MEMORANDUM

TO: Tom Rien, ODFW

FROM: Michele DeHart

DATE: January 27, 2014

RE: Review of BPA/COE/Skalski presentation to the Independent Scientific Advisory Board on January 17, 2014

In response to your request the Fish Passage Center staff and the Comparative Survival Study Oversight Committee developed the following comments on the COE/BPA Power Point presentation to the ISAB. Members of the Fish Passage Center staff and Oversight Committee representatives attended the presentation. The COE/BPA/Skalski presentation (Presentation) focused on three primary themes. First, the BPA and COE reviewed implementation of actions in the 2008 Biological Opinion (BiOp) and stated that progress is being made and that they deserve a chance to continue on the same course. Second, they criticize the CSS analyses which indicate that higher SAR would result from higher spill for fish passage. Third, they assert that the CSS monitoring program ignores all elements of proper study design and is incapable of evaluating the effects of higher spill levels. The presentation is misleading and includes inaccurate statements. The following discussion outlines summary review concerns and specific comments on each presentation slide.

Theme 1: Hydro actions are being implemented and progress is going well.

Hydro actions are being implemented as described in the Presentation. In addition, extensive monitoring and analyses have taken place concurrently with the implementation of these actions. Significant data, analyses, new knowledge and technical concerns have emerged that are not presented by BPA and COE in their presentation to stay with the present course. The large body of scientific work that has emerged indicates that spill continues to be identified as an important factor affecting smolt-to-adult survival. The CSS evaluation of spill for fish passage is based on many years of monitoring and analyses which have been repeatedly subject to scientific review.
Theme 2: Criticism of the CSS analyses

The criticisms of the CSS analyses in the Presentation are addressed directly in specific comments on each slide. Many of the critical statements directed at the CSS are misinformed. The BPA and COE mistakenly state that the CSS analysis utilizes oversimplified parameters such as percent of the river spilled. This is simply not true as explained in the following discussion. The implementation and operation of surface passage structures and available acoustic tag data have all been incorporated into the CSS analyses spill metric. This methodology has been presented to the region at the 2012 and 2013 CSS Annual Review Meetings and is available to the public. Subsequent to the Presentation, FPC staff met with NOAA representatives, reviewed the publicly available data and analyses, and reached agreement that the CSS analyses do incorporate telemetry data and the operation and implementation of surface passage structures.

Theme 3: The CSS monitoring program ignores all elements of proper study design and is incapable of evaluating the effects of higher spill levels.

The BPA and COE and John Skalski of the University of Washington assert in their presentations that the CSS monitoring program ignores all elements of proper study design and is incapable of evaluating the effects of higher spill levels on Chinook salmon and steelhead. These criticisms are not valid and do not advance progress on improving the management and monitoring of Columbia River Basin salmonids. In addition they do not advance efforts toward improving evaluations of the effects of increases in voluntary spill and spillway passage structures in relation to the NPCC SAR goals.

In response to regional guidance, scientific reviews, and requests for analyses, the CSS has led efforts to improve estimation and monitoring of salmon and steelhead throughout the Columbia River Basin and improve understanding of the factors that influence salmon and steelhead over their life-cycle. The Presentation does not recognize that the CSS study provides a proven, established, adaptive management experimental framework, implemented and tested over the years to evaluate the effects of higher spill levels, while accounting for the additional factors that influence survival and migration rates. The CSS life-cycle monitoring study has a rigorous study design that meets the requirements of both effectiveness monitoring and validation monitoring (Roni et al. 2005) in evaluations of adaptive management experimental actions, including the experimental increase in voluntary spill that has been proposed.

