Comments to the draft Water Temperature TMDL for the Pend Oreille River

General comments – wherever the term "natural conditions' is used in regard to water temperature, this should be qualified to instruct the reader that these are actually "modeled natural conditions" in lieu of actual pre-dam and pre-land management water temperature data.

This document covers the Pend Oreille River and tributaries up to the Colville National Forest boundary. Are the portions of these tributaries on private and state lands within the Colville National Forest boundary covered in the TMDL for the Colville National Forest, this document or another document?

Specific comments:

Pg xi, paragraph 1, Overview of Results – *"...daily maximum temperatures in many reaches of the river are cooler than what occurred naturally and, where warming does occur (most prominently in the reaches directly upstream of the facilities) it tends to be low, about 1$_o$C above what occurred naturally."*

We are not aware of any substantive and continuous water temperature data in the Pend Oreille River in Washington prior to the implementation of the Albeni Falls and Box Canyon dams. It would be appropriate if there was a reference to or presentation of this data to justify the above statement. As well, the phrases "occurred naturally" and "under natural conditions" are used throughout the draft and should be changed to "modeled natural condition" or "predicted to have occurred naturally" since a natural, pre-Albeni Falls and Box Canyon dams data set does not actually exist.

Pg xi, paragraph 2, Overview of Results – *"At Newport, the most upstream reach in Washington and situated below Albeni Falls dam, river temperatures are cooler now than what is predicted to have occurred naturally."*

Where are these predicted natural water temperatures from the models used in this document? It would be helpful if there was a reference to how the model justifies these predicted water temperatures.

Pg xi, paragraph 2, Overview of Results – *"This is due to withdrawal of colder subsurface water within Albeni Falls forebay which is discharged downstream following power generation. This cooling effect is observed in the temperature profiles from Newport to Blueslide, providing a dampening effect on river warming. Through the same process, Box Canyon and Boundary dams also depress the maximum temperatures observed in their associated tailrace reaches."*

Existing data collected during relicensing process for both Box Canyon and Boundary hydroelectric projects indicate that the reservoirs do not stratify except immediately upriver of each dam where the stratification is not significant. There is no data that we are aware of that indicates that the river cools down from Newport to Blueslide. A reference to the data that supports the above statement would be appropriate.

Pg xiii, paragraph 3, Allocations - Tributary and mainstem shading: *"Temperatures will be reduced in Pend Oreille River tributaries and along the mainstem through the establishment of potential natural vegetation conditions. Providing optimal riparian shade conditions to reduce peak temperatures will further increase the extent of viable habitat augmenting the river's designated uses."*

It is unclear the above conditions are expected to occur in tributaries to the Pend Oreille River under the current state forest practices rule which allows the removal of all riparian vegetation along intermittent streams and up to 30% of the riparian vegetation along non-fish bearing perennial streams.

Page 16: Discussion on assumptions relative to natural temperature conditions is missing.

Page 27: Typo (Scenario 8.0 depicts the temperatures of a natural or pre-developed condition)

Pg 41, paragraph 1, Results, Compliance with criteria, Peak temperature – Washington State criteria – **"***... the maximum temperature differential between the existing and natural conditions remained less than or equal to 0.3^{o}C. In fact, overall, maximum temperatures observed at the majority of the upper river reaches, are cooler now than what occurred naturally."*

See specific comment #1.

Pg 42, paragraph 2, Heating Patterns and Temperature Shifts – *"With the exception of the Skookum reach, the Pend Oreille River, from Newport to Blueslide, is cooler now in relation to the natural condition by about 0.5^{o}C. This is particularly evident for the upper most Newport Reach, situated just downriver from the Albeni Falls hydroelectric facility. The cooler maximum temperatures at Newport appear to be the result of the withdrawal and release of deep, cooler water downstream as a consequence of power generation. At Newport, the existing condition is now cooler by approximately 0.6^{o}C in comparison to the natural condition. Prior to completion of Albeni Falls Dam, the primary source of flow to the river was from the upper surface layer of Lake Pend Oreille. As with most lakes, during the critical summer period, the upper water column (epilimnion) has the greatest water temperatures due to high exposure to solar short-wave radiation.*
Albeni Falls Dam has now altered this pattern. Because cooler subsurface water from the lake

