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MEMORANDUM

TO: Tom Lorz, CRITFC
Rick Kruger, ODFW

Michele DeHart

FROM: Michele DeHart, FPC

DATE: February 16, 2011

RE: Review Performance Standard Testing/ John Day 2010

In response to your requests, the FPC staff reviewed the available material from the John Day 2010 study conducted by PNNL. The FPC staff also reviewed the 2009 study conducted at John Day and those comments are attached. In addition, the FPC provided comments on early drafts of proposed studies for performance standard testing, those are also attached to provide context. The draft report for the John Day study for 2010 was not available for review. Further hindering our review is the fact that acoustic tag data are not available in a public data base. The data we were able to review were obtained by requesting spread sheets from the COE.

In order to respond to your request, we reviewed the AFEP summary Power Point presentations provided by PNNL, the original study plan (Skalski 2009) and proposal (Carlson 2009), the draft reports for 2009 (Weiland et al. 2010), the final report for 2008 (Weiland 2009), and some spreadsheet data summaries from 2010 (FFDRWG 2011). The Skalski (2009) study design was also reviewed by the Independent Scientific Review Panel (ISRP 2009). In our review of the available materials from the John Day 2010 study, serious technical and study design issues became apparent regarding the context of the John Day study and the evaluation of project specific performance standards. The 2009 and 2010 studies at John Day were not conducted using the paired-release study design originally described by Skalski (2009) and Carlson (2009) and reviewed by the ISRP (ISRP 2009) and did not evaluate the defined performance standards (concrete face to tailrace survival). Instead, the studies abandoned the paired-release design and implemented a single-release design for evaluating *reach* survival (concrete face to The Dalles forebay survival). In addition, the 2009 and 2010 studies attempted to evaluate two project operations (30% spill versus 40% spill), but we found no documents justifying the sample sizes, the statistical power of these evaluations, or why it was important to compare these two particular spill levels. Our review of the 2010 and 2009 studies at John Day show that:

- Spill should be increased at John Day.
- At 40% spill steelhead survival was statistically significantly higher than at the 30% spill level.
- Median forebay residence time for juvenile yearling Chinook, steelhead and subyearling Chinook was reduced at the 40% spill level when compared with the 30% spill level.
- Mean tailrace egress time was significantly lower at the 40% spill level than at the 30% spill level for all three species in 2009.
- Although the power point presentation to AFEP by PNNL refers to performance standard evaluation at John Day, this study was not designed to evaluate whether or not the performance standard criteria are met at particular spill levels.
- The study conducted in 2008 at John Day was a paired release design, and indicated that at the 30% and 40% spill level, BIOP performance standards were not met for either yearling Chinook or subyearling Chinook.

An experimental design and methods of analyses for evaluating performance standards and the resulting regional operations decision process has not been agreed upon by the region, so it is difficult to assess the adequacy of the John Day study within a management context and management application of results. A report entitled "Statistical Design for the Lower Columbia River Acoustic-Tag Investigations of Dam Passage Survival and Associated Metrics" was prepared for the Corps of Engineers (Skalski 2009). Reviewers provided significant comments and concerns regarding the proposed approach. It is not clear if the COE is proceeding with this design, or if there is regional agreement with this design. The studies conducted at John Day in 2009 and 2010 abandoned the design described in Skalski (2009) and Carlson (2009). The John Day study draft report and data for 2010 are not available for review. We have not found a document that adequately describes the single-release study design used in 2009 and 2010, which is critically important for justifying the sample sizes, defining the statistical power of the comparisons between project operations, and choosing treatment levels of spill. It is premature to consider changes in operation based upon these studies because there has not been adequate time provided for review. In attempting to understand the scientific plan for assessing project survival, we reviewed the available draft reports for The Dalles and Bonneville (PNNL and UW 2010a and 2010b). We found that the methods and metrics were inconsistent among projects. For example, a paired-release design was used at The Dalles Dam in 2010, but the studies at John Day and Bonneville dams in 2010 used a single-release study design. Other inconsistencies include variable tailrace study areas, which appear to extend 10 km at John Day Dam, 2 km at The Dalles Dam, and 1 km at Bonneville Dam. Similarly, the forebay region of The Dalles Dam is defined as extending 100 m upstream of the dam when measuring forebay residence time, whereas the forebay region is defined as extending 2 km upstream of the dam when measuring forebay survival. Additional examples of inconsistent metrics include the use of median travel times at Bonneville Dam and John Day Dam but mean travel times at The Dalles Dam. Our conclusions are listed below followed by a detailed discussion of each point.

