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MEMORANDUM

To: Paul Wagner, NOAA

From: Michele DeHart

Date: November 30, 2014

Re: Response to comments on the Draft CSS 2014 Annual Report

Attached, please find the Comparative Survival Study Oversight Committee responses to your comments on the draft 2014 Comparative Survival Study Annual Report. Thank you for reviewing our report and providing comments. As always, your comments help to keep us on track and aid in clarifying our report.

CSS responses to NOAA Fisheries comments on draft CSS 2014 report

1) *Chapters 3 and 5 report estimated juvenile survival from Lower Granite Dam to Bonneville Dam. Including survival from release location to Lower Granite Dam would be informative.*

   CSS Response: There are no release to Lower Granite Dam survival estimates associated with the data presented in Chapter 3. Those survival groups begin with fish detected at LGR dam and returned to river and represent an aggregate. We could add the above LGR survival estimates as suggested, for Chapter 5 in future reports.

2) *The survival estimates reported in Appendix A are often based on an estimate of survival per mile of an upstream reach which is then expanded to a longer reach. (e.g. Table A 4.) My question is, does the confidence interval reported when the expansion per mile estimate is applied reflect the uncertainty of applying the expansion per mile method, or does it only reflect the uncertainty of the upstream reach survival estimate where an actual survival estimate was made?*

   CSS Response: The per mile expansion is included in the calculation of each iteration of the bootstrap reach survival estimate. So the variability reflected in the 90% confidence interval around the estimate includes the chosen expansion (one to three reaches). Since the per-mile expansion is sub-reach survival taken to a constant power function (total rkm/expansion reach rkm), the variability would come, as you suggest, from the estimated reach survivals upstream of the expansion calculation. Using the power function to effectively multiply the sub-reach survival amplifies the sub-reach variability. Our analyses suggest that the variances are similar to those from full reach survivals. We reviewed expansions versus full reach estimates for migration year 2010, a year when no reach expansions were necessary for Snake River hatchery Chinook release groups, and found similar estimated variances when comparing full reach survival to survival expanded by one to three reaches. The coefficient of variation (cv) for one reach expansion on average (for nine different release groups) was 15% higher than the full reach survival cv; for two reach expansion the average cv was 9% lower than the full reach cv; and for three reach expansions the average cv was 25% higher. Based on our analysis it appears that, overall, the per-mile expansion does not result in a decrease in variability of the reach survival estimates using bootstrap methods for estimating the variance.

3) *Additional information on the C_1 group in Appendix A would be informative. The text suggests that the C_1 group represents the entire study period (e.g. April 1 onward). However, the only time when collected fish are deliberately bypassed is prior to the beginning of transport. Once transport begins all collected fish are transported with the exception of study groups used to make in-river survival estimates. Creating a category that reflects the SAR of fish bypassed while transport is occurring would better inform the relative effect of transporting fish compared to returning collected fish to the river during the transport period. Knowing the relative success of returning fish to the river during these two time periods would be informative.*

   CSS Response: The text stated, beginning on page A9-l1 "Second, the C_1 group (detected and returned to river) now represents the portion of the run at large that out-migrates before transportation started…." We are not sure how this can be interpreted as suggesting the C_1

group represents "…the entire study period…." You are correct that in order to compare bypassed (during transport fish) to transported fish, a different group of bypassed fish would have to be developed for SAR estimation. Currently, the CSS SAR estimation procedures do not allow for assigning bypassed fish to a particular category based on date of detection (at LGR, LGS or LMN), which is what would be required to do the comparison you suggest. While we have not directly calculated the C_1 group as you have described it (bypassed during transport only), it seems that this would be a fairly small proportion of the overall population. A good example would be the proportion C_1 fish in the fall Chinook groups—since transportation occurs throughout their migration. In the fall Chinook groups we looked at (migration years 2009, 2010 and 2011), the proportion in the C_1 group ranged between 1% and 9% with an average less than 5%. These C_1 fish represent a very small number of PIT tags from which to estimate a SAR.

Nor are the fish in such a category representative of any larger population. PIT-tagged fish are the only fish returned to river during transportation operations. It is unclear how useful such a group would be in answering the effect of transporting versus bypassing, since an actual bypass strategy (i.e., not just small numbers of PIT tags) would greatly increase the in-river population (if half the fish collected were bypassed for example).