The CSS has been implemented and reviewed in the Columbia Basin for nearly two decades, demonstrating that the experimental design can isolate signals from background noise through temporal and spatial analyses. These analyses have led to the development of models that identify the primary factors that influence SARs, ocean survival rates, freshwater survival rates, and freshwater migration rates. Application of these models has indicated that increases in voluntary spill are expected to improve survival and migration rates at several life stages and result in higher SARs. Those expected improvements were presented to the region at the 2013 CSS Annual Review following the detailed discussions and reviews among leading scientists at the 2013 CSS Workshop (Hall and Marmorek 2013). The CSS has established a successful structure for data collection, data management and data analyses. All of the CSS data are available to the public. The CSS study design, data, and analyses are a proven adaptive management experimental framework that forms the foundation for evaluating the effects of the higher spill levels that have been proposed.
Starting with the existing CSS framework, design, structure, and analyses that have been conducted to date, the CSS Oversight Committee is capable of providing additional details and analyses if requested to do so. The advantage of the existing CSS framework is that it has been subject to scientific review throughout implementation, and the CSS has been conducted in a transparent framework with all data and analyses available to the public. The CSS remains committed to advancing understanding, improving monitoring, and responding to regional reviews and requests. Additional details and analyses on candidate spill proposals could include summaries of expected responses to increases in voluntary spill, analyses of the statistical power to detect changes in SARs, ocean survival rates, freshwater survival rates, or freshwater migration rates, analyses of the effects of various study durations, or evaluations of the size of mark groups.

Specific Comments on Presentation Slides
The last bullet is misleading, as it implies that recent actions and testing have been conducted under spill levels prescribed by the 2008 BiOp. However, the 2008 BiOp has never been fully implemented. Since 2006, the FCRPS has essentially been operated under a continued roll-over of the Court Ordered spill program. While many of the instantaneous spill volumes are the same between the Court Ordered spill program and the 2008 BiOp, the 2008 BiOp calls for an overall reduction in spill. Spill is reduced under the 2008 BiOp primarily through later initiation of spill, earlier transition between spring and summer spill volumes, and the cessation of spill in early August.

Data collected for the CSS include all of the hydro system improvements described by BPA and COE, with complete SARs through MY 2010. Improvements in juvenile survivals and SARs since 2006 have varied and are not showing consistent improvement due to meeting performance standards.

There is an extensive body of technical comments, reviews, and concerns with both methods and analyses relative to performance standard testing and their management application. The BPA and COE have yet to recognize or address these concerns.
Implementation of 2008/10/14 BiOp Configuration Improvements

- Hydropower Strategy 2 - Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival
  - Numerous configuration improvements to increase fish survival have been completed since 2007 and include:
    - Minimum gap runner turbines at Bonneville Dam Powerhouse
    - Adult fish ladder improvements at John Day Dam
    - Juvenile screened bypass systems improvements and/or outfall relocation at Bonneville, McNary, Lower Monumental, and Little Goose dams
    - Juvenile screened bypass systems fish-flow PIT detection at Bonneville, John Day, Lower Monumental, and Little Goose dams
    - Tailrace eel weir removal at The Dalles and John Day dams
    - Spillway flow deflectors at John Day (spillway 20) and Little Goose (spillways 1 and 8) dams
    - Extended length spillway at The Dalles Dam
    - Conversion of the Bonneville Dam Powerhouse ice and trash sluice away to a surface passage route
    - Spillway weirs at John Day, McNary, Lower Monumental, and Little Goose dams
It is worth noting that the rejection rate (for inclusion in the tag experimental group) for yearling Chinook for the 2010 performance standard test at The Dalles was approximately 12%, which was among the highest rejection rates. In fact, concerns about rejection rates of this magnitude, and the resulting distortion of survival estimates, caused a revision in the criteria used for smolt selection for 2011, 2012, test groups and future performance testing. Performance standard testing does not provide a robust foundation for management decisions. This slide was presented by the BPA and COE without any discussion of the considerable body of technical concerns regarding the applicability of performance standards testing results.
The spill schedule in this table represents a reduction in spill from the present implementation of the Court Ordered spill program. This is not “staying the course,” this is reducing spill for fish passage by making spring/summer transition earlier than what has been provided since 2006.
Performance standards testing continues to be conducted while ignoring the many concerns and comments regarding their applicability to management of the FCRPS. The FPC has completed several memoranda regarding the myriad of problems and technical issues existing with the performance standards tests and the interpretation of their results (FPC Memoranda: 6/24/09; 7/29/2010; 10/6/2010; 2/16/2011; 3/24/2011; 6/21/2011; 2/15/2012; 3/16/2012; 3/23/2012; 1/4/2013; 2/11/2013; 3/19/2013; and 10/7/2013). Below is a brief summary of the primary problems revealed by these reviews.