The John Day Evaluation

- The John Day evaluation conducted in 2010 did not follow the study plan or study design for 2010. There were no paired releases in 2010 as identified in the study plan.
- The power point presentation provided to the COE AFEP process indicated that there was no significant difference in survival for any species at John Day. This is not correct; steelhead had a **statistically significantly higher survival at the 40% spill level when compared to the 30% spill.**
- The John Day 2010 results do not provide an adequate basis for reducing spill at John Day, because the power of the test was not adequate to detect a 2% or 3% difference in survival. Even with the low power of the test, steelhead showed a significantly higher survival (3.6% higher survival) at the 40% spill level.
- Although performance standards were not met under the 30% spill level in 2010, study results suggest that an increase in spill levels results in higher project survival for spring migrants. **This is a clear indication that higher spill levels at John Day are necessary to achieve performance standards and improve overall reach survival rates.**
- The PNNL presentation comparing results from 2010 study with those for 2009 or 2008 are not appropriate since the TSW configurations were different between these years.
- As with the 2009 study results, the 2010 study results continued to show that important passage characteristics, such as forebay delay, decreased under the 40% spill test.
- The Skalski (2009) and Carlson (2009) study plan at John Day was not implemented. Paired forebay and tailrace releases were not conducted. The researchers, in an attempt to evaluate performance standards, utilized a tailrace release from a study conducted in 2008 and propose to utilize this as the control group for 2009 and 2010. This is not appropriate and violates the definition of a control group. The 2008 tailrace release represents conditions in 2008 only and can be considered a control for the 2008 test release only and has no valid application in other years.
- Results from analysis of 2008 paired release studies at John Day could not be replicated utilizing the data in the 2008 report

A process for applying data and analytical results to fish passage management decisions has not been established

- The evaluation of dam specific performance standards which are the basis for future operations including spill for fish passage appear to be going forward on an *ad-hoc* basis.
- A management decision framework, in which all available data are considered, and the application of data and analyses to decisions regarding fish passage and spill management has not been identified. Decisions to modify or change fish passage operations should take into account ALL of the available data in a management decision framework and should consider the entire hydro system. The strengths and weaknesses of each data set should be considered together in a decision framework to inform the most prudent management action.
- The Biological Opinion sets the stage for a management decision framework by discussing offsets of performance among projects that share the same evolutionarily significant units (B.2.6-2-7). This indicates that operations at John Day should consider the fact that performance standards are not being met at The Dalles. This Biological Opinion language indicates that the intent is to consider these data in a management decision framework.

- Without a management decision framework for application of analytical results, including new data, the adaptive management components of the Biological Opinion cannot be implemented.
- Operations decisions should incorporate all of the available data, including the delayed mortality and reduced SAR, associated with juvenile passage through the powerhouse JBS. Spill for fish passage should consider recent data that indicates that delayed mortality is associated with routes of passage and significantly reduces SAR.
- The present Fish Operations Plan process for considering changes in operation is flawed because the data, analyses and draft reports, have not been provided to the region in advance of proposals to change operations. The John Day draft report is not available for review. Without the opportunity for careful review, there is a high level of risk that management decisions, such as a decision to reduce spill at John Day, could be based on weak data or erroneous analyses that could be detrimental to fish passage.

