Oregon
Kate Brown, Governor

Department of Fish and Wildlife
Office of the Director
4034 Fairview Industrial Drive SE
Salem, OR 97302
(503) 947-6044
FAX (503) 947-6042
odfw.com

February 28, 2019

Maia Bellon, Director
Heather Bartlett, Water Quality Program Manager
P.O. Box 47600
Olympia, WA 98504-7600

Re:Comments on the Draft EIS for Short-term Modification of Total Dissolved Gas Criteria in the Snake and Columbia Rivers

Dear Director Bellon and Program Manager Bartlett:

The Oregon Department of Fish and Wildlife (ODFW) is submitting these comments (attached) in response to the draft EIS issued by the Washington Department of Ecology (Ecology) in January, 2019, for a short-term modification of total dissolved gas (TDG) water quality standards for federal dams on the lower Snake and lower Columbia rivers through 2021. This modification by Ecology is vital for the successful implementation beginning this spring of the Columbia River Flexible Spill and Power Agreement (Agreement) supported by all state, tribal, and federal management partners.

We appreciate the work that went into the draft EIS, and find most material provides sufficient detail and well-articulated rationale. However, we are concerned the focus appears to be on perceived risks rather than the *documented* benefits of increased spill, and are concerned some vital points were overlooked or discounted, especially when considering the efficacy of the current monitoring programs. These concerns are highlighted below and expanded on in the accompanying attachment. ODFW acknowledges development of the EIS is an important step in providing better protections for salmon and steelhead listed under the Endangered Species Act. We encourage Ecology to make appropriate use of all available information in helping secure TDG allowances necessary to implement the state, tribal, and federal Agreement.

- The draft EIS should present and discuss in greater detail data from the Smolt Monitoring Program.
- The draft EIS should consider recent analyses presented to the Independent Scientific Advisory Board by the Comparative Survival Study Oversight Committee regarding associations between total dissolved gas saturation and in-river survival of Chinook salmon and steelhead.
- The draft EIS should discuss historical empirical information from periods of involuntary spill, which suggests strongly the benefits of increased spill outweigh any negative impacts.
- The role of established adaptive management processes in responding to actual system results should be discussed.

- The well-established monitoring programs currently in place are effective and provide a basis for learning from proposed operations to inform adaptive management. This point deserves acknowledgment.

Thank you for this opportunity to comment on the draft EIS. Oregon looks forward to working with Washington to help restore the natural resources that define the Pacific Northwest.

Sincerely,

Curt Melcher
Director, Oregon Department of Fish and Wildlife

Attachments

cc: Jason Miner, Natural Resources Policy Manager, Governor's Office
Richard Whitman, Director, Oregon Department of Environmental Quality

Attachment

Detailed comments from ODFW concerning the draft Environmental Impact Statement for short-term modification of total dissolved gas criteria in the Snake and Columbia rivers

(1) Data from the Smolt Monitoring Program (SMP) should be presented and discussed.

In the draft Environmental Impact Statement for short-term modification of total dissolved gas criteria in the Snake and Columbia rivers (draft EIS), several relatively short-term studies assessing the relationship between incidence of gas bubble trauma (GBT) and total dissolved gas saturation (TDGS) are cited. Largely absent, however, is any detailed treatment of data collected by the SMP. Yet, GBT monitoring associated with the SMP represents observations at multiple Federal Columbia River Power System (FCRPS) projects on the Snake and Columbia rivers, over the span of more than two decades and across a broad range of TDGS levels. Below is a series of plots, based on SMP data, characterizing relationships between GBT and TDGS from 1995–2018. These data indicate that relative to the prescribed 15% (Figure 1) and 5% (Figure 2) action criteria[1], GBT does not become problematic until TDGS has exceeded–considerably in many cases–125%. As noted on page 49 of the draft EIS, Maule et al. (1997a, 1997b) "found that significant mortality did not occur in test fish until approximately 60% of the exposed population exhibited bubbles in the fins, or 30% displayed bubbles covering 25% or more of any unpaired fin." (NMFS 2000). Accepting the findings of Maule et al. (1997a, 1997b) or the more conservative current action criteria, SMP data indicate strongly that spill up to at least 125% TDGS is biologically safe for juvenile salmon and steelhead (USACE 2018, FPC 2017).

