

State, Federal and Tribal Fishery Agencies Joint Technical Staff

Columbia River Inter-tribal Fish Commission
Idaho Department of Fish and Game
Nez Perce Tribe
Oregon Department of Fish and Wildlife
Shoshone-Bannock Tribes
US Fish and Wildlife Service
Washington Department of Fish and Wildlife

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Mr. Tim Wik
US Army Corps of Engineers
Walla Walla District
201 N 3rd Ave
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Ms. Kim Fodrea
Bonneville Power Administration
PO Box 3621
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Dear Mr. Wik and Ms. Fodrea,

In response to a request from the Bonneville Power Administration (BPA), the Salmon Managers' are providing the following rationale to support their recommendation that summer 2005 tests of the removable spillway weirs be conducted at **both** Ice Harbor and Lower Granite dams. Recent scientific information indicates that there is great uncertainty with the effectiveness of current mainstem mitigation measures for Snake River fall chinook. The best available data indicates that transportation may not provide a benefit in terms of returning adult fish. Because of the uncertain benefit of transportation for Snake River fall chinook, the 2000 NOAA Fisheries Biological Opinion (BIOP) contained a reasonable and prudent alternative (RPA) to compare the adult return rates of transported fall chinook with juveniles provided the best possible in-river migration conditions (spill provided at all projects). The test outlined in this RPA was to begin in summer 2005 when the power transmission system could handle this change in operation. The current draft BIOP states that this test will be delayed until 2007 or 2008 so that it can be conducted with removable spillway weirs (RSWs) operating at all four lower Snake River Projects. While RSWs have been proposed as the alternative for providing the best possible in-river conditions for summer migrants, the effectiveness of RSWs in passing fall chinook juveniles has not been tested. The following states our rationale for testing the effectiveness of RSWs for fall chinook juveniles at both sites (LGR and IHR) where they will be installed in summer 2005.

1. This is critical information. The evaluation at LGR will include determination of passage efficiency, forebay and tailrace behavior and delay, and survival through the dam and tailrace. This is critical information for the overall in-river/transportation survival study design. Information from this evaluation at Lower Granite, the first dam the migration encounters and where the migration is still intact, is very important to help define the study design parameters.
2. More information can be gained with testing at both sites.

The two sites available for testing in summer 2005 are at the uppermost (LGR) and lowermost (IHR) projects in the lower Snake River. The prudent operation would be to perform evaluations at both projects. A logical test would be to evaluate at least one operation that is similar at both projects to quantify the benefits, if any, that an RSW would provide as compared to conventional spill. (More information on spill test protocols may be available subsequent to the modeling workshop to be conducted at Vicksburg regarding spill levels and tailrace conditions.) Juvenile survival study results at Ice Harbor over several migrations have not been consistent, presumably affected by differing hydraulic conditions in the spillways and tailrace. These site-specific differences may also affect RSW survival results, limiting the applicability of survival results from just one dam to the other three.
3. Fall chinook juveniles change physiologically between LGR and IHR.

There is a continuum of changing migration behavior as subyearling chinook move from Lower Granite pool down through the Snake River. Thus, operations may need to be very different to pass fish through spill at Lower Granite than at Ice Harbor. Also, Snake River fall chinook arriving at Ice Harbor are generally larger and more smolted than fish arriving at Lower Granite, and these size and physiological differences will likely influence passage behavior and test results at the two dams. Lower Granite will provide a better comparison to Little Goose than Ice Harbor with regard to fish size and behavior. The remaining 5-10% of Snake River fall chinook that are in-river at Ice Harbor Dam have passed through the powerhouse turbines of three upstream dams, or are PIT-tagged fish that have been returned to the river at bypass outfalls. The turbine survivors may be migrating deeper, avoiding intake screen guidance, and therefore likely do not represent the entire population arriving at LGR, or what will be migrating in-river via spillways during the transportation study. If the few remaining in-river fish at Ice Harbor are not representative of the population arriving at LGR, then RSW test results at Ice Harbor cannot be presumed to represent how an RSW will perform at Lower Granite. A critical question is does the size and length of time of migration affect fall chinook juveniles' behavior when they encounter an RSW? Without a test at both locations, it will be impossible to answer this critical question for future RSW operation.
4. There are more fish to test at LGR than IHR.

A pilot study is needed to provide a reasonable estimate of the number of fish needed to tag for the full transport study. Approximately only 5-10% of the Snake River fall chinook migration remains in the river at Ice Harbor. While a suggestion to take fish from Lower Granite and transport them to Ice Harbor has been made, the handling and

transport effects would likely confound the results. There would likely be no way to account for those confounding effects during the evaluation, and the question as to whether the size and migration time of the juveniles affect their response to an RSW could not be answered.

5. The spatial migration patterns are still intact at LGR.

At Lower Granite, the first dam encountered, no fish have been removed from the migration, so the natural aggregates of fish passing through the reservoir remain intact. This grouping behavior may influence forebay and RSW passage behavior. However, the majority of fish are currently transported from the collector projects and given what has been observed of the remaining fish migrating through the hydrosystem, these aggregates spread out over time and will likely migrate more independently at Ice Harbor. Information from the evaluation at Lower Granite dam (where the groups are still intact) will provide the best indication of how Snake River fall chinook will respond to RSWs, and possibly at other dams downstream under the transportation study spill conditions. Therefore, passage behavior and test results at Ice Harbor in 2005 would likely not be representative of passage behavior and test results expected at Lower Granite or the intermediate dams with best possible in-river conditions.

6. Reservoir conditions are different between LGR and IHR.

The Lower Granite project has a large forebay where temperature stratification has been shown to occur. From work conducted by Karr et al. (1998), temperature stratification was identified at all Snake River Projects when cold water was released from Dworshak Dam. However, the degree of stratification declines exponentially as you move down the river. Thus, the Lower Granite forebay temperature profile is very different than at Ice Harbor in the summer, and much more similar to conditions at Little Goose Dam. In addition, summer RSW operation or bulk spill at Lower Granite might affect the stratification of the reservoir, and thus affect the behavior of the fish.

In conclusion, because the two projects are unique, both in terms of in river conditions, operations, and in terms of fish size and migration behavior, the operations that provide the best summer passage conditions have yet to be determined at either Lower Granite or Ice Harbor. RSW operations need to be optimized at each site for fall chinook migrants. Hence, for Snake River fall chinook under current operations, the RSW passage behavior and survival test results at Ice Harbor cannot be relied upon to be representative of RSW performance at Lower Granite and the other Lower Snake River dams. Unless consistent results are obtained at both Lower Granite and Ice Harbor, summer RSW studies will need to be conducted at each project to determine the best operation to optimize in-river passage conditions for the transportation studies and future operations.

Sincerely,



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