- Smolts used in performance testing do not represent the run-at-large. Smolts that fall outside of size requirements or exhibit physical conditions such as disease, injury, or descaling are not included. Rejection rates range from 3.7% to 18%, depending on the year, species, and location.

- The use of multiple release groups in the Virtual-Paired Release design generates the possibility of artificial inflation of survival estimates. High predation rates in the tailrace, as have been observed (Petersen 1994, Ward et al. 1995), will depress survival of the control group, and inflate the ratio of survivals used to calculate overall dam passage beyond the single-release estimates.

- Performance tests are designed to measure mortality that occurs at the dam, these estimates do not address the mortality that results from passage through powerhouses that occurs downstream of the project, in the estuary, or in the ocean. However, passage through turbines or juvenile bypass systems during the freshwater outmigration has been shown to significantly reduce smolt-to-adult returns (SARs), while smolts that pass through the spillway have higher SARs. The singular focus on at-dam survival estimates generated by performance tests is misleading because these performance standards result in underestimating the adverse effect of powerhouse passage by excluding important data which indicates that freshwater passage history affects estuary and marine survival later in the salmon life-cycle.
BPA and the COE continue to ignore the growing body of technical issues and concerns regarding the performance standards testing and its applicability to management of the FCRPS. The route-specific survivals that are presented in this slide were not made available to the region for review. Without an opportunity to review these data we have no way of knowing if and/or to what degree these estimates may be inflated. While the overall release estimate that was presented by the BPA and COE (98.2%) meets the 96% performance standard, the single release estimate from this study (95.8%) did not. This is an example of artificial inflation of survival estimates (as discussed above), one of the ongoing methodological concerns of performance testing (Beeman et al. 2011), and has repeatedly led to the suggestion of using single release estimates as an alternative for the virtual-paired release design.

The COE’s representative presented the concern of adult delays at LGS at spill levels above 30%. The perception that spill at LGS should be capped at 30% dates back to a delay in adult Chinook passage that occurred when summer spill began in 2005, which was the result of unique powerhouse operations. Since the initial problem in 2005, the FPC has conducted several analyses that have demonstrated that there was no effect on travel time or conversion rates from spill levels of greater than 30% (up to at least 40%) of instantaneous flow at LGS (see FPC memos from 7/7/2005; 11/6/2009, and 12/9/2011).

Furthermore, analyses show that LGS spill patterns and TSW operations at low flows may have a more significant effect on adult Chinook passage at LGS than spill percent. Tests in 2008 revealed that uniform spill minimized eddies in the LGS tailrace and resulted in the fastest adult travel times. Special operations in 2009 (during high flows) and 2010 (during low flows) suggest that TSW operation in low flows may cause delay in adult Chinook. This is because in low flows, operation of the TSW (prioritizing spillbay 1) results in a bulk spill pattern, that may increase the production of eddies in the LGS tailrace.
These tables are extremely misleading because they display prescribed operations rather than operations that actually occurred. The “Spill Operations” that are displayed in the table are simply what is prescribed in the BiOp, not what actually occurred during the performance standards testing (see 12/3/2013 FPC memo). In fact, due to high river flows that occurred during test years, the actual spill levels during testing that produced the performance standard estimates were much higher than what the BiOp would provide and, in some cases, as high as what has been proposed under the 125% TDG scenario of the Experimental Spill Management modeling efforts.

The BPA and COE neglected to include any results from performance standards testing for subyearling Chinook that indicate the performance standard of 93% is not being met at some projects. Nor is there any explanation for a lower standard for summer migrants than spring migrants. The Ice Harbor results presented for 2006 were not part of performance standards testing and have not been reviewed by the COE Studies Review Work Group (SRWG) for consideration. Furthermore, methodologies used in 2006 for other purposes than testing performance standards were entirely different from current performance standards testing methodologies.