Specific Discussion

2010 Results and Increased Spill at John Day
According to the PowerPoint presentation provided to the COE for the AFEP Annual Review, the 2010 study results suggest that, for spring migrants, project survival under 40% spill is higher than under 30% spill. At 30% spill, the 2010 estimates of project survival were 94.3% for both steelhead and yearling Chinook. At 40% spill, the 2010 estimates of project survival were 97.6% for steelhead and 95.2% for yearling Chinook. While the difference in project survival for yearling Chinook was not statistically significant, the 40% spill level resulted in significantly higher project survival for steelhead (see below for discussion of test for significant difference). Furthermore, the 30% spill level did not meet the current performance standard of 96% project survival for spring migrants. However, the 40% spill level met this performance standard for steelhead, but not yearling Chinook. The trend of increased project survival with increased spill (40% vs. 30%) in 2010 suggests that a spill level above 40% may be necessary to achieve performance standards for spring migrants, particularly yearling Chinook.

TSW Placement
Caution is warranted when comparing results from the John Day study over the past three years. In addition to differences in study design (see below for detailed discussion) and out-migration conditions, the position of the TSWs has been different throughout the years. In 2008 and 2009, the TSWs were operated in spill bays 15 and 16, while in 2010 the TSWs were operated in spill bays 18 and 19.

Other Passage Characteristics
In our review of the 2009 study results, the FPC pointed out that the 40% spill level seemed to improve other passage characteristics, such as forebay delay. This same pattern is evident in the 2010 study results as well. For all three species, the 30% spill level resulted in longer median project passage times. Furthermore, for steelhead and subyearling Chinook, Spill Passage Efficiency (SPE) was highest under the 40% spill level.

Results from analysis of PNNL 2008 paired release studies at John Day could not be replicated utilizing the data in the 2008 report

Based on our review of the PNNL 2008 acoustic telemetry study it is difficult to determine how the steelhead survival estimates were grouped to arrive at the numbers reported both in the PNNL 2008 report to the COE and in the Weiland et al. presentation to AFEP 2010. In both the 2008 report and the 2010 presentation by PNNL the paired steelhead survivals in 2008 were 99.1% for the 30% spill treatment and 97.2% for the 40% spill treatments. However, upon using the average survival for the virtual release blocks from the appendices of the 2008 report and the date blocks identified in Figure 3.29 from 2008 PNNL report, we estimated the paired release survival at were 99.0% for the 40% nominal spill treatment group when we took a simple average of the survival blocks, while the 30% group average survival was 97.7%. We also considered sample size weighted average estimates and found the same pattern; with the 40% spill test having a 99.2% average survival compared to 97.8% average for the 30% tests. Finally, we also pooled detection tallies for all blocks within each treatment and estimated a paired release survivals of 98.6% for the 40% treatment blocks compared to 97.6% for the 30% blocks. Our results are the opposite of what PNNL is reporting and lends confusion to the consideration and application of these results to operations decisions. In all of the methods we used to combine the data; the 40% blocks appeared to have higher survival than the 30% blocks, which is opposite of what was reported in the PNNL reports.

Table 1. Paired release survival estimates from Appendix H of the PNNL 2008 report. FPC average estimates are in blue font.

Nominal Spill Treatment	Virtual Release Dates	Paired Concrete Survival
30%	5/02-5/03	0.977
40%	5/04-5/05	0.957
30%	5/06-5/07	0.979
30%	5/08-5/09	1.005
40%	5/10-5/11	0.990
40%	5/12-5/13	0.991
30%	5/14-5/15	0.951
30%	5/16-5/17	1.009
40%	5/18-5/19	1.028
30%	5/20-5/21	0.961
40%	5/22-5/23	0.979
40%	5/24-5/25	1.014
30%	5/26-5/27	0.952
40%	5/28-5/29	0.975
pooled		0.986
n-wt Avg 30%		**0.977**
n-wt Avg 40%		**0.992**

