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August 24, 2004

MEMORANDUM FOR:F/NWR5 – Jim Ruff

THRU: F/NWC3 – John Ferguson

FROM: F/NWC3 - John Williams

SUBJECT: Input to the Regional Office on the gap analysis for Snake River fall Chinook salmon

This memo provides a summary of two telephone conversations on August 23, 2004: one between John Williams, Jim Ruff, and Paul Wagner, and a subsequent one between John Williams and Bob Lohn relating to the gap analysis for Snake River fall Chinook salmon.

In summary, the gap analysis calls for more specificity than available science/data can provide.

The details:

The gap analysis requires a value of the ratio of post-Bonneville Dam survival for transported fish to that of the in-river migrants (D), which is not directly observable. In practice, we estimate D based on estimates of in-river survival and a comparison of the smolt-to-adult return rates (SARs) of transported (T) and in-river (I) migrant fish, commonly referred to as the T:I ratio. In the case of Snake River fall Chinook salmon, the requisite in-river survival value is obtained by extrapolating incomplete data, and knowledge of the T:I ratio is based on very little data. The Tech Memo pointed to “severe lack” of data and stated “no empirical evidence exists to suggest that transportation either harms or helps fall Chinook salmon.” While the memo also states that the use of T:I=1 is justifiable, we have subsequently suggested that the gap analysis should use a range of T:I values to derive D. The final version of the Tech Memo will indicate this. That is, while the available data do not constitute evidence that T:I is *not* 1, we also cannot rule out a range of other values. To use data from recent years to evaluate the proposed action, we have suggested using a range of T:I between 0.67:1 and 1.50:1. Note that this range is symmetric around 1.0 on the multiplicative scale (2:3 to 3:2), not on the additive scale. Thus, based on this range and on the in-river survival values derived from SIMPAS’s extrapolation, we suggest the use of D-values ranging from (0.67)*(in-river survival) to (1.50)*(in-river survival).

If T:I *did* equal 1 in a given year, then D necessarily would equal the in-river survival. However, use of a constant T:I=1 in the analysis of the proposed action does not imply that D should necessarily change if in-river survival changes under the reference action. Recall that D pertains to *post-Bonneville Dam* survival of transported fish relative to that of in-river fish. A change in juvenile in-river survival between Lower Granite and Bonneville Dams need not have any effect on the post-Bonneville Dam survival of either group. If the in-river survival did indeed increase, then this would presumably increase the SAR of in-river fish, which would result in a change (decrease) in T:I, but no change in D. Accordingly, we recommend using the same range of D values in the analysis of the reference action as in the analysis of the proposed action.

We have a further concern related to recent information based on adult returns to Lower Granite Dam from the late 1990s to early 2000s (the juvenile migrants that produced these adults encountered conditions similar to the proposed action). It appears that around 50% of the fall Chinook salmon that returned to the Snake River as adults actually migrated out of the system as yearlings rather than subyearlings. We have almost no information regarding where these yearling outmigrants spent the winter, nor do we know what factors influenced a subyearling's "decision" to migrate in the summer or to postpone migration until the following spring. Based on these new data, it appears that for any given brood year, a portion of the juvenile migrants will migrate as subyearlings and a portion will migrate as yearlings. Given our lack of knowledge, we have no idea what effect reference actions might have on the yearling-migrant portion of the population. Changes in summer river conditions under the reference action might benefit subyearling migrants, but have no effect on yearling migrants, the life-history stage that has produced approximately half of the adult returns. On the other hand, changes to flow and spill under the reference action might encourage some fish to migrate as subyearlings, and in terms of their chances of ultimate survival to adulthood, this would lead to a lower adult return rate than if they had migrated as yearlings the following spring. Thus, considering all segments of the population, the reference actions might actually decrease overall stock performance rather than increase it. We just don't know – we have no data that could provide a basis for meaningful modeling of this important aspect of the complex life cycle of Snake River fall Chinook salmon.

We may obtain more information in the next several years to address these issues based on returns of PIT-tagged fish presently in the ocean. To provide definitive support for different actions may require additional information beyond what we can obtain from research conducted to date.

If you have any questions about the above, please do not hesitate to contact me at (206)-860-3277 or Steve Smith at (206) 860-3352.

cc: F/NWR – Lohn
F/NWC – Iwamoto
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F/NWC3 - Smith