[1] As stated in the draft EIS, the current action calls for a reduction in voluntary spill if 15% of sampled fish on a given day show any bubbles on unpaired fins or if more than 5% of the fish examined exhibit bubbles covering 25% or more of the surface of any unpaired fin.

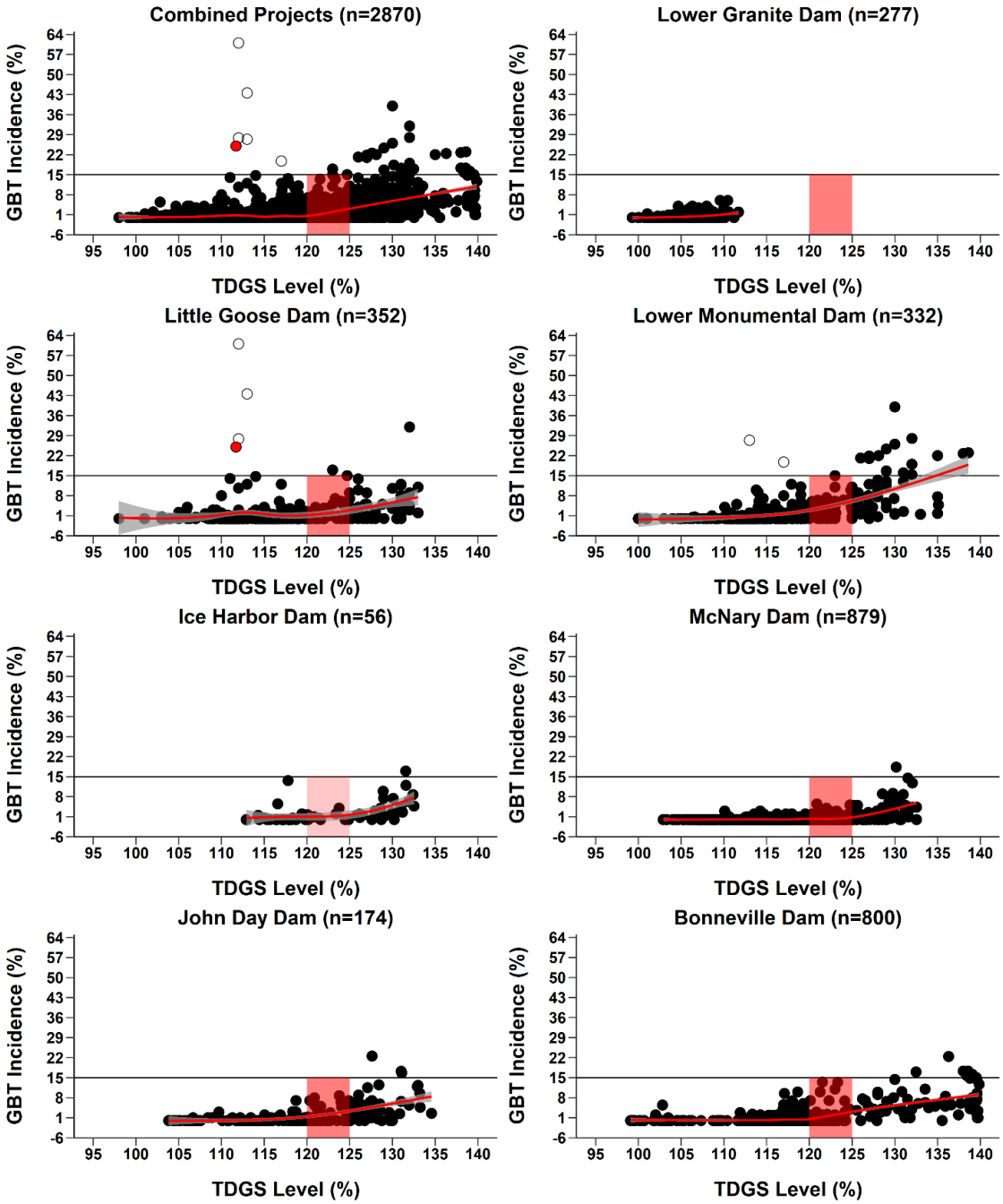

Figure 1. Incidence of Gas Bubble Trauma versus total dissolved gas saturation levels at seven Columbia and Snake River dams and all seven projects combined. Solid horizontal line indicates the current 15% action criteria (see footnote 1). Solid red line represents a Generalized Additive Model (GAM; cubic spline) fit to each data set. Shading around each GAM curve represents the 95% confidence interval. Red/pink polygons highlight the TDGS under consideration as part of the flexible spill agreement. Open circles indicate samples comprised of late migrating steelhead (i.e, residuals) not representative of the population response. The red circle represents a sample where the examiner misidentified incidence of GBT. Points represent samples consisting of ≥ 75 examinations. Data provided by the Fish Passage Center.