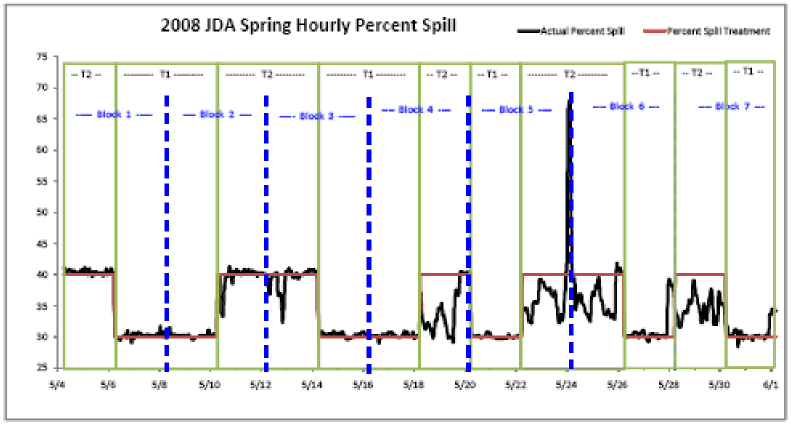

Figure 3.29. Spill treatments as prescribed (red line) and actual conditions (black line) in spring (repeated from Figure 3.22 for ease of reference)

Figure 3.29 of the PNNL final 2008 report to the COE on JDA survival.

The power point presentation provided by PNNL to the COE AFEP process indicated that there was no significant difference in survival for any species at John Day. This is not correct; steelhead had a statistically significantly higher survival at the 40% spill level when compared to the 30% spill.

We believe that the results from the test of two spill treatments on Yearling Chinook, subyearling Chinook, steelhead at John Day Dam as presented at the January meeting of the Fish Facility Design Review Work Group (FFDRWG) were incorrectly interpreted. The experimental design followed a single release through two treatment levels of 30% and 40% spill with several blocks within each treatment. The results were presented as “no significant difference” between 30% and 40% spill for all three species. However, the results for steelhead did appear to show a highly significant lower survival for the 30% spill group as compared to the 40% spill group.

Although the full study design including the number of fish in each treatment and block are not available, an approximate statistical test is possible using the overall results. The table below summarizes the measurements presented at the FFDRWG meeting with the results from the statistical test in the far right column. Because the degrees of freedom are unknown, it was assumed that the distribution of this statistic resolved to approximately Normal. A test statistic was calculated as:

$$[\text{Surival}_{30\%\ \text{SPILL}} - \text{Surival}_{40\%\ \text{SPILL}}] / [\text{SE}_{30\%\ \text{SPILL}}{}^{\wedge 2} - \text{SE}_{40\%\ \text{SPILL}}{}^{\wedge 2}]^{\wedge(1/2)}$$

The p-value was calculated for a two-tailed test with α=0.05 using a standard Normal distribution. The results show a highly significant negative effect of reduced spill on juvenile steelhead survival.

Survival - Dam Face to TDA (CR349 to CR309)

	Estimate	SE	n	p.value
		Steelhead		
30% Spill	0.942	0.01	985	***0.0025***
40% Spill	0.978	0.008	1175	
		Yearling Chinook Salmon		
30% Spill	0.945	0.01	1066	***0.3278***
40% Spill	0.951	0.009	1112	
		Subyearling Chinook Salmon		
30% Spill	0.91	0.008	1304	***0.6382***
40% Spill	0.906	0.008	1357	

Estimates, Standard Errors, and sample size from handout at FDDRWG meeting, Jan 2011.
P.value calculated from Z-score using $\alpha = 0.05$ for a two-tailed test;

The John Day 2010 results do not provide an adequate basis for reducing spill at John Day, because the power of the test was not adequate to detect important difference in survival. Even with the low power of the test, steelhead showed a significantly higher survival at the 40% spill level.

The ability to detect small differences in survival between the two spill treatments is very unlikely without an adequate sample size or without sufficient contrast across treatments. We believe that the spill treatment tests were problematic because:

1) The tests are underpowered and therefore inadequate measures of how these spill treatments affected survival.
2) The tests had inadequate contrast across spill groups in order to detect an effect of spill.
3) There is no clear definition of the magnitude of difference in survival between treatments groups that this study was designed to detect.

