State, Federal and Tribal Fishery Agencies Joint Technical Staff Memorandum

Columbia River Inter-Tribal Fish Commission *Oregon Department of Fish and Wildlife*

TO: Matthew Eppard, USACE

FROM:

Thomas K. Lorz, CRITFC Erick Van Dyke, ODFW

SUBJECT: Comments on *Systematic review of JSATS passage and survival data at Bonneville and The Dalles Dams during alternative turbine and spillway operations from 2008–2012*.

DATE: June 8, 2015

In response to the request dated May 1, 2015, from Joyce E. Casey, Chief, Environmental Resources Branch, U.S. Army Corps of Engineers, the identified representatives of the fishery management agencies and tribes are submitting the following comments on the subject report to the Anadromous Fish Evaluation Program (AFEP) process.

Our review identified significant technical issues that lead us to recommend not supporting the report's conclusions as a scientifically sound or reliable guide for adaptive management actions that improve fish passage operations at The Dalles or Bonneville dams. Specifically, the conclusion "that different turbine operations at Bonneville Dam Powerhouse 2 have no effect on juvenile survival" is unsupportable and should not be used as a justification to modify fish passage operations.

In addition to the technical review provided by Fish Passage Center (see FPC Memo from June 8, 2015), our collective issues include:

- A high degree of confounding in the data due to inter-annual variability in environmental conditions;
- The study does not include populations that have experienced high mortality and injury due to turbine operations (e.g., sockeye and Spring Creek NFH subyearling Chinook salmon) because these groups were not included in the original tagging groups;
- No assessment of delayed mortality effects;
- Inadequate sample sizes to detect significant differences in survival if they occur;
- No assessment of turbine operation effects on bypass system or overall dam survival.

The approach implemented in these analyses was to combine acoustic tag performance standard testing data from studies conducted from 2008–2012. A primary assumption of this approach is that year-to-year variation in the studies does not exist, or can be ignored. This assumption cannot be supported by the data. Significant technical problems with the study design, implementation, and analyses of these specific performance standard tests have been documented. Combining all of the data from these tests, as was done in this analysis, also combines and includes all of these documented problems.

The analyses fail to address our concern over the significant mortality and injury events documented at Bonneville Dam in association with turbine operations. The study used only turbine passed fish, and does not mention the link between turbine operations and mortality of bypassed fish. Therefore, the data do not support the conclusion "that different turbine operations at Bonneville Dam Powerhouse 2 have no effect on juvenile survival." Whether or not there is a direct impact of turbine operations on turbine survival, the results of this study cannot be expanded to include the effects on survival for all fish passing Bonneville Dam Powerhouse 2. Mortality and injury have repeatedly been documented to occur in the bypass at Bonneville Dam, particularly to sockeye and subyearling Chinook, when turbines are operated outside of, or above the midpoint of, the 1% turbine efficiency range. However, this study only reviewed turbine survival, and the effects of turbine operations on other passage routes were not included. Spring Creek NFH subyearling Chinook and sockeye were not included in this study, which was not clearly stated. The study also does not address the delayed effects of turbine operations on smolt mortality rates.

We also find that the data and analyses utilized in this report have serious technical shortcomings that do not provide sufficient statistical support for the stated study conclusion. This analysis was conducted without a formal study design and without consideration of what would be required to observe a significant difference in survival, if it were to occur. The data utilized were generated from studies designed to address different objectives. Because of small sample sizes, the weak power of these analyses make their ability to detect statistically significant differences in juvenile fish survival with differing turbine operations is doubtful. Given the sample sizes available, the detectable differences in survival using this technique should have been discussed. Additionally, the essential components of statistical analyses such as presentation of p values are not included in the report, which makes it difficult to gauge the strength of the report's findings. Because of these issues, conclusions regarding juvenile survival at varying turbine efficiency ranges at Bonneville are not well supported.

We hope to continue to provide our collective regional prospective on future technical reviews as active participants in the current adaptive management framework. The Fish Passage Center has submitted detailed comments on this study (FPC Memo from June 8, 2015). These comments provide details of the specific technical and statistical analyses problems with this study.