BPA and COE continue to ignore the growing body of technical issues and concerns regarding the performance standards testing and it’s applicability to management of the FCRPS.
These data are inconsistent with the performance standard data that were presented in the previous slide. The slides provide no explanation of their “Pre-BiOp” and “Proposed Action” reference.

BPA and COE continue to ignore the growing body of technical issues and concerns regarding the performance standards testing and its applicability to management of the FCRPS. There is no indication that meeting dam passage performance standards, as displayed in this graph, will lead to meeting SARs that translate to improvements in adult returns.
After reviewing the calculations that generated the fish travel time estimates for “No dams” and “4 Dams” we conclude that they are not valid and based upon far reaching assumptions. Furthermore, Muir and Williams (2012) continually cites “operational changes” as being the leading cause of decreased fish travel times under the “8 Dam” period. However, the major operational change that occurred during this time was the provision of increased spill levels, 24-hours per day, as a result of the Federal Court Order. Spill has been shown to reduce fish travel times by reducing forebay residence time.

We agree with the primary conclusion of Muir and Williams (2012) that, under the present hydro system configuration, meeting pre-dam fish travel times cannot be achieved.
This slide is misleading as it implies that operations in the Post-BiOp Period (2008–2012) are what the 2008 BiOp prescribes. However, as we explained in our comments from Slide #4, this is not the case, as the FCRPS has been operated under a roll-over of the Court Ordered spill program since 2006. While many of the instantaneous spill volumes are the same between the Court Ordered spill program and the 2008 BiOp, the 2008 BiOp calls for an overall reduction in spill. Spill is reduced under the 2008 BiOp primarily through later initiation of spill, earlier transition between spring and summer spill volumes, and the cessation of spill in early August. It is unclear why the BPA and COE chose the time periods reported and why they call them pre- and post-BiOp, when the 2008 BiOp has never been fully implemented.

Furthermore, the average runoff volume for the pre-BiOp period is less than that for the post BiOp period. Consequently, there is more uncontrolled higher spill in the post-BiOp estimates. The pre-BiOp includes 2001 with extremely low flow, almost no spill, and low in-river survivals. The inclusion of 2001 biases the survival estimates low for the pre-BiOp period. There are no pre-BiOp survival estimates for Chinook for 1997 and 1998, for steelhead there are no survival estimates for 2004 and 2005, and for sockeye there are no survival estimates for 1997 and 2004-2005. Additionally, few sockeye were marked prior to the transport experiments initiated in 2009, so pre-BiOp estimates are based on small sample sizes with wide confidence intervals. Finally, improvements in steelhead survivals in recent years are likely a result of increasing juvenile survival due to increased number of in-river migrating juveniles resulting from increased spill volumes and the delayed start of smolt transportation in recent years.
The specific data defining “Wild” utilized to generate the data presented in this slide is not identified. Presumably, this slide is using dam counts to estimate abundance of “wild” adults. Only adipose fin clip information can be used at counting stations to categorize returning adults as hatchery or “wild.” This is an important point when unclipped hatchery origin fish are present. Because hatchery spring Chinook are much more abundant than wild spring Chinook, a small hatchery mis-clip or unclip rate can inflate the estimate of numbers of wild origin fish. Where supplementation hatchery programs produce unclipped salmon and steelhead, the wild adults cannot be precisely distinguished in the window counts. A large portion of Snake River hatchery fall Chinook and steelhead are released unclipped. Therefore, any unclipped hatchery fall Chinook that return and are counted as adults will be incorrectly identified as being “wild.” Thus, the wild abundance for Chinook is likely inflated, particularly for recent years where hatchery fall Chinook production has increased.
The slide shows the adult returns for the period 1990–2012. The implication is that there has been an increase in abundance since the initiation of listing of stocks. This is not an appropriate way to assess improvement, since the time period selected is constrained and the trend line is largely driven by a few high return years and the extremely low returns in the early 1990s. It is more appropriate to look at SARs and consider these relative to regional goals, such as the NPCC’s 2–6% SAR goal.