The study design and/or a power analyses for the single release spill comparison is not available. However, the approximate power of these tests can be calculated using a simple simulation that employs the information in the above table using the following methods. To calculate power, 10,000 simulations were performed each with simulated survival estimates. Each treatment's simulated survival estimate was drawn from a normal distribution structured around the original estimate's value and standard error. These were then compared with the Z-test used above to ascertain significance. Power was indicated by the summary of the p-values for these 10,000 tests in relation to 0.05. The results are shown in the table below.

	Difference in Survival estimates (%)	Power ($1-\beta$)
Steelhead	3.6%	80.1%
Yearling Chinook	0.6%	6.8%
Subyearling Chinook	0.4%	1.2%

Often researchers desire a power of 80% (Thomas and Juanes 1996) or an 80% chance of detecting a difference between treatments if a difference actually exists – an 80% chance of avoiding a type II error. For yearling Chinook there was a 6.8% chance of detecting a difference between treatments given these survival estimates. For subyearling Chinook there was a 1.2% chance of detecting a difference given these survival estimates. The ability to detect these small differences in survival across Chinook treatment groups is underpowered for both yearlings and subyearlings. The small difference in survival for the Chinook groups could also be from a lack of contrast across treatments; a better treatment contrast would be 60% spill vs. 30% spill.

For steelhead there seemed to be adequate power to detect these types of differences and a significant difference was found. However, this brings up the question, what loss in survival is it acceptable to not detect? This was not clear from the FDDRWG presentation of the data. Here a 3.6% loss in steelhead survival was detected but if a 2% loss existed and was not detected is that acceptable? From these data it appears that this test did not have enough statistical power to detect a 3% or 2% difference in survival and had just enough to detect a 3.6% difference in survival. The tipping point between statistical power and an acceptable loss in survival is not defined here but is integral to how these data are interpreted.

A process and regional plan for applying data and analytical results to fish passage management decisions has not been established

The evaluation of performance standards appears to be going forward on an *ad-hoc*, disjointed basis. There is no evidence of a disciplined framework for applying analytical results to management decisions. As an example, the information presented for John Day discusses utilizing 2008 tailrace results against 2009 and 2010 forebay releases to evaluate performance standards. We discuss the technical problems with this approach in our previous comments. At the present time proposals to change operations based upon analytical results advance to the discussion without adequate advance review and discussion of the underlying data and analyses. A management decision framework would allow information to be organized, with a clear understanding of its limitations, appropriate management applications and would be presented relative to other available data. In addition a management decisions framework would assure consistent technical and analytical approach to all project performance standards. In this way the management decision would incorporate all of the available data together, weighted by the limitations and appropriate application of each data set.

References:

Carlson, T.J. 2009. Acoustic Telemetry Evaluation of Dam Passage Survival and Associated Metrics at John Day, The Dalles, and Bonneville Dams, 2010. Final Research Proposal Submitted to the U.S. Army Corps of Engineers Anadromous Fish Evaluation Program 2010 Project Year.

FFDRWG spreadsheet. January 26, 2011. Excel spreadsheet summary of 2010 studies at John Day Dam.

FFDRWG spreadsheet. January 26, 2011. Excel spreadsheet summary of 2010 studies at Bonneville Dam.

Independent Scientific Review Panel. 2009. Review of AFEP project - Statistical Design for the Lower Columbia River Acoustic-Tag Investigations of Dam Passage Survival and Associated Metrics. ISRP Memorandum 2009-43.

Pacific Northwest National Laboratory (PNNL) and University of Washington (UW). 2010a. Compliance Monitoring of Juvenile Yearling Chinook Salmon and Steelhead Survival and Passage at The Dalles Dam, Spring 2010. Prepared for the U.S. Army Corps of Engineers, Portland District, Under a Government Order with the U.S. Department of Energy Contract DE-AC05-76RL01830.

