



FISH PASSAGE CENTER

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MEMORANDUM

TO: Jon Rerecich, USACOE

FROM: Michele DeHart, FPC

DATE: November 16, 2018

RE: Comments on “Bonneville second powerhouse fish guidance efficiency (FGE) program post-construction”

At your request, we have reviewed the draft final report of “Bonneville second powerhouse fish guidance efficiency (FGE) program post-construction”. This report outlines many years of efforts to modify the juvenile bypass system at BON. The end result of these modifications is to increase flows through the turbines while not increasing direct mortality and attempting to increase guidance into the juvenile bypass system. However, the growing body of scientific analyses indicate that significant delayed mortality is associated with powerhouse passage, including both the turbines and juvenile bypass systems. Modifications that are designed to increase flow through the powerhouse will only lead to increased powerhouse passage, increases in delayed mortality, and decreases in adult returns. The growing evidence of the deleterious impacts of powerhouse passage on adult returns should be accounted for when considering continued financial investment in juvenile bypass systems.

Since 2007, when turbines at the second Bonneville powerhouse have operated at the high point of the 1% efficiency range elevated descaling and mortality have been observed in the Juvenile Bypass System (JBS), particularly in subyearling Chinook and sockeye (SOR #2012-1, #2012-2, #2013-3, FPC Memos April 24, 2012; May 4, 2012; May 10, 2012; June 7, 2012; December 17, 2012; December 18, 2012; May 7, 2013; March 13, 2013; June 8, 2015; March 31, 2016, Gilbreth et al. 2012, Absolon and Sandford 2016). Operations at Bonneville have been limited to the mid- or low-point of the 1% efficiency range to avoid these elevated descaling and mortality rates. In attempt to reduce mortality while operating with higher flows through the

turbines, vertical barrier screens (VBS) were installed to improve gatewell conditions. These screens were removed due to faulty attachment and it is proposed to replace with a concrete structure that will create flow conditions equivalent to the VBS.

Previous studies have not shown that modifications to the gatewells will reduce injuries and mortalities when operated above the mid-point of the 1% efficiency range. The claim that biological testing will not be necessary upon completion of the proposed work is premature, given the lack of improvements provided by other modifications to the gatewell structure. Additionally, increasing flow through the turbines increases overall powerhouse passage, known to increase delayed mortality and reduce adult returns. Expectations that new modifications will improve overall fish passage should be critically reviewed before changes in operations are made. These concerns are outlined below.

- The report “Bonneville second powerhouse fish guidance efficiency (FGE) program post-construction” uses the survival estimates described in Absolon and Sandford (2016). This study was compromised by a number of methodological and statistical failings and the results presented in “Bonneville second powerhouse fish guidance efficiency (FGE) program post-construction” should be interpreted with extreme caution. The Fish Passage Center reviewed this study in detail (FPC Memo March 31, 2016, see attached), and here is short summary of identified concerns:
 - Only Spring Creek subyearling Chinook were included in the study, and the results cannot be extrapolated to juvenile sockeye or subyearling Chinook that did not originate from Spring Creek NFH.
 - The study design includes many confounding factors that raise doubts regarding the management applications of the results.
 - The background mortality assumption of 3%, and the observed mortality, are both significantly higher than those found in other studies. These unusually high mortalities raise questions about the methodology and handling of fish, and could mask actual differences between treatments.
 - The significantly different recovery rates suggest that other uncontrolled factors, not related to the flow control device, are impacting passage and confounding results.
 - The high loss of test fish while operating at the upper end of the 1% indicates that the VBS structures are increasing turbine passage when compared to turbines without the VBS structures and operating at the mid-point of the 1%. Increased turbine passage is not the desired outcome from modifications to the Bonneville second powerhouse.
- Operating the turbines at the upper end of the 1% efficiency range will move more water through turbines and increase overall powerhouse passage of juvenile migrants. Powerhouse passage has been shown to have lower survival in the estuary and first ocean year, and are less likely to return as adults than those that pass via spillways (Haeseker et al. 2012, Petrosky and Schaller 2010, Tuomikoski et al. 2010, FPC Memos October 6, 2010; January 19, 2011; July 14, 2011). Even if the proposed structures improve FGE to the juvenile bypass system, increasing turbine flow will reduce juvenile survival and adult returns.

- The proposed work outlines testing of the water flow conditions after installation, but does not include testing with juvenile fish. Given the confounded and inconclusive results of the 2015 testing (Absolon and Sandford 2016), any changes that affect salmonid migration should be tested on representative populations.