We disagree; hydro results are not promising and are cause for concern. Under current conditions, SARs are being maintained in the undesirable range of under 1%. The additions of RSWs and TSWs have not benefited spring Chinook as originally anticipated.

It is important to note that the performance-based approach referenced in this slide does not include any smolt-to-adult return rate performance criteria and the juvenile performance-based approach was established without any reference to survival to returning adult.
The CSS provides an experimental adaptive management framework capable of providing the region with a real opportunity to determine if SARs can be improved under the present configuration of the hydro system. In addition to measurements of SARs, the experimental adaptive management framework also will be measuring in-river survival, fish travel time, and ocean survival rates to monitor the effects of increased spill levels on both yearling Chinook and steelhead. Additional details on the analyses that have been conducted are available, and additional analyses could be provided if the CSS is requested to do so.

What the CSS presented was a synthesis of many years of monitoring data that showed consistently low SARs in an undesirable range. Multiple lines of evidence indicate that delayed mortality relative to passage through the hydro system contributes to these undesirable SARs. When accounting for variability in ocean conditions and river flows, results from these analyses consistently indicate that increased spill levels are correlated with increased SARs. Since there are no management actions available to affect ocean conditions and limited ability to affect flow, spill remains the most useful and effective tool available to fisheries and river managers for increasing adult returns.
We disagree; the impacts of hydroelectric operations are not limited to juvenile dam survival or reach survivals. The BPA and COE presentation ignores recent peer reviewed papers by Schaller et al. (2014), Petrosky and Schaller (2010), Schaller and Petrosky (2007), Haeseker et al. (2012), and recent CSS analyses (Tuomikoski et al., 2013) that show freshwater conditions affect smolt-to-adult returns when ocean indices are taken into account. A growing body of data and analyses, relative to delayed mortality, indicate that freshwater passage history and early ocean survival are not independent. The emerging relationship between freshwater passage and early ocean survival indicates that performance standards of dam survival are not appropriate and do not capture the full effect of the hydro system on the full life-cycle survival. Furthermore, performance standard testing is not consistently done at each dam each year. In all years, most dams are unmonitored with unknown effects of the operations that were implemented.
The BPA and COE are misleading in their presentation of Burke et al. (2013). Burke et al. (2013) did not include spill as a variable in their analysis. Spill cannot be shown to have an influence on adult returns if it is not included in the analysis. In addition, Burke et al. (2013) used annual adult counts at Bonneville Dam. Annual adult counts contain multiple juvenile year classes and multiple ESUs that experience various levels of hydro system impacts. Therefore, adult counts at Bonneville Dam cannot be used to assess any effect of juvenile passage conditions. Therefore, Burke et al. (2013) cannot be used to assess the influence of freshwater conditions on survival to adult. The most effective way to test the impacts of environmental factors throughout the life-cycle is to utilize PIT tags and estimates of SARs.
The figure in this slide incorrectly uses a $T_0$ SAR for year 2001 of 0.14 (identical to that for in-river fish), which greatly increases the correlation between $T_0$ SARs and spill proportion. For example, including the erroneous value of 0.14 for 2001, the $T_0$ SAR correlation to the estimate of average spill used was 0.54. However, when the correct $T_0$ value of 1.28 was used, the correlation dropped to 0.29. The correlation between in-river $C_0$ SARs and the average spill value presented was 0.57, nearly double that of the $T_0$ group (when the correct 2001 value is used). Their argument is not supported by the correct data in Tuomikoski et al. (2012).

Further, using mean spill percent on an annual basis is not really informative, since it doesn’t indicate spill levels that fish actually encountered. The CSS model does not use annual average spill measures or annual SARs. The CSS model uses 2-week cohorts and incorporates spill efficiency metrics for each cohort as they out-migrate. SARs are also estimated for each 2-week cohort.
The three bullets on this slide are not true. The CSS model is based on empirical data reflecting the actual conditions that occurred, including the implementation and operation of surface passage structures and hydro-actions operations implemented by the BPA and COE through 2011. In response to specific requests from NOAA Fisheries at the 2011 CSS Workshop, the spill metric used in CSS model analysis was modified to incorporate the implementation and operation of surface passage structures at each of the projects based on available acoustic tag data. The development of the new spill metric, including methodology and supporting data, was presented to the region and the public (including representatives of the BPA and COE) at the 2013 CSS Annual review in the April 2013 meeting and in written reports (Hall and Marmorek 2013)