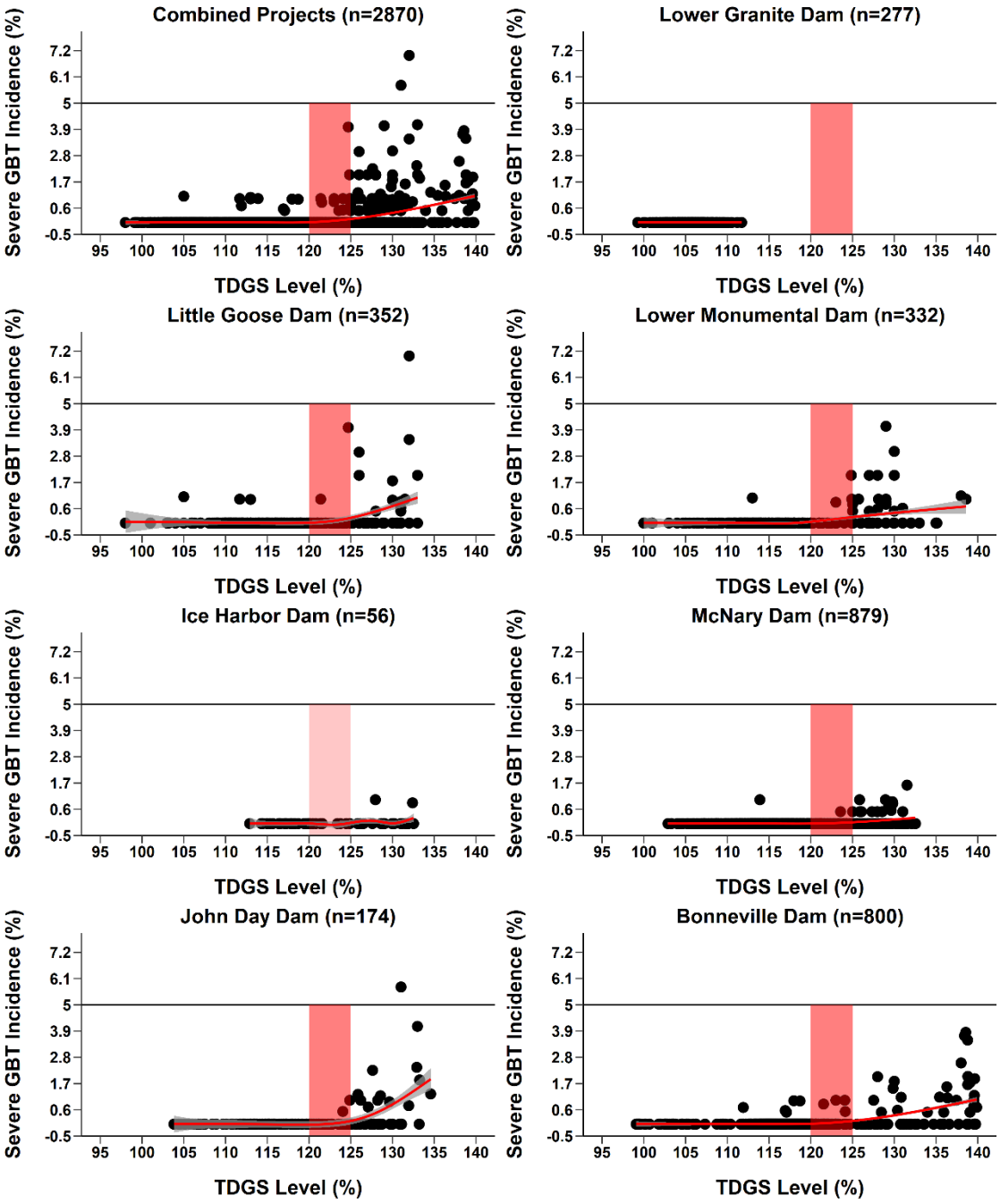

Figure 2. Incidence of <u>severe</u> Gas Bubble Trauma versus total dissolved gas saturation levels at seven Columbia and Snake River dams and all seven projects combined. Solid horizontal line indicates the current 5% action criteria (see footnote 1). Solid red line represents a Generalized Additive Model (GAM; cubic spline) fit to each data set. Shading around each GAM curve represents the 95% confidence interval. Red/pink polygons highlight the TDGS under consideration as part of the flexible spill agreement. Points represent samples consisting of ≥ 75 examinations. Data provided by the Fish Passage Center.