Pacific Northwest National Laboratory (PNNL) and University of Washington (UW). 2010b. Compliance Monitoring of Juvenile Subyearling Chinook Salmon Survival and Passage at The Dalles Dam, Summer 2010. Prepared for the U.S. Army Corps of Engineers, Portland District, Under a Government Order with the U.S. Department of Energy Contract DE-AC05-76RL01830.

Skalski, J.R. 2009. Statistical Design for the Lower Columbia River Acoustic-Tag Investigations of Dam Passage Survival and Associated Metrics. Prepared for M. Brad Eppard, USACE.

Skalski, J.R., R.L. Townsend, T.W. Steig, and S. Hemstrom. 2010. Comparison of two alternative approaches for estimating dam passage survival using acoustic-tagged sockeye salmon smolts. North American Journal of Fisheries Management 30:831-839.

Thomas, L., and F. Juanes. 1996. The importance of statistical power analysis: an example from Animal Behaviour. Animal Behaviour 52, no. 4: 856–859.

Weiland, M.A., and 18 coauthors. 2010. Acoustic Telemetry Evaluation of Juvenile Salmonid Passage and Survival Proportions at John Day Dam, 2009. Prepared for the U.S. Army Corps of Engineers, Portland District, Under a Government Order with the U.S. Department of Energy Contract DE-AC05-76RL01830.

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MEMORANDUM

TO: Tom Lorz, CRITFC
Fish Passage Advisory Committee

Michele DeHart

FROM: Michele DeHart

DATE: July 29, 2010

RE: Review of Acoustic Telemetry Evaluation of Juvenile Salmonid Passage at John Day Dam, 2009 Draft Final Report

In response to your request the FPC staff reviewed the subject draft report. Following are our comments for your consideration. The review and comment period for this draft closed on July 23, 2010. However, these comments may be useful to you in considering, design, analyses and appropriate management application of future acoustic tag evaluations of fish passage.

Our overall conclusion is that acoustic tag studies of this type do not provide a reliable basis for management decisions establishing spill levels for fish passage at individual hydroelectric projects. Juvenile acoustic tag data, such as was generated by this study, needs to be considered within a management decision framework that accounts for all of the available data and the specific limitations of each data set. An emerging body of scientific work indicates that there is the potential for delayed mortality occurring later in the life cycle, associated with juvenile route of passage. This study reports that survival was highest through the juvenile bypass route (JBS). However, a study conducted in the same year, Migratory Behavior and Survival of Juvenile Salmonids in the Lower Columbia River and Estuary in 2009, which used the same acoustic tagged fish, indicated that steelhead that passed through the JBS at John Day had lower survival in the estuary. In general the Comparative Survival Study results indicate that salmon and steelhead that pass through juvenile bypass systems have lower smolt-to-adult return rates than fish that pass through spill (Tuomikoski et al 2009). Petrosky and Schaller (2010) found that smolt to adult survival rates are related to juvenile migration conditions as well as marine conditions.