Contrary to the BPA, COE, and Skalski assertion, the results from the CSS model are not extrapolated beyond the range of the empirical data. The CSS model was built from empirical data under actual conditions with total dissolved gas levels as high as 128% for an individual cohort at a project, and a daily maximum TDG of 133%. Consequently, the scenarios proposed (up to 125% Gas Cap) are within the range of empirical data.
Statistical Design & Analysis
Considerations Regarding
a Proposed Spill Study

John R. Skalski
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Properties of Scientific Experiments

Fisher (1947)  
- Replication
- Randomization
- Error control
- Treatment contrasts

Cox (1958)  
- Elimination of confounding factors
- Precision
- Useful range of validity
- Simplicity
- Ability to estimate error variance
The CSS provides an experimental adaptive management framework capable of providing the region with a real opportunity to determine if SARs can be improved under the present configuration of the hydro system. In addition to measurements of SARs, the experimental adaptive management framework provided by the CSS is capable of measuring in-river survival, fish travel time, and ocean survival rates to monitor the effects of increased spill levels on both yearling Chinook and steelhead if implemented. Additional details on the analyses that have been conducted are available, and additional analyses could be provided if the CSS is requested to do so. The CSS presented a synthesis of many years of monitoring data that showed consistently low SARs in an undesirable range. There are multiple lines of evidence indicating that delayed mortality relative to passage through the hydro system contributes to these undesirable SARs. When accounting for variability in ocean conditions and flows, results from these analyses consistently indicate that increased spill levels are correlated with increased SARs. Since there are no management actions available to affect ocean conditions and limited availability to affect flow, spill remains the most useful and effective tool available to fisheries managers for increasing adult returns.

The CSS model includes a high degree of replication: 10 years, four cohorts/year, and four response variables resulting in 160 expected observations for each species (yearling Chinook and steelhead). Randomization at the individual level is accomplished through upstream releases of PIT-tagged fish, with their random entry into the 2-week cohorts. Error control will be achieved through accounting for the freshwater and ocean factors that have been shown to influence survival at each life stage. There is little harvest prior to detection at BON, where PIT-tagged adults are enumerated. Finally, the 125% TDG level has a high degree of contrast against the last 14 years of observations under the BiOp and Court Order spill levels that have been implemented.
The CSS model properly accounts for confounding factors of water transit time, seasonal effects, and ocean conditions. Each of the four response variables has a high degree of precision. The 125% TDG level provides the greatest contrast over the historical BiOp and Court Order spill levels and is expected to provide the greatest improvement in fish survival and migration rates. The CSS model accounts for all the major factors that have been shown to influence survival and migration rates. Therefore, there is no basis for increasing complexity by adding new variables.

The hypotheses that will be evaluated center on whether there is a change in the response variables relative to the time series of responses that have been measured under the historical BiOp and Court Order spill levels. In addition, responses under Experimental Spill Management will be compared to the expected responses based on the models that have been developed to determine whether they are consistent or require revision.
The 2013 CSS Workshop Report describes each of the four response variables that will be measured. This report can be found on the FPC website. Skalski does not present any data or analysis that support the conclusions in this slide. We believe Skalski is mistaken.

The Experimental Spill Management framework is capable of comparing responses under the 125% spill level to responses under the historical BiOp and Court Order spill levels. There are 14 years of observations under the historical spill operations. The models that have been developed can account for any variables that change over time. While there is some unaccounted for variability in each of the response variables, the expected magnitude of change is relatively large, which will increase the likelihood of detecting a response.
Each year the study is conducted, 16 response measurements can be collected for each species (i.e., four response variables and four cohorts per year). After 5 years there will be 80 response measurements and after 10 years there will be 160 response measurements for each species. These observations can be compared to the 14 years of observations that have been collected under the historical BiOp and Court Order spill levels that have been implemented. The Experimental Spill Management framework does not utilize abundance trends that are confounded by changes in smolt production. The SARs and other metrics that have been collected do not show strong temporal trends over the 1998–2011 time series.
The expectation under the null is that observations will match the model predictions. Models can be refined as new observations are obtained. It would also be possible to generate predictions of what would have occurred if historical spill levels had been implemented instead of the Experimental Spill Management levels.

