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MEMORANDUM

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FROM: Michele DeHart, FPC

DATE: February 12, 2016

RE: Research Proposal – *Within-season indicators of fish condition related to differential delayed mortality*

We have recently become aware of a new research proposal for 2016 titled *Within-season indicators of fish condition related to differential delayed mortality*. The project appears to be funded by the Bonneville Power Administration under BPA project #199302900, *Survival estimate of passage through the Snake and Columbia River Dams*. This study is proposed as a multi-year project and it appears to be an expansion of the original scope of this BPA project. We have several concerns about the implementation of this project that we have summarized below:

- **Potential Impacts on the Smolt Monitoring Program (SMP) and the Comparative Survival Study (CSS)**
 - The sample numbers required for this study may necessitate sampling rates higher than normally used by the SMP for some portion of the study period. Increased sample rates will affect both run-of-river and SMP/CSS smolts by imposing additional handling.

- There has been considerable effort to reduce handling effects by the SMP throughout the hydrosystem. Sampling rates at tributary traps and John Day Dam have been scaled back considerably starting in 2015 and 2016. A significant increase in sampling rates does not fit with region-wide goals of minimizing impacts on wild and ESA-listed fish.
- **The lethal sampling rate will result in significant impact on populations**
 - This proposal requires sampling 100 smolts every week during the study period, at each of four sites. Using the study dates provided in the original proposal, this sampling rate results in 4,600 spring/summer Chinook and 6,100 fall Chinook smolts removed from the basin during every year of the multi-year study.
 - At SARs of 1%, this will result in 46 and 61 fewer listed adult spring/summer and fall Chinook, respectively, for each year the study is conducted.
- **This proposal will not result in any foreseeable management applications**
 - It is unclear what information the study will provide beyond the data already available in Congleton et al. (2000, 2003, 2005).
 - Previous studies with different release points of transported fish throughout the system have not shown a demonstrable benefit to salmonid survival.
- **There are serious unresolved technical questions regarding the study design**
 - A short proposal was not endorsed by the Columbia Basin Fish Passage Advisory Committee or SRWG (see FPAC notes from [October 6](#), [October 21](#), February 9). A complete proposal, including the details of sampling and analysis, has not been made available for review to the region.
 - Sampling of run-of-river fish at different sites will be confounded by the release of hatchery fish of unknown origin, as well as upper- and mid-Columbia fish that are not directly comparable to Snake River migrants.
 - Information regarding the impacts of delayed mortality will not be available from the study design as written, since all sampled fish will be collected via a juvenile bypass system.
 - Key variables known to impact fish condition, such as river flow, are not included in the study.

Proposal summary

This study proposes to develop a real-time system that identifies when and where to collect and release transported fish. This real-time transportation management system would be based upon fish condition factors related to energetic reserves, size, mass, and degree of smoltification. Two variables have been selected for the proposed analysis: water temperature (thermal stress) and fish condition. These are proposed to relate to inter-annual changes in barged and run-of-river fish survival and differential delayed mortality.

Wild and hatchery fish will be collected at Lower Granite, Little Goose (added after the original proposal), McNary, and Bonneville dams for data collection on fish condition. The proposal will provide preliminary data regarding a strategy to transport early season migrants from Lower

Granite Dam to the John Day pool, and transport later season migrants consistent with the present transportation program to below Bonneville Dam. This transportation proposal is supported by previously conducted hydroacoustic studies (Eder et al., 2009, Rechisky et al., 2014). The agencies and tribes have expressed significant concerns regarding these hydroacoustic studies, citing flawed designs and analyses that raise serious concerns about applicability of results.

The management goal of this study is to continue to modify the transportation program to expand smolt transportation to include the early component of the outmigration by releasing fish in locations upstream of current release sites.