- The conclusions of this report do not reflect all of the actual data collected during the study.
- The high JBS survival estimate appears inconsistent with the observations obtained from past radio-tag studies.
- Although the Biological Opinion performance standards were not met for any species at the project in 2009, the report concludes that lower spill levels with a wider spread should be tested (such as 10% versus 30%). However, given that performance standards were not met under the configuration tested, the data actually supports testing of higher spill levels at the John Day project, but the recommendations do not reflect this data.
- The 8 test block study design that was planned was not implemented at the project because of conditions. There is no discussion of the impact of not meeting the study design on study conclusions.
- The study showed that important passage characteristics such as forebay delay, decreased under the 40% spill test, but this was not emphasized in the conclusions, and the report concludes that there was no difference in the 40% and 30% spill tests, when looking at all seven blocks combined.
- The conclusion that there was a higher survival for yearling Chinook at the 30% spill level using only 5 of the seven blocks is difficult to assess. The 30% spill blocks were met throughout the seven block study period. However, the last two blocks were eliminated because the corresponding 40% spill level blocks were not achieved due to total dissolved gas management. In order to reach the conclusion that the 30% spill has a higher survival than the 40% spill, only 5 blocks were used. If all seven blocks are used there is no difference between the two spill levels. In block 6 and block 7 the survival estimates for the 30% spill actually decreased relative to the estimates for the first five blocks. For five blocks the survival estimate was 0.943, but decreased to 0.93 when all seven blocks were included.
- There is no way to determine the route specific survivals by spill treatment to compare the two conditions. It cannot be determined if this was due to limited tag numbers due to cost.
- There are no formal hypotheses presented in the in the study to be statistically tested, and yet two spill treatments were compared statistically. The report should address *a priori* hypotheses to be tested, or address the less formal approach adopted due to the decision to limit the number of tags to reduce cost.

Petrosky, C. and H. Schaller. 2010. Influence of river conditions during seaward migration and ocean conditions on survival rates of Snake River Chinook salmon and steelhead. Ecology of Freshwater Fish.

Tuomikoski, J., J. McCann, T. Berggren, H. Schaller, P. Wilson, S. Haeseker, C. Petrosky, E. Tinus, T. Dalton, and R. Ehlke. 2009. Comparative Survival Study (CSS) of PIT-tagged Spring/Summer Chinook and Summer Steelhead, 2009 Annual Report. BPA Contract # 19960200. http://www.fpc.org/documents/CSS/2009%20CSS%20Annual%20Report-Final.pdf

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MEMORANDUM

TO: FPAC
Tom Lorz, CRITFC

Michele DeHart

FROM: Michele DeHart

DATE: June 24, 2009

RE: Review of; "Statistical Design for the Lower Columbia River Acoustic-Tag Investigations of Dam Passage Survival and Associated Metrics"

In response to an FPAC request the Fish Passage Center staff has reviewed the document and offers the following comments for the committees' consideration.

The document proposes a study design for the lower Columbia River, including John Day, The Dalles and Bonneville, using acoustic tags, to estimate performance standards included in the 2008 Biological Opinion. In accord with the 2008 Biological Opinion, the study is designed to provide estimates of dam passage survival, spill passage efficiency, forebay residence time, tailrace egress time and boat restricted zone to boat restricted zone survival. The study proposes to use acoustic tags and to include spring migrating yearling Chinook and steelhead and summer migrating sub-yearling Chinook.

The study is proposed independently of a Decision Framework

Because the study is proposed without an identified Decision Framework it is difficult to assess the degree to which assumptions inherent in the subject study design will affect the applicability of the proposed study results to the run-at-large. Tagging studies are used to make inferences about a population. In this proposed study the measured juvenile survival through the hydrosystem projects would be applied to the run-at-large. The proposed study will generate estimates as identified in the study objectives but whether or not the estimates reflect the experience of the run-at-large depends upon the whether or not the study assumptions are met.

The study is ambitious and complicated; it includes marking at dams of actively migrating smolts, extensive handling and transportation, and the use of acoustic tags. All of these have the potential to affect the resulting estimates and raise the question of applicability to the run-at-large. There is no discussion in the proposal of reconciling study results with long reach survival estimates and adult returns. In addition the study results have limited applicability to fish mitigation management decisions because the long term documented effects of route specific passage on adult returns is not incorporated into this proposal. Including this study in a Decision Framework would weight the study results appropriately relative to the significant study assumptions inherent in this design, and would require the study results to be considered within the context of other research and monitoring information. Including this study within a Decision Framework would reduce the potential for erroneous management decisions.

Proposed study assumptions

Several assumptions are inherent in the study design, which have potential for affecting the applicability of the results to the run-at-large. Some study assumptions of the proposed design are mentioned in passing but details regarding how violations of assumptions inherent in the design would affect study results and applicability of study results to the run-at-large are not included. Including detailed discussion of how violation of study assumptions could affect study results and application of results to the run–at- large would be helpful.