continues to be the dominant source of flow to the river, with few significant tributaries through the study reaches, lower temperatures are evident through much of the upper 40-miles of the river. During the critical season, the passage of cooler water along with changed hydraulics (increased river volume) result in cooler maximum temperatures now in comparison to what occurred naturally. Once this cooler water is passed below Albeni Falls, the increased river volume, the result of the impoundments, buffers the river from temperature variation. This is why even at Blueslide, approximately 40-miles below Newport, the overall existing condition remains cooler than the natural condition by about 0.7oC."

There does not appear to be historic water temperature data for the portion of the Pend Oreille River between Albeni Falls Dam and Lake Pend Oreille for the above comments that the existing situation with the dam provides cooler water than without the dam. If so, this should be referenced. Based upon modeling data presented in the Idaho Pend Oreille River Model Scenario Simulations Technical Report, the high water temperatures coming out of Lake Pend Oreille are almost identical to water temperatures in the forebay of Albeni Falls Dam. The summer water temperatures, during the period of concern, range from about 22 to 25 Degrees C. with very little stratification. It is difficult to consider these cooler water temperatures passing below Albeni Falls.

Pg 42, paragraph 4, Heating Patterns and Temperature Shifts – *"Similar to Albeni Falls, the Box Canyon facility withdraws water for power generation from a deeper and colder region of the water column in its forebay. Following power generation, this water is discharged downstream and its effect on peak river temperatures is particularly evident in the downstream Metaline and Slate reaches though its effects are also apparent in the Boundary forebay reach*."

Previous information from the Application for New License – Box Canyon Hydroelectric Project FERC No. 2042 indicates that "Data for maximum water temperatures and seasonal temperature regimes in the BCR are well documented in other reports (Pelletier and Coots 1990; Coots and Willms 1991; Skillingstad et al 1993; EPA 1993 miscellaneous District records). All studies showed the river to be homothermous throughout with no vertical or horizontal stratification."

The discrepancy concerning stratification of the reservoir, between this draft TMDL and these documents, is confusing and should be addressed.

Page 73: Table 11 … Part 2, last 4 rows do not meet criteria in 2005, but no level of exceedance values in 2005??

Page 76: Degree symbols??
Because the loading capacity is 0.3oC above natural conditions, and the allocation for mainstem shade is for potential natural vegetation (i.e. natural conditions), a portion of the 0.3oC load capacity is not assigned to mainstem shading.

Page 77: Table 13 provides needed increases in height and % canopy cover, however there is no relative value to compare against. Is there a specific cover or height for all reaches or does each reach have its own value?

Pg. 88, Pend Oreille River and tributaries up to the Colville National Forest boundary – *"Increasing the amount of mature, natural riparian vegetation is the most important, easy and effective tool to reduce temperatures of most streams. Mature riparian trees and shrubs are important because the shade they provide blocks the amount of sunlight that heats the water. Riparian buffers that contain a variety of native trees, shrubs, and grasses may help to decrease water temperature in other ways such as:*
• *Reducing the amount of erosion from (or increasing stability of) stream banks. The roots of the riparian vegetation act as a web that holds the soil in place. So, the amount of suspended sediment that can contribute to heating the water is reduced.*
• *Helping run off and rain water infiltrate into the ground, which helps cool streams when it re-enters as ground water. This increase in ground water is important to maintain stream flows into the summer months.*
• *Maintaining narrow and deep tributary channels so that there is a reduced amount of stream surface subjected to solar heating.*
• *Increasing channel roughness, which increases the diversity of habitat types in stream channels and helps to create cold water refuge.*
Planting vegetation along streams is needed to create shade and reduce the impact direct sunlight has on increasing stream temperatures. So, landowners with property along the Pend Oreille River and tributaries need to establish or augment mature riparian vegetation."