Potential Impacts on the SMP and the CSS

Over the past two years, in a collaborative process, the states, tribal, and federal agencies have put considerable effort into modifications of the SMP to reduce handling and sampling. This effort was initiated in response to NOAA Fisheries' concerns about reducing the impact of handling and tagging of salmonid populations. Sampling has been significantly reduced through a number of methods, including reducing sampling at John Day by half, the redistribution of PIT-tagging efforts to traps in the tributaries, and modifying the operation at mainstem traps.

This proposal could potentially require additional sampling at SMP sites in order to collect the required sample size for the study. Higher sampling rates require increased sample rates for all migrants, not just the species and origins of interest. This proposal is counter to region-wide stated goals of reducing impacts on ESA-listed populations.

Lethal sampling rate of this proposal will have significant impacts on populations

This proposal requires the lethal sampling of 100 spring/summer and fall Chinook each week, at each of four sites, during the study period. The sampling dates provided in the original proposal would result in the removal of 3,400 spring/summer Chinook and 4,500 fall Chinook from the system. In the permit submitted to ODFW and WDFW, sampling at Little Goose Dam was added to the original proposal, which brings sampling totals to 4,600 spring/summer and 6,100 fall Chinook.

If SARs are estimated at 1%, this study will result in 46 and 61 fewer adult spring/summer and fall Chinook returns, respectively for each year the study is conducted. An adult mortality event of this magnitude would result in concern from fisheries managers and a change in operations. As this study is proposed as a multi-year study, the total impacts would be much larger and would carry on for many years.

No foreseeable management application of study results

The proposal is similar in format, but contains much less information, than previous studies conducted in the hydrosystem (Congleton et al. 2000, 2003, 2005). The proposal does not specify what additional information this study would add to the current body of knowledge for management in the basin.

Earlier studies throughout the hydrosystem have experimented with collection and release sites of transported fish above Bonneville Dam (Marsh et al. 2006, 2009, 2010, 2011, 2012). These

efforts may inform future efforts in alternative transportation studies, but a comprehensive analysis of these tagging efforts has not been conducted, and is not included in this study proposal. Without consideration of existing data, the data collection outlined in this proposal may replicate earlier efforts that have not shown a demonstrable benefit to salmonid survival.

Serious unresolved technical issues regarding the study design

This study plan is flawed, and will result in high smolt mortality, high cost, and little benefit in terms of data that can be used in management decisions. Because a full and detailed proposal has not yet been made available, it is impossible to fully evaluate the potential concerns with this study. However, a few concerns are listed below.

- The collection of smolts at McNary and Bonneville will be confounded by hatchery releases and wild migrants from the upper- and mid-Columbia. The run-of-river smolts collected in the lower hydrosystem are not directly comparable to run-of-river migrants collected in the Snake River.
- Conclusions regarding delayed mortality will not be possible because all fish in this study will have experienced one or more juvenile bypass passages. Studies to date show that smolts that pass through juvenile bypass systems at dams have delayed mortality, whether they are transported or not.
- The exclusion of variables other than temperature and condition ignores findings from past studies that demonstrate a significant impact of travel time and river flow.
- The study is based on the fundamental assumption that there is no difference between fish that pass through a juvenile bypass system and fish that pass through the spillway, which is not supportable by the available data.
- The use of collected smolts for physical and physiological condition monitoring will likely introduce biases relative to the true in-river population, which is not collected. The smolt collection systems have been shown to cause delay and increased injury to smolts relative to in-river migrants (those not collected at the projects). Thus, smolts sampled in the collection system will represent a biased sample that has higher injury levels and experience increased delays relative to in-river migrants. It is unlikely that the study would be able to correct for these biases.
- Because transportation does not occur at Bonneville or McNary dams, the proposed sampling of collected smolts at these projects will provide no information useful for transportation management decisions.

The Columbia Basin Fish Passage Advisory Committee does not support the implementation of this study design.

This proposal was discussed at the Columbia Basin Fish Passage Advisory Committee (FPAC) on October 6th and October 20th. At both meetings, all FPAC members agreed that the proposed study was inappropriate given regional goals to reduce handling and would not provide useful information for management.

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