



# FISH PASSAGE CENTER

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## MEMORANDUM

TO: Bob Heinith, CRITFC  
FPAC

FROM: FPC Staff

DATE: November 18, 2005

RE: Review of PowerPoint Presentation

We received your request to review the PowerPoint presentation titled "Injunctive Spill Retrospective Analysis" that apparently was developed by the University of Washington. The presentation includes a section on the radio tag studies that were conducted this year, a presentation of fish passage and spill timing, a listing of concerns regarding the FPC analysis and a section on power impacts.

Similar to what we responded in our comments on the After Action Report, the FPC is not prepared to make any comments on the economic impact estimates. Nor can we make comments on the RSW preliminary analysis because study sponsors are not required to make the preliminary data available to the public or to provide details of their analysis, such as assumptions and methodology. Therefore, it is impossible to comment without access to the data and the analysis.

The University of Washington (UW) criticizes of the FPC analysis and then provides different conclusions. The FPC analysis provided the data set and methodology used to develop the survival, travel time estimates, environmental parameters and conclusions. On the other hand, the UW results are presented without providing the data set utilized and the assumptions or methodology used. As a result it is impossible to determine how their estimates were generated and therefore how they reached the conflicting conclusions they present.

In order to help you interpret the PowerPoint presentation we offer the following comments relative to some of the concerns expressed:

*FPC's analysis does not consider the main issue, which is whether to transport or leave juvenile fall Chinook migrants inriver. A comprehensive evaluation of adult returns is required to compare inriver vs transport survival.*

We agree with this statement and the FPC memos, including the response to the Federal After Action Report and the PPC-PNGC comments, clearly documented the fact that we did not and could not address the issue of transported fall Chinook because that particular analysis requires adult returns. Generating predictions of smolt to adult returns on the basis of juvenile survival estimates plus a myriad of assumptions without actual adult returns is, at best, an exercise and has the dangerous potential of misdirecting passage management decisions. Although there have been estimates of smolt-to-adult returns for transported fall Chinook calculated for past years, which were included in the NOAA technical memorandums supporting the Biological Opinion, these transportation benefits from past years were not optimistic. We agree with the inference of the UW power point presentation, that several years of study of the summer spill operation will be required before the efficacy of transportation and spill can be assessed relative to the effect on adult returns. We agree and stated in the FPC analysis that it was simply an assessment of the migration characteristics, survival and travel time that occurred in 2005.

*The FPC document can be easily misinterpreted as evidence that overall survival in 2005 was better than the past few years.*

The FPC analysis clearly stated the methods and data used and included in the estimation of survival and travel time and clearly stated the results. The FPC analysis did not make predictions or recommendations.

*UW found technical flaws in the FPC analysis  
FPC regression analysis of a spill survival relationship incorrectly assumes all survival estimates are measured with equal error*

Here the UW seems to be suggesting that the data be analyzed using a weighted regression analysis, where estimates with tighter confidence intervals are given more weight in the analysis. If the UW had provided the data set, methods and actual calculations the reference would be more clear. In fact the FPC conducted the analysis using both simple regression and weighted regression techniques. However, utilizing the same data set and applying a weighting methodology to the same data set, as inferred by the UW did not change the results. The relation between spill and survival was equally strong and the coefficients remained essentially the same in both instances. Additionally, the results were basically unchanged when the 2005 data was incorporated, and when it was not included in the analysis. This suggests that the 2005 post spill data point was not highly influential in determining the relation between survival and spill. Most of the shape of the relation is dependent on the survival estimates for earlier migrating fall Chinook in past years that migrated during the tail end of the spring spill. Because UW did not provide their data set or analysis, we cannot determine why they generated different results. One possibility is that they used a different data set. We cannot duplicate the UW analysis or results without their data set.

*FPC analysis used mean percent spill across multiple dams to characterize spill in the early and late periods each year.*

The FPC recognizes the difficulty associated with quantifying environmental variables. There may be other methods but again without any information we cannot assess the UW methods. The FPC method of characterizing spill is very similar to and consistent with the way other regional groups (like NOAA) characterize environmental variables in their analyses. The FPC utilized standard methods used in the region.

*Spill conditions overlapped significantly across the early and late blocks used in the analysis.*

The FPC divided the fish into two groups for this analysis, those that migrated prior to the court ordered spill program and those that migrated post implementation of the court ordered spill program. The fact that the two groups were likely to have some overlap was recognized in the original document, "For the pre-spill group (group 1) the date range May 20 to June 12 was chosen. Looking at PIT-tag timing at Lower Granite Dam it appeared that May 20 encompassed the beginning of the run, while June 12 was chosen to assure that many of the migrants would pass through at least part of the hydrosystem prior to spill beginning." The exposure of the early group to some spill was not considered a problem for the analysis because given the higher survival observed for the later migrants that passed inriver during spill, we assumed that the survival of the group 1 fish was likely biased high. Also, the early group was mostly hatchery origin fish, which typically show higher survival through the reach than wild fish and surrogates that made up the majority of fish in the late 2005 group. Given the fact that we observed a difference, in spite of the fact that the Group 1 estimate was likely biased high, only strengthened our conclusion

*UW recalculated the survival estimates for the periods used in the FPC analysis*

It is impossible to respond to any of these remarks since there is no way of evaluating what data the UW used for their analysis. We cannot conclude why the UW analysis does not support the conclusions relative to spill and cannot duplicate with our data any relation of that magnitude of significance with temperature without the provision of the actual UW data sets. There was an error in one number in the earliest data sets the FPC used, however, when recalculated with the corrected estimate it only yielded a relation between spill and survival with a higher  $r^2$  (0.71) than the original analysis (0.61). The slide also refers to a data point from 2000 when the FPC did not include data from 2000 in our analysis. There is also considerable knowledge required of which fish to include in an analysis to assure that one does not inadvertently include yearling Chinook in the survival estimation procedure. Perhaps this is what led to the inconsistency of the UW data versus the FPC data. We have looked at using various groupings of fish, including all possible tags and find that the linear regression relationships between survival and flow and spill variables are always significant and that coefficients of the relationships are quite stable even when survival estimates are weighted by inverse variance.

*Based on the operations and passage index data, the majority of the fall Chinook migration occurred before the court ordered spill*

This is a true statement only if one purposely ignores the passage of the wild Snake River fall Chinook and the Clearwater fall Chinook. The passage indices are predominated by hatchery-released fish. The run of hatchery fish was early this year since some of the major production lots were released earlier than usual because of deteriorating in-river migration conditions (this was prior to the decision to grant the injunctive relief for spill). However, it has clearly been demonstrated that the majority of Snake River fall Chinook and most of the Clearwater fall Chinook were in river during the court ordered spill program.

Conclusion:

- The UW does not provide adequate description of assumptions or data sets to actually conclusively determine how they generated their estimates. When a weighting methodology was applied to the FPC data set the relationship did not change.
- When all FPC calculations were reviewed and recalculated the spill survival relationship actually strengthened to a higher  $r^2$  value.
- We cannot duplicate the UW results because they did not provide the data set they used.
- The UW may have used a data set that included yearling fall Chinook or sub-yearling spring Chinook.