



## Independent Scientific Advisory Board

*for the Northwest Power and Conservation Council,  
Columbia River Basin Indian Tribes,  
and National Marine Fisheries Service  
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**Memorandum (ISAB 2012-5)**

**July 12, 2012**

**To:** ISAB Administrative Oversight Panel  
Joan Dukes, Chair, Northwest Power and Conservation Council  
Paul Lumley, Executive Director, Columbia River Inter-Tribal Fish Commission  
John Stein, Science Director, NOAA-Fisheries Northwest Fisheries Science Center

**From:** Rich Alldredge, ISAB Chair

**Subject:** Review of draft 2011 Fish Passage Center Annual Report

### Summary

The Northwest Power and Conservation Council's [2009 amendments](#) to the Columbia River Basin Fish and Wildlife Program call for a regular system of independent and timely science reviews of the [Fish Passage Center's](#) (FPC) analytical products. This regular system of reviews includes evaluations of the FPC's draft annual reports, which began two years ago with the ISAB's review of the FPC's draft 2009 Annual Report ([ISAB 2010-4](#)), followed by a review of the draft 2010 Annual Report ([ISAB 2011-2](#)). This is the ISAB's third review of FPC annual reports.

The ISAB finds the draft 2011 Annual Report informative. The organization of annual reports continues to improve. For example, the inclusion of an introductory section is a worthwhile improvement. However, as evidenced by the ISAB comments below, the ISAB's review has progressed into a detailed editorial review rather than a review of scientific issues critical to management. This is in large part due to the FPC Annual Report's intended and important purpose of telling the story of juvenile migration, river conditions, and hydrosystem operations. As such the annual reports involve more data reporting and documentation than data analysis, although some analyses are included. As noted in previous reviews, the writing quality and level of completeness at this draft stage varies across sections. Considering the progress in reporting made in the past few years, the intended content, and the draft nature of FPC annual reports, the ISAB recommends that a detailed ISAB review of the draft FPC annual reports is no longer warranted and that the ISAB review effort would be better focused on other FPC products. In the course of these three reviews, the FPC has responded positively to ISAB comments, and we anticipate they will constructively apply our comments to finalizing the 2011 report and in developing and structuring future reports.

The ISAB recommends that review of the draft Comparative Survival Study (CSS) annual report and attendance at the CSS annual workshop continue, at least through this year. The CSS report has more analyses that are suited for ISAB evaluation than does the FPC annual report. In addition to the CSS review, the ISAB is on call to evaluate technical memos and other FPC products that meet the criteria in the review guidelines for the ISAB review of FPC products. Those criteria are: new or novel analyses are introduced; new conditions or data bring old analyses into question; and/or consensus cannot be reached in the region on the science involved in the product. The ISAB looks forward to discussing the future scope of reviews with the Fish Passage Center Oversight Board.

The ISAB's comments are provided below, organized by the sections in the FPC draft annual report.

# ISAB Comments on the draft 2011 FPC Annual Report

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## General Suggestions

**Metrics and methods.** In many cases the methods for estimating various metrics, such as smolt survival and population estimates, are not described clearly, or at all. Thus, the reader cannot understand how the metrics are calculated, and therefore cannot interpret the results. A reader should be able to find a summary of these methods, at least in an Appendix, if not in the main report.

**Acronyms.** The manuscript often uses acronyms so placing the acronym list up front would be useful.

**Editing.** The document needs judicious editing because of incomplete sentences, incorrect grammar, and mistakes in referencing tables and figures. The Table of Contents incorrectly labels the Appendices.

## I. Introduction

Overall, the Introduction is an improvement to the report. It effectively describes the purpose and scope of the report, although it seems unnecessary to state that the Introduction is new as a result of an ISAB request. The Introduction also differentiates the responsibilities of the Fish Passage Center from those of the many other groups and agencies that carry out research, data analyses, and forecasting for Columbia River salmon populations. Although the Introduction briefly identifies topics that will be discussed, such as adult returns and hatchery releases, a brief summary of how the sections of the report relate to each other might improve the sense of connectivity of subsequent sections of the report. A paragraph on how past reports have been used in making decisions would be enlightening.