(2) The review should also discuss analyses submitted to the Independent Scientific Advisory Board (ISAB) by the Comparative Survival Oversight Committee (CSSOC) regarding the importance of TDGS in explaining variability in in-river survival.

In 2017, the CSSOC submitted to the ISAB a synthesis report titled "Documentation of Experimental Spill Management: Models, Hypotheses, Study Design, and Response to the ISAB" (CSSOC 2017). The CSSOC provided in that document details on the development of models to evaluate associations between in-river survival for Chinook salmon and steelhead and various explanatory variables including mean and maximum TDGS; where data spanned a range of TDGS levels at times in excess of 125% (i.e., when maximum TDGS was considered). Modeling results, including mean and maximum TDGS levels as covariates, indicated TDGS was not a significant factor in explaining variation in in-river survival for either species. The authors concluded outcomes of the analyses provided "no evidence that TDG[S] levels reduce in-river survival over the range of TDG[S] levels that have been observed during 1998-2015, which have ranged up to average levels of 123% and maximum levels of 133%". Unlike many of the studies cited in the draft EIS, these analyses represent a synthesis of the responses of out-migrating smolts to broad changes in TDGS, across multiple dams and over almost two decades. This type of quantitative treatment also incorporates inherently some of the uncertainty alluded to throughout the draft EIS by considering effects of TDGS on empirical survival and does not rely simply on associations between GBT and TDGS to infer deleterious impacts.

(3) The draft EIS discusses potential ramifications of elevated TDGS resulting from increased spill during controlled conditions. Yet, available information includes many years where conditions during the spring outmigration were uncontrolled; even during these periods of involuntary spill, action criteria generally were not exceeded.

Operational limits commonly drive spill beyond levels specified in regionally collaborated management agreements or to levels that precipitate exceedance of modified water quality standards currently in place (i.e., periods of involuntary spill). Although variable in magnitude, stream run-off volume exceeds the hydraulic capacity of Federal Columbia River Power System (FCRPS) dams for periods in nearly every year. Whatever the length of these annual uncontrolled periods, involuntary spill operations have provided information to assess the existence of direct biological impacts associated with elevated TDGS. The regional process that led to the flexible spill agreement was based, in large part, on the understanding that incremental changes in spill that meets without exceeding 120% in FCRPS tailraces during 2019, and meets without exceeding 125% in 2020 and 2021 will provide a sustained conservation benefit for anadromous fish while supporting the authorized purposes of the FCRPS. Empirical information from periods of involuntary spill, suggesting this benefit over a broad time frame, should be considered in the draft EIS.

(4) Adaptive management processes that support the flexible spill agreement should be outlined in more detail.

The flexible spill agreement is supported by an adaptive management process including well established monitoring programs and a tested system for conferral. Given the novelty of the operations outlined in the flexible spill agreement (with enhanced spill to 120% or 125% of TDGS), this system of adaptive management is intended to ensure that any potential unintended negative consequences–including those discussed in the draft EIS–can be mitigated in a timely manner. Animal behavior (e.g., hydrostatic depth compensation) that may help mitigate negative impacts of elevated TDGS are discussed at length throughout the document. The system of adaptive management currently in place will also play a vital role, and should be better defined/highlighted in the body of the draft EIS. This is particularly relevant to discussions of increasing to the 125% gas cap. The draft EIS states: "further research that addresses the uncertainties of the science will help to determine if the potential benefits of spill at 125% TDG outweigh the adverse effects of TDG to salmonids and resident aquatic life." Decades of monitoring and the development of models based on empirical data suggest strongly that the benefits of spill up to at least 125% TDGS outweigh any obvious detriment. Remaining points of uncertainty can best be addressed in an adaptive management framework, where the operation in question is applied in practice and adjustments are made when/if issues (i.e., unintended negative consequences) arise. This concept deserves to be highlighted.

