



## FISH PASSAGE CENTER

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### MEMORANDUM

TO: Scott Fielding, USACE

FROM: Michele DeHart

DATE: February 20, 2015

RE: Comments on draft of *Compliance monitoring of subyearling Chinook salmon survival and passage at John Day Dam, 2014*

At your request, we have read *Compliance monitoring of subyearling Chinook salmon survival and passage at John Day Dam, 2014* and are providing the following comments. In general, we find that the study design used in this, and similar performance testing, cannot accurately represent the impact of dam passage on smolt survivals. A number of issues raised previously by managers have not been addressed. Below you will find a brief summary of our concerns, followed by a detailed description of each.

- The exact rejection rate of smolts smaller than 95 mm in length (the tagging limit) is not reported in this study. However, Figure 3.4 (d) shows that approximately 20% of the subyearling Chinook run of river were below the tagging threshold. The results cannot represent the run of river with rejection rates of this magnitude.
- Performance testing uses only fish that have survived at least one juvenile bypass facility. If these fish have a behavior that predisposes them to juvenile bypass facilities, or physical characteristics that increase the probability of bypass survival, results obtained from these studies are biased and do not represent the run at large.
- The V1 group in the John Day study is made up of R1, R2, and R3 smolts released for the McNary study that survive to the forebay of John Day Dam. The mortality of these three release groups is 30% before inclusion in the dam-passage study group at John Day Dam. This loss represents a high-grading of study fish that pass through the dam. Fish that survive the tagging, dam passage, and release process, but do not survive long after will

not be included in the dam-passage group, but will be included in the control group mortalities released below John Day Dam. This artificially inflates the V1 survival estimate.

- Performance testing at John Day Dam continues to include tests at both 30% and 40% spill, as in 2010, 2011, and 2012. No power analyses have been completed to determine the sample size required to statistically compare these two operations.
- Performance tests do not incorporate a myriad of impacts that dam operations are known to have on salmon populations. Smolts passed through powerhouse bypass facilities are known to have lower survival through the estuary and oceanic stages and lower smolt-to-adult return rates than fish that pass without detection (Haeseker et al. 2012, Petrosky and Schaller 2010, Tuomikoski et al. 2010, FPC Memos<sup>1</sup> October 6, 2010; January 19, 2011; July 14, 2011). Forebay residence and water travel times both have an impact on adult returns. Whether or not standards are met, performance tests are misleading and do not represent the true impact of the hydrosystem on salmon populations.

### **Test cannot represent run at large due to tagging constraints**

The JSATS tagging protocol requires rejection of fish based on multiple criteria, including size and condition. Although required by tagging protocols, these rejections severely limit the applicability of results to the actual migration conditions for the run at large. While rejection rates due to injury and disease are lower than in previous performance testing, they are still 2.0% in this study. Rejection rates due to the minimum size limit of 95 mm are not included in the report. However, Figure 3.4 (d) from the draft report shows that more than 20% of smolts were below the size threshold for subyearling Chinook.

Because rejection due to size was not included in Section 3.1 “Fish collection, rejection, and tagging,” the numbers of handled fish reported in this section underrepresent the total collection required for performance testing.

### **Distance between R1 and V1 eliminates weaker fish and artificially inflates survival estimates**

In the virtual/paired-release design, fish are released upstream of the dam so they achieve a distribution through passage routes that reflect the run at large. In this two-dam study, the fish released for McNary Dam performance testing are used at John Day Dam if they survive their release groups. The mortality of smolts between the release groups at McNary Dam and the John Day forebay was 30%.

This means that weaker fish, less likely to survive, will not be included in the dam passage group, but the equivalent mortality will be included in the control groups. This drives down survivals in the R<sub>2</sub> and R<sub>3</sub> groups in comparison to the V<sub>1</sub> group, and will inflate survival

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<sup>1</sup> FPC Memos can be found on the Web at [www.fpc.org/documents/FPC\\_memos.html](http://www.fpc.org/documents/FPC_memos.html).

estimates (see FPC Memos from March 24, 2011; February 15, 2012; March 23, 2012; January 4, 2013; February 11, 2013; March 19, 2013; March 22, 2013; December 3, 2013).

### **Testing both 30% and 40% spill does not provide useful information**

To test both 30% and 40% spill operations, more fish must be handled and tagged. However, the power of the test is likely too low to show survival differences at a biologically significant level (FPC Memo February 16, 2011). The testing of two operations with this experimental design does not provide enough information to justify the additional handling of juveniles.

Performance testing at Ice Harbor dam has been postponed due to the lack of a single spill treatment to test. The required cost and number of tagged fish required to test two spill operations has been determined to be undesirable. However, a similar analysis has not been completed for John Day Dam.

### **Management decisions should not be based on single-dam performance standards**

Past FPC memos have reviewed performance standards testing throughout the hydrosystem (June 24, 2009; July 29, 2010; March 24, 2011; February 15, 2012; March 16, 2012; March 23, 2012; January 4, 2013; December 3, 2013). Repeatedly, these memos have raised concerns regarding the use of these studies for project fish passage management decisions. Management decisions should reflect the entire life cycle of the fish, rather than survival at projects considered in isolation. All available data should be utilized, rather than ignored in favor of simplistic but out of date performance standards that do not reflect the current understanding of salmonid population dynamics. The performance standard approach does not incorporate the growing body of scientific data and analyses that indicates that fresh water passage history affects estuary and first year ocean survival, and the resulting smolt-to-adult return rates. These new data clearly show that powerhouse passage results in delayed mortality and lower smolt-to-adult return rates.

The long-term effects of passage route for juvenile fish have been well documented in recent years. Even if fish survive juvenile bypass systems or powerhouse passage, they are less likely to survive their first ocean year, and less likely to return as adults, than those that pass undetected through the hydrosystem (Haeseker et al. 2012, Petrosky and Schaller 2010, Tuomikoski et al. 2010, FPC Memos October 6, 2010; January 19, 2011; July 14, 2011). The effects of project operations on these metrics are not incorporated in the current performance testing requirements.

Acoustic-tag studies provide only short-term survivals for specific projects, and current performance testing does not include metrics such as forebay residence time, travel time, or latent mortality. Performance testing cannot fully inform policy makers about methods for improving adult returns. We recommend a decision-making framework for the Columbia Basin that will incorporate the strengths and limitations of each data type as part of a straightforward guide to the results of project operations.

## References

Federal Columbia River Power System Juvenile Dam Passage Performance Standards and Metrics, August 2012. 17 pp.

Haeseker SL, McCann JM, Tuomikoski JE, Chockley, B. 2012. Assessing freshwater and marine environmental influences on life-stage-specific survival rates of Snake River spring/summer Chinook salmon and steelhead. *Transactions of the American Fisheries Society*. 141:121–138.

Petrosky CE, Schaller HA. 2010. Influence of river conditions during seaward migration and ocean conditions on survival rates of Snake River Chinook salmon and steelhead. 19:520–536.

Tuomikoski J, McCann J, Berggren T, Schaller H, Wilson P, Haeseker S, Fryer J, Petrosky C, Tinus E, Dalton T, Ehlke R. 2010. Comparative Survival Study (CSS) of PIT-tagged Spring/Summer Chinook and Summer Steelhead 2010 Annual Report.