*Specific comments:*

1. What are “migration flows”?
2. Why is the Smolt Monitoring Program the “central component” of the report? It is certainly an important component but perhaps no more so than several other activities. The importance of the reports is its integrated analysis of the fish passage process.
3. The sentence, “The report documents prevailing management questions or events that were discussed in the subject year,” raises some issues. What are the management questions? Who discussed them and for what purpose?

*Editorial suggestions:*

- first two sentences seem unnecessary; suggest they be deleted.

- second paragraph includes some sentences that could benefit from revision.
  - 1<sup>st</sup> sentence: Suggest changing “the resulting fish passage characteristics” to “fish passage events”
  - 3<sup>rd</sup> sentence: Suggest changing “that is helpful in describing the year in terms of Columbia Basin salmon and steelhead passage through the hydrosystem” to “and context that could help to evaluate factors affecting salmon and steelhead passage through the hydrosystem”
  - 5<sup>th</sup> sentence: Suggest changing “to complete the representation of the year” to “provide a more complete record of data useful for assessing salmon and steelhead production”

## II. Water Supply

### *General Comments:*

This section provides an objective summary and includes a basic overview of water levels at key dams and discharges relevant to fish migration at important times of the year. The presentation is technically sound and provides abundant detailed data and information. The summary of information provides good context, and the comparison among years is useful. The graphics are clear and provide a useful context with flood control and BiOp-related objectives. Although this section provides much background information, it is not clear how these data are used, or if they are intended to be used in the remainder of the report. For example, some discussion of how these data relate to spill and to fish transit times would be useful. As mentioned in comments concerning the Introduction a brief transition to these important topics would be welcome.

### *Specific comments:*

1. Please identify why the January-July time period is used.
2. Please provide an explanation of the January final water supply forecast (does this mean this is a forecast for the water year that is made in January?) and the April final water supply forecast. If these are forecasts, why is this information necessary?
3. If there are data for Lower Granite and The Dalles dams for 83 years, why is the observed runoff for WY 2011 only shown in comparison to 1971-2000? What is the significance of that time period? Does it make sense to compare WY 2011 runoff with more recent years? Please consider adding WY 1971-2000 for clarity.
4. Please define “seasonal” precipitation on page 5. There is room for confusion because the dates in the parentheses are the Water Year (annual precipitation?) while the table shows months (monthly precipitation?). Which months are included in the seasons for which the statistics are given?

5. Again the time period of 1971-2000 is used in Table 2.3 – what is the significance of that time period? Why not include the entire period of record? Assuming this is WY please add “WY 1971-2000” for clarity.
6. For Table 2.4 (and accompanying text on page 6), over what years was the average calculated? Is it still the WY 1971-2000 period? If not, why is it different?
7. Are April 10th BiOp FC elevations (mentioned on p. 8) the same as April 10<sup>th</sup> BiOp elevations (shown on Fig 2.1)? Please provide a short explanation about FC and BiOp elevations. Perhaps a brief explanation can be provided here or since there is an explanation in the next chapter on Spill Management, perhaps readers can be referred to Chapter III for details.
8. What is the Spring Flow Objective period related to? What is Initial Controlled Flow (ICF)? Is it for hydropower, flood control or fish issues?
9. The last paragraph on page 8 should be clarified. It would help if one clarifying sentence or statement was made to say whether the BiOp draft limit was met. The last two sentences about Lake Roosevelt seemed unrelated to the prior part of the paragraph, but if they are related, a connecting sentence should be included to relate releases for Lake Roosevelt to the end of August BiOp.
10. Define SOR and TMT or direct the reader to Appendix L.
11. Identify what months are included in the Spring flow objective and Summer flow objective?
12. The axis labels on Figure 2.9 are very difficult to read. Consider using “outflow” in the axis label such as “Dworshak Outflow Discharge” to make the association clear.
13. In the first bullet in general conclusions, is the “average runoff between 1971 and 2000” just for the months of January to July?