And

Pg 89, paragraph 3, Forestry – "*Consistent with the directives of the 1999 Forests and Fish agreement, Ecology conducted a formal ten-year review of the forest practices and adaptive management programs in 2009:*
www.ecy.wa.gov/programs/wq/nonpoint/ForestPractices/CWAassurances-FinalRevPaper071509-W97.pdf
Ecology noted numerous areas where improvements were needed, but also recognized the state's forest practices program provides a substantial framework for bringing the forest practices rules and activities into full compliance with the water quality standards. Therefore, Ecology decided to conditionally extend the CWA assurances[see below] *with the intent to stimulate the needed improvements. Ecology, in consultation with key stakeholders, established specific milestones for program accomplishment and improvement. These milestones were designed to provide Ecology and the public with confidence that forest practices in the state will be conducted in a manner that does not cause or contribute to a violation of the state water quality standards."*

Within the 2009 Clean Water Act Assurances Review of Washington's Forest Practices Program, WDOE states that "*The amount of forest that must be retained in buffers to protect water quality and other public resources is dependent on the type of the waterbody. Non-fish bearing perennial streams (Type Np) receive substantially less forested buffers than do fish bearing waters. Ecology contends*

that the prescriptions associated with the Type Np rules have the greatest potential risk of violating the water quality standards."

WDOE states in the Colville National Forest Temperature, Bacteria pH, DO TMDL Submittal Report that *"If median conditions are considered for water depth (0.3 m) and groundwater inflow is considered to be minimal and, therefore, reflect the most vulnerable situations for heating, an effective shade level of* ***80 percent*** *is needed to maintain maximum water temperatures at or below 16°C. From an initial setting of a depth of 0.3 m, assuming no groundwater inflow, and an effective shade of* ***80 percent****, each variable was adjusted independently to examine its influence on water temperature. From this analysis, the annual maximum water temperature decreased by 0.5^{o}C for each 0.1 m increase in depth, decreased by 0.4^{o}C for each 0.1 m/s increase in groundwater inflow, and decreased by 1.7^{o}C for each 10 percent increase in effective shade. So, for the most vulnerable locations, those with little spring discharge through the reach monitored, and assuming an average flow depth (0.3 m) then the real importance of shade becomes evident. "*

It is obvious from the above statements that the WDOE considers effective shading to be key in meeting state water quality standards for temperature on tributaries to the Pend Oreille River. In the Colville National Forest TMDL report excerpt above, WDOE states that "an effective shade level of 80 percent is needed to maintain maximum water temperatures at or below 16°C". Yet the Forest and Fish Rules allow the harvest of up to 30% of riparian vegetation along non-fish bearing, perennial streams and complete removal of the riparian vegetation along intermittent streams. Although effectiveness monitoring of the ability of the Forest and Fish Rules to comply with state water quality standards was supposed to occur during the 1999-2009 period, the WDOE instead has no baseline or other monitoring data as to whether these rules have complied with or violated these standards for the last 11 years. As part of WDOE's 2009 review, there is the potential to conduct some level of effectiveness monitoring for water temperature in 2013, funding permitting.

Taken as a whole, the requirements for hydroelectric project licensees and the Colville National Forest, to address compliance with state water standards, appear to be more stringent than those listed for private timberland owners under the Forest and Fish Rules. This apparent uneven application of WDOE's authority to enforce the Clean Water Act needs to be addressed in this TMDL. Specific changes to Forest and Fish Rules will need to be made if effectiveness monitoring indicates that their application is causing an adverse effect to state water quality standards. This needs to be part of this draft TMDL language in order to be consistent with what is required of other entities and agencies.

Page 93: 1) Should the plan revision be mentioned? 2) Sentence: "Create and follow range allotment management plans …" [**add:** which protect water quality.]

Page 95: Table 17, year 50 … What is the percent increase that accomplishes PNV?

Page 96: 1) Standards are to be met in ten years. If shade is a component, then there are 50 years. This appears to be a discrepancy. 2) PUD does shore based monitoring once a month … Is this for temperature or other water quality measures?

Page 98: Sentence: "The model will need to be rerun to determine compliance because natural conditions, which the allocations are based on…" What are the parameters the model uses to determine the natural condition of the river?