



## FISH PASSAGE CENTER

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Mr. Rudd Turner  
U.S. Army Corps of Engineers, Northwestern Division  
P.O. Box 2870 attn: CENWD-PDD-A  
1125 NW Couch St.  
Portland OR 97208-2870

Dear Mr. Turner,

Thank you for the opportunity to review and comment on the draft report, Water Quality Plan for Dissolved Gas and Water Temperature in the Mainstem Columbia and Snake Rivers. We are providing these comments given the very short deadline that the COE has provided, however, we may have additional comments at a later date. In general, there has been concern raised over the last several years regarding the implementation of the Biological Opinion and Court Ordered Summer Spill Program under the existing 115/120% total dissolved gas guidelines and the configuration of the physical monitoring stations. The 2000 Biological Opinion addressed the concerns by developing RPA 132, which required the Action Agencies to develop a plan to conduct a systematic review and evaluation of the TDG fixed monitoring system in the forebays of all the mainstem Columbia and Snake river dams. The COE undertook the study and relocated some forebay monitors based on temperature related considerations.

The Fish Passage Advisory Committee asked the Fish Passage Center to conduct a review of the 2006 spring spill program and to review the appropriateness of the forebay monitoring system (FPC memo to FPAC dated September 29, 2006) relative to present water quality waiver requirements. Based on this review, the FPC concludes that the forebay monitors may not be adequately representing the total dissolved gas resulting from spill at upstream projects. Downstream forebay monitors, as presently configured, are not indicative of the readings in a well-mixed water column due to the local influence of temperature, barometric pressure and biological processes.

We believe that the COE should present the issues in the Water Quality Plan and discuss how TDG may be better monitored including, the possibility of setting the waiver criteria to 120% TDG at both the forebay and tailrace monitors based on the gas bubble trauma (GBT) monitoring program data collected over the past twelve years. These data show that the incidence of GBT is much less than 1% of fish sampled and the severity of the signs of GBT are mostly of the least severe Rank 1, where less than 5% of a fin is affected. The COE might also include the possibility of routinely monitoring the concentration of oxygen in the water column to distinguish the partial pressure of gas added to TDG from local biological processes.

The following are the Fish Passage Center's specific preliminary comments:

1. Page 18, para 4 - Total Dissolved Gas (TDG) is the measure of the sum total of all gas partial pressures (including water vapor) in water. It is important to note both the relation of TDG with barometric pressure and temperature particularly at the forebay monitor locations, and the oxygen gas added to the water column by primary productivity. While oxygen can contribute significantly to the overall TDG concentration, it is not regarded as a problem for aquatic organisms since oxygen can be removed from tissues via metabolic activity.
2. Page 21, TDG Fixed Stations – Function and Location – The COE should include a discussion of the limitations of measuring only TDG in the complex situation where fixed monitors are located. In the tailrace fixed monitoring stations it is likely that the TDG measured represents the additional gas added to the water column due to spill, however, at the forebay sites the representation of the additional spill gas is confounded by other gases and physical changes. At the very least the COE should explore the possibility of measuring oxygen at these locations and consider only the partial pressures due to nitrogen increases when assessing against a 115% criterion.
3. Page 22-23. All of the language relative to RPA 132 has been stricken from the text. The COE concludes that the forebay monitor relocation has addressed the issue of misrepresenting the TDG due to spill, and that the only remaining issue that remains is the Camas/Washougal Monitor. While the use of the Camas/Washougal station remains an issue, the issue of the forebay monitors adequately representing TDG associated with upstream spill has not been adequately resolved for the agencies and tribes. The Fish Passage Advisory Committee requested that the Fish Passage Center conduct a review of the impact of the forebay monitors on the implementation of the Biological Opinion spill program. That review was provided in a memo to FPAC dated September 29, 2006 (attached). As a result of that review considerable questions remain concerning the adequacy of the forebay monitors. This section should be rewritten to express regional concern.
4. Page 75. The COE presents their perspective on current water temperature and the relation to historic temperatures. The COE clearly labels the discussion as their perspective and that is appropriate, however, it would be helpful to include alternatives to the COE's perspective since this document talks about input from other entities.
5. Page 83. Section 13.1.3.4 – The reference to some regional interests suggesting that releases that approach 120% would make more sense in the COE included the years when Dworshak was operated to 120% and the results obtained from GBT monitoring that took place below the dam. The discussion would also benefit by including an explanation (i.e. the flexibility to augment flows with higher levels of flow augmentation from Dworshak Dam) when presenting regional interests' suggestions. Additionally, this section should incorporate a discussion of possible modifications to Dworshak Dam that would help alleviate TDG concerns under spill conditions. For instance, are there possible spillway modifications that would decrease TDG.

6. Page 91. The paragraph relative to the merits of transportation should reflect current knowledge regarding the benefits of transportation to the overall survival of wild spring Chinook to return as adults. The results of the Comparative Survival Study shows no benefit of transportation to wild spring Chinook and only marginal benefit to hatchery spring Chinook relative to migrating in-river. Benefits of transportation may be better for hatchery and wild steelhead. The statement in the document regarding the negative impacts to the runs if transportation cannot be implemented need to be revised.
7. Page 96, third paragraph. The last sentence states that “These drawdown scenarios would be expected to decrease the amount of time that water is exposed to solar radiation, however because of the reduced volume of water, the peaks in temperature would be expected to be higher and the water in that stretch of the river would be expected to warm and cool much faster during the daily cycle.” The later part of this sentence is misleading and likely untrue. There is much more to consider when discussing peak temperatures. Of particular importance is the surface area of the water body, also the width to depth ratio of a particular stretch of water - wide and shallow stretches would heat and cool faster than a narrow and deep section.
8. Page 96. When discussing the drawdown of reservoirs the COE should also include discussion of an intermediate drawdown of JDA to MOP (approx. five feet lower than MIP).
9. Page 106, third paragraph. As an effect of changing flood control rule curves, the second sentence states “...if more water were used to flush fish out during the spring, decreased power production would result in the summer and fall.” Changing flood control rule curves should not impact summer water. The intent of changing of flood control rule curves would be to reduce winter and early spring power drafts, so reservoirs do not have to work as hard to get to their April 10<sup>th</sup> elevations. This would reduce power production in the winter and early spring months- not during the summer.
10. Page 106, third paragraph. Pushing more water out in the spring as a result of altered flood control does not necessarily mean more TDG. Changes in flood control would likely benefit juveniles the most during medium and low water years. It is unlikely that during these types of water years, even with more spring water, projects would be in a forced spill situation.
11. Page 124. The paragraph under 15.4.2 is the exact same paragraph that is under 15.3.2 on page 122.

Sincerely,



Michele DeHart  
Fish Passage Center Manager