
AC5		Corps of Engineers	Hydrologic Budget, correct open gate in existing condition scenario (1) and re-run	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.
AC6		Corps of Engineers	Hydrologic Budget, re-calibrate	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

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AC7		Corps of Engineers	Lake Pend Oreille Elevation: natural conditions scenario (8) are too low during the summer and all year. Use the ACOE-developed lake elevation rating curve, which is based on USGS data, to run a sensitivity analysis on the "natural" scenario model runs using their rating curves.	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.
AC8		Corps of Engineers	Use of surface and bottom cells for compliance is not representative of water quality conditions in the Pend Oreille River. Simulations have generated physically unrealistic temperatures near the channel bottom. Surface cells represent extreme conditions that are highly influenced by atmospheric and tributary inputs, and they do not represent the dominant aquatic habitat in the Pend Oreille River. ACOE recommends using volume-weighted or flow-weighted temperatures, which are more representative of the water quality of the dominant aquatic habitat.	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.
AC9	PP4	Corps of Engineers	Use of instantaneous metric comparing two model scenarios for compliance does not accurately reflect meaningful changes to the thermal loading of the Pend Oreille River and it makes no distinction between sources of pollution within or outside the river reach of interest. The use of daily maximum and daily average temperatures are a more accurate and comprehensive metric for assessment of compliance. The 7-day average of the daily maximum is a better assessment of compliance when comparing scenarios with different travel times using CE QUAL.	IDEQ is proposing the use of Load Duration Curves for the development of allocations.

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AC10a		Corps of Engineers	<p>IDEQ has conducted considerable research on temperature regulation and published documents how temperature compliance should be addressed for Idaho rivers. ACOE sees little evidence this has been followed, nor have they seen the current method used in previous temperature TMDLs in Idaho.</p>	<p>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.</p>
AC10b		Corps of Engineers	<p>A more rigorous statistical analysis of the data on frequency, magnitude and duration of violations, a comparison of the frequency and duration of temperatures over 22 °C for both model scenarios, and 95th percentiles. ACOE developed their own frequency analysis to quantify thermal conditions between the two scenarios using a frequency of exceedance of the volume weighted daily average temperatures.</p>	<p>IDEQ has provided a more rigorous analysis of model outputs. Please see newest version of IDEQ evaluation of Model Scenario Simulations.</p>
AC11		Corps of Engineers	<p>Idaho DEQ's publication, "Temperature Frequency of Exceedance Calculation Procedure" states if frequency of exceedance is less than 10%, and there is no other evidence of thermal impairment, then it is possible to move for delisting than proceed with a temperature TMDL. A frequency analysis of the data should be performed to better quantify temperature exceedances outlined in the TMDL.</p>	<p>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.</p>

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AC12		Corps of Engineers	Idaho DEQ's publication, "Application of the Idaho Water Quality Standards Temperature Exemption" states that the numeric temperature criteria is exempt when air temperature exceeds the 90th percentile of the annual maximum weekly maximum temperatures as determined from the historical record of a nearby weather station. During 2004, air temperatures exceeded the 90th percentile at Sandpoint and Priest River several times in July and August. The TMDL needs to explain this exemption and how it may or may not be used in the pend Oreille River TMDL.	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.
AC13		Corps of Engineers	The Draft TMDL is lacking technical data that justifies how compliance metrics were determined in Idaho.	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.
AC14		Corps of Engineers	The Draft TMDL is lacking technical data that justifies how water quality standards compliance was decided upon in Idaho.	The TMDL should reference the material prepared by IDEQ which addresses this issue. Please see revised evaluation of Model Scenario Simulations

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AC15		Corps of Engineers	TMDL should present statistics, figures and tables of the data used by Idaho DEQ for making compliance determinations.	The TMDL should reference the material prepared by IDEQ which addresses this issue. Please see revised evaluation of Model Scenario Simulations
AC16a	PN1, PP6	Corps of Engineers	In addition to recognition of detrimental changes to the thermal regime, the positive thermal impacts of Albeni Falls Dam on the Pend Oreille River to the aquatic environment should be discussed in the TMDL through a comprehensive risk assessment of beneficial uses in the Pend Oreille River.	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.
AC16b	PN1, PP6	Corps of Engineers	Formal recognition of the enhancements to the thermal regime of the Pend Oreille River by Albeni Falls Dam should be considered in the form of thermal credits as allowed under the Pollution Trading statutes of Idaho State regulations.	
AC17		Corps of Engineers	Loading Analysis, the loading allocations as estimated by equation 1 page 71 has been improperly applied. The spatial and temporal designation of water temperature and discharge parameters needs to be consistently identified. If the discharge used in equation 1 reflects a depth integrated estimate, the corresponding temperature also should correspond to a depth integrated estimate	Agreed, future load allocations will only apply to portions of the water column, if appropriate.
AC18		Corps of Engineers	Use of inconsistent boundary conditions at the upstream boundary of the model for different scenarios	This has been addressed.
AC 19		Corps of Engineers	Washington state line target on May 1, 2004. Differences between Washington's natural and existing conditions scenarios were the result of comparing different boundary conditions. When determining WA state line targets upstream model simulated boundary conditions should be used for both the existing and natural simulations.	This has been addressed.
AC20		Corps of Engineers	TMDL Analyses – The methodology applied has not clearly identified the source of the perceived thermal impairment. External sources of heat are the primary determinant of temperatures in the Pend Oreille River because of the short residence time in this reach (2-12 days). It is inappropriate to associate the existence and operation of Albeni Falls Dam as the source for these external thermal loads.	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.

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CS1		City of Sandpoint	Allocations need to be set to accommodate anticipated future growth	IDEQ is preparing to have PSU re-run the model with higher anticipated future growth. Because of the relatively cool temperature of the discharges it is likely that these higher flows will be used when determining allocation for each waste water treatment plant.
SW1		Southside Water and Sewer	Allocations need to be set to accommodate anticipated future growth	IDEQ is preparing to have PSU re-run the model with higher anticipated future growth. Because of the relatively cool temperature of the discharges it is likely that these higher flows will be used when determining allocation for each waste water treatment plant.
SW2		Southside Water and Sewer	Most of the time, in the summer season, Albeni Fall causes lower than natural temperature conditions in the river - this should stated in the report	Agreed
SW3		Southside Water and Sewer	Table 15 (p. 71) has inconsistencies; referenced tables and figures do not correspond to reaches; suggest adding "results" and "result date" columns	Not addressed at this time
SW4		Southside Water and Sewer	Upstream state should set allocations to meet downstream state standards	Agreed, future load allocations will include meeting downstream state standards