(5) The monitoring programs currently in place are effective and provide a basis for learning from the operations proposed in the flexible spill agreement.

Some language in the draft EIS seems to suggest that the current biological monitoring programs are not sufficiently reactive to instances where water quality conditions may be having negative effects on aquatic biota. It has been the long-standing position of managers and scientists in the region that any modification in hydro system operations be accompanied by active monitoring to ensure that negative unintended impacts do not result. It has also been the belief of regional interests that current monitoring programs and methods have provided for an effective alert system; a conclusion that has in the past been reinforced by state and federal water quality agencies. In fact, the recent District Court order–upheld on appeal–was supported in part by the ability of theses monitoring programs to help mitigate for unintended impacts. While the Oregon Department of Fish and Wildlife feels current monitoring efforts are adequate to effectively alert regulatory agencies to any unintended negative consequences, we are also fully supportive of further collaborative discussion to refine programs to better learn from the application of novel operations. We recommend this process include coordination among regional water quality agencies (i.e., ODEQ and EPA) and the working group that developed the flexible spill operation agreement.

As was highlighted when the states of Oregon and Washington previously modified TDGS standards, adaptive learning will be essential to more fully identify how modifications in dam operations relate to the status and trends of Columbia River species. Methods employed under the SMP, for example, will continue to provide timely detection of GBT, serving the regulatory process effectively. In addition to relying on fixed-monitoring approaches or instantaneous measures of condition (e.g., associations between GBT and TDGS), to assess

the effectiveness of the additional spill, metrics that characterize life-cycle success must be considered to better understand the outcomes for aquatic biota. With this in mind, effects from enhanced mitigation (e.g., flexible spill) should continue to be evaluated using tools currently available (e.g., reach specific survival, powerhouse passage metrics, and Smolt to Adult Returns) in addition to direct monitoring of GBT. Additional monitoring efforts may contribute to our understanding and help support in-season adaptive management, but should not supplant proven monitoring tools.

References

Comparative Survival Study Oversight Committee (CSSOC). 2017. Documentation of Experimental Spill Management: Models, Hypotheses, Study Design, and response to ISAB. Comparative Survival Study Oversight Committee, 2017. FPC Document Number 30-17. http://www.fpc.org/documents/CSS/30-17.pdf.

Fish Passage Center (FPC). 2017. Appendix A Fish passage constraints associated with each project. In Dehart, M. editor Fish Passage Center 2017 Annual Report. To Northwest Power and Conservation Council and Bonneville Power Administration Contract 74404, Portland Oregon http://www.fpc.org/documents/annual_FPC_report/2017FPCAnnualReport.pdf.

Maule, A. G., M. G. Mesa, K. M. Hans, J. J. Warren, and M. P. Swihart. 1997a. Gas bubble trauma monitoring and research of juvenile salmonids. U.S. Department of Energy, Bonneville Power Administration, Environment, Fish and Wildlife, Annual Report 1995 (Project 87-401), Portland, Oregon.

Maule A.G., J.W. Beeman, K.M. Hans, M.G. Mesa, P. Haner and J.J. Warren. 1997b. Gas Bubble Disease monitoring and research of juvenile salmonids: Annual Report 1996 (No. DOE/BP-93279-1). Bonneville Power Administration, Portland, OR (United States); Geological Survey, Columbia River Research Lab., Cook, WA (United States).

McCann J, B. Chockley, E. Cooper, B. Hsu, S. Haeseker, R. Lessard, C. Petrosky, T. Copeland, E. Tinus, A. Storch and D. Rawding. 2018. Comparative Survival Study (CSS) of PIT tagged spring/summer Chinook and summer steelhead. 2018 Annual Report. Project No. 199602000. http://www.fpc.org/documents/CSS/2018_Final_CSS.pdf, Chapter 2.

National Marine Fisheries Service (NMFS). 2000. Biological Opinion Reinitiation of Consultation on operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin. December 21, 2000.

U.S. Army Corps of Engineers (USACE) 2018. Appendix J 2018 Fish Passage Summary. In USACE Annual Total Dissolved Gas Report. Available electronically at http://pweb.crohms.org/tmt/wqnew/tdg_and_temp/2018/2018_Appendix_J-Fish_Passage_Center_Final.pdf last visited 2-13-2019.