This slide and several previous slides have comments on statistical analysis and design. However, this has very little utility within the context of the CSS data, analyses, and modeling results, that are all available to the public on the FPC website.

The CSS has already identified and fit highly accurate models for each of the response variables, and new observations will allow for future calibrations. Currently, all models perform well and are accurate.
The CSS provides an experimental adaptive management framework capable of providing the region with a real opportunity to determine if SARs can be improved under the present configuration of the hydro system. In addition to measurements of SARs, the experimental adaptive management framework provided by the CSS is capable of measuring in-river survival, fish travel time, and ocean survival rates to monitor the effects of increased spill levels on both yearling Chinook and steelhead, if implemented. Additional details on the analyses that have been conducted are available, and additional analyses could be provided if the CSS is requested to do so. The CSS is currently conducting power calculations. Under Experimental Spill Management, the current tagging levels coordinated under the CSS will be maintained. The expected changes in each of the response variables were presented at the 2013 CSS Workshop and are available in the workshop report (Hall and Marmorek 2013). Large changes in SARs are expected under the 125% spill level (possibly as much as three- to four-fold improvements).
All the points in this slide are not true. The Smolt Monitoring Program includes monitoring for changes in smolt conditions. In addition, there are triggers (originally developed by NOAA) to terminate spill based on the incidence and severity of signs of gas bubble trauma in the existing and ongoing gas bubble trauma monitoring program. The gas bubble trauma monitoring program is a requirement of the state of Oregon for any TDG waiver from current EPA 110% standard. Finally, adult upstream success is monitored in-season by the fisheries management agencies.
The CSS is capable of conducting additional analyses on the effects of various study durations. It is important to note that it takes 3 years for out-migrant smolts to return as adults. Thus, it will take a number of years for the adults to return after several years of experimental spill operations.

The CSS provides an experimental adaptive management framework capable of providing the region with a real opportunity to determine if SARs can be improved under the present configuration of the hydro system. In addition to measurements of SARs, the experimental adaptive management framework provided by the CSS is capable of measuring in-river survival, fish travel time, and ocean survival rates to monitor the effects of increased spill levels on both yearling Chinook and steelhead, if implemented. Additional details on the analyses that have been conducted are available, and additional analyses could be provided if the CSS is requested to do so.
We disagree. The best available science does not support the existing path forward. The BPA and the COE continue to ignore the growing body of science that indicates that the juvenile, at-dam, performance standard approach underestimates the actual impact of hydro project passage and ignores the relationship between freshwater passage experience and early ocean survival. The BPA and COE continue to ignore the extensive body of technical comments, reviews, and concerns with both methods and analyses relative to performance standard testing and their management application.

The BPA and COE misrepresent the CSS model, which is not based on oversimplified correlations, particularly percent spill. The BPA and COE continue to ignore recent data and analyses including the development of the model spill metric which includes the implementation and operation of surface passage structures which is based on available acoustic tag data.

The BPA and COE refer to but do not identify specific ISAB comments. The CSS oversight committee responds in writing to all ISAB comments, which is made available on the FPC website.

The outstanding science questions which remain are the basis and rationale for conducting an evaluation of higher level of spill for fish passage.
Literature Cited:


CSS Annual Review 2013 Presentations available on web at:
http://www.fpc.org/documents/CSS/Presentations%20from%20the%202013%20CSS%20Annual%20Meeting.pdf

FPC Memoranda:


Petrosky, C.E. and H.A. 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, 19(4), 520–536.


Schaller, H.A., C.E. Petrosky, and E.S. Tinus. 2014. Evaluating river management during seaward migration to recover Columbia River stream-type Chinook salmon considering the variation in marine conditions. Canadian Journal of Fisheries and Aquatic Sciences, 71.