Tag size limitations

Tag size limitations of acoustic tags should be clearly identified. In any tagging study, in order to make valid inferences applicable to the run- at- large, tagging must be representative of the entire population in terms of their size. If the tagged population does not represent the population of interest, this can bias the outcome of the study and the applicability of the results to the run-at-large. When tagging fish to represent a population of small sized fish, the lower size limit of effective tagging is a primary concern. The assumption that the tagged fish are representative of the run- at- large is the first assumption in this proposed study. To test for a bias in this assumption the author suggests, “Length, weight and condition factor distributions of the tagged fish will be compared to distributions for fish routinely monitored at the John Day juvenile collection facility”. Fish size, limitations with acoustic tags, and variable affects of acoustic tags on behavior and survival relative to fish size may be unavoidable and therefore could bias study results.

Acoustic tag effects on survival and behavior

Recent studies (Rub et al.2009) have indicated that JSATS tags proposed for use in this study have impact on the survival and behavior of tagged fish. The author of the proposed study recognizes this but minimizes the serious implications to study results and applications of the results to the run-at-large. The author states, “Research on the effects of JASATS tags on fish have identified the possibility of decreased smolt survival as fish pass through several successive hydroprojects.” If true, it may be prudent to limit the fish used in the virtual release groups to fish released in river pools closer to the dam of interest, but this need can be evaluated *a-posteriori* and adjusted as required.” The research has shown that the longer the tags are in the fish the greater the impact of the tag. This is inconsistent with the authors proposed study design where fish are used and reused. This is a serious issue. The impact of acoustic tags on juvenile fish survival and behavior should be clearly understood before the study goes forward.

Marking, handling, transporting effects
The study is ambitious, proposing extensive and complicated holding, marking and transporting of groups of fish. Analysis of past studies has shown that marking at dams biases study results (Petrosky presentation ISAB/ISRP 5/8/2008;FPC memorandum 2.18/2009 www.fpc.org). Similar impacts have been documented in truck transporting and release of marked fish in many studies. These impacts on fish are variable and impossible to control. This will affect the application of study results to the run-at-large.

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DATA REQUEST FORM

Request Taken By: Michele **Date:** 2-10-2011

Data Requested By:
Name: Tom Lorz **Phone:**
Address: CRITFC **Fax:**
Email: X

Data Requested:
see attached email - update 2009 review of John Day performance standards - research with 2010 data -

Data Format: Hardcopy ☐ Text ☐ Excel ☐

Delivery: Mail ☐ Email ☐ Fax ☐ Phone ☐

Comments:
I called Tom and asked for the 2010 draft report + data - He did not have it - I sent the attached e-mail to Brad asking for the data to facilitate our review -

Data Compiled By: **Date:**

Request # ~~10~~ 12

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Michele Dehart

From: Tom Lorz <LORT@critfc.org>
Sent: Thursday, February 10, 2011 9:19 AM
To: Michele Dehart; Margaret Filardo
Subject: John Day Research Review

Could you review the current JDA 2010 spill test evaluation that the COE performed and take a look at strength of the test as well as any implications this may have on long term survivals of returning salmon.

thank you

Tom Lorz
CRITFC

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http://www.fpc.org
e-mail us at fpcstaff@fpc.org

DATA REQUEST FORM

Request Taken By: ~~Rick Kruger~~ Michele **Date:** 2-10-2011

Data Requested By:
Name: Rick Kruger **Phone:** +
Address: ODFW **Fax:**
Email:

Data Requested:
Review John Day spill/ performance standards research - done in 2010 -
also requested review of 09

Data Format: Hardcopy ☐ Text ☐ Excel ☐

Delivery: Mail ☐ Email ☐ Fax ☐ Phone ☐

Comments:
I sent (e-mail) our 2009 review

Data Compiled By: ______ **Date:** ______

Request # 11

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