*Editorial Comments:*

- Section C, some sentences should be corrected:
  - “Bold font ~~would~~ indicates”
  - “The general **shape** of runoff in the Columbia and Snake Rivers **were** similar with high flows beginning in mid-May followed”
- Several figures show elevations, not “operations.” Also it would help to define FC in the first figure caption.

## III. Spill Management

### A. Spill

#### *General comments:*

Overall, this section does a good job of documenting conditions influencing flow and spill operations at each of the lower Snake, lower Columbia, and middle Columbia dams in 2011. The introductory Overview section provides useful background information on the spill program specified by the Biological Opinion and on the dissolved gas problems produced by higher spill levels. Less appropriately, this section also attempts to explain the significance of spill for fish survival. New data are available that bear on this issue, and these data should be addressed in detail elsewhere, not in this brief introductory section. The few references cited are not well chosen. Specifically, the statement is made that:

“Additionally, recent analytical results of salmon life cycle survival indicate that spillway passage affects survival throughout the life cycle. Chinook adult returns declined with multiple passages through powerhouses at dams (Petrosky and Schaller 2011). Analyses conducted by NOAA Fisheries in the development of the Biological Opinions showed that smolt to adult return rates for Chinook and steelhead were related to arrival time at Bonneville Dam, and that multiple bypass reduced SARs (Scheurell [sic] and Zabel 2007).”

The Petrosky and Schaller 2011 reference is incorrectly cited (it was published in 2010) and incompletely cited in the following References section (the journal issue and pages are not specified). This paper describes a modeling study that did not examine the within-year effects of multiple powerhouse passage on survival; it appears to be an inappropriate citation here.

The Scheurell and Zabel 2007 reference is an unpublished NOAA Fisheries Center manuscript, but a paper with an almost identical title was subsequently published by Scheuerell, Zabel, and Sandford in 2009. This paper did not examine or address the effects of multiple bypass events on SARs.

#### *Specific comments:*

1. Actions that are implied by “action required” mentioned later should be defined on page 25.
2. Specify dates to be included in the spring and summer seasons in Table 3.1
3. Define “gas cap.”
4. Consider including the abbreviation “DWR” after Dworshak in the caption.
5. The implications about RSW in the first paragraph regarding Lower Granite Dam on p. 28 are not clear. Are the authors saying the SPE with the RSW for 24 hrs with 20 Kcfs spill is

not much different than the SPE estimated without the RSW for 12 hrs at 60 Kcfs? If so, is this a good thing?

6. For figure 3.2 – suggest adding the abbreviation “LGR” to the caption for clarity (same comment for all other dam figures in this section)
7. For Ice Harbor Dam at the top of p. 31, there is a reference to “all with RSW in place” – what does this mean? Is the RSW now in place? Is the significance of the RSW the same as what was referred to for Lower Granite Dam where the RSW was explained (including year of installation and studies of SFE)?
8. Why are Figures 3.13, 3.15, 3.17, 3.19, 3.21 not shown for other dams? They are interesting figures, but not really discussed in the text. Figures show data for 1997 but caption identifies 1998 to 2011.
9. Table 3.3 caption – suggest including definitions of the name abbreviations used in the table.
10. Figures 3.24 to 3.28: A line across the graph at the second y-axis value for “action required” for GBT (e.g., 15%) would make it easier to tell that action was required. Identify the action that is required?
11. Define terms in the figure caption such as GBT and TDGS. How is TDGS different than TDG?
12. Table 3-4: What is RIS?

## **B. Gas bubble trauma monitoring and data reporting**

### *Specific comments:*

1. Figures 3.24 through 3.28 clearly summarize the results of gas supersaturation monitoring and gas bubble trauma (GBT) monitoring during the spring and summer juvenile migration seasons in 2011.
2. A minor improvement would be to show a “0” above the baseline for dates when sampling was performed but no cases of GBT were observed.
3. Page 51, first paragraph of the discussion. In the monitoring of the total dissolved gas levels what is considered biological monitoring or physical monitoring?

### *Editorial comments:*

- Page 51, first sentence of discussion: The semi-colon should be a comma. Otherwise, the sentence is a fragment.

## IV. Smolt Monitoring

### A. Summary

*General comments:*

This section provides a good short description of flow conditions in 2011 and the survival of juvenile salmon and steelhead relative to other years. It would be very useful if a description of the methods used to calculate the various indices was provided so the reader does not have to struggle to decipher how each index is calculated and interpreted from the descriptions scattered throughout the section.

### B. Special Operations

*General comments:*

In the sections describing John Day, The Dalles, and Bonneville dams, it is unclear whether the survival rates reported are based on the acoustic tagging, or another method. The methods of capturing, tagging, and detecting these fish should be described in the text or summarized in an appendix. The meaning of “spillway effectiveness” is not defined.

### C. Overview of travel time and survival under 2010 conditions

*General comments:*

**Snake River** – The method and data for determining smolt survival should be described in the text or summarized in an appendix. Dam names are shown as acronyms, instead of spelled out, in one place.

The Annual Report does not include a Methods section so many technical terms are not defined when first introduced, and this “overview” section is separated from the graphical presentation of data on migration timing, travel times and survival later in the report. For these reasons the information presented here is laborious reading and so not as useful as it could be.

*Specific comments:*

Should the title of this section be “... under 2011 conditions”?

p. 56 – The report states, “Temperatures were cooler than average in the Snake River. So, it appears that the high survivals and shorter fish travel times observed for all spring migrants were likely due to high spill proportions and the presence of surface passage weirs at all

projects in the Snake River.” An explanation of why the conclusion in the second sentence follows from the statement in the first sentence is necessary.

## **D. Smolt monitoring sites**

### *General comments:*

The general introductory material that begins this section seems out of place here so perhaps could be deleted without harm.

This section discusses “passage indices” for the first time, without defining what they are or how they are calculated. It would seem useful to provide an introduction, methods, and results before presenting a discussion or summary of the findings, or perhaps a summary/abstract could be included at the beginning of each major chapter. Here, summaries appear throughout this section, but before the data are presented.

### *Specific comments:*

P 58-The meaning of the statement, “In addition, treating larval and juvenile lamprey as target species of the SMP allowed for the expansion of lamprey samples to an estimated collection” is not clear.

## **E. Collection Estimates, Relative Abundance, and Population Indices**

### *General comments:*

The distinctions between collection index, passage index, population index and population estimate are explained more cogently than in previous reports, but are still somewhat arcane. It would be useful to have a clear statement of the methods used to calculate each index, and what each is designed to measure. A narrative and a summary table would be useful, and could be put in an Appendix since it would be needed in each Annual Report.

An example of the confusion that could be eliminated by an effective methods section is provided on Page 60, first paragraph (incomplete one) – “The population index is then computed by dividing the daily collection by the estimated daily collection efficiency.”

1. There is no metric described previously as the “daily collection.” The “collection estimate” described above is apparently an estimate of what passes through one bypass, based on timed collections throughout the 24-hour period and expanded to the total period.
2. It is unclear whether this “collection estimate” is divided by a detection probability it would yield an estimate of the total number of fish that passed through this one bypass.

3. If the authors want to estimate the total population passing the dam would this be calculated as the “daily passage index” divided by the detection probability? Is the “daily passage index” calculated by expanding the “collection estimate” to the entire flow passing the dam?

Another example of possible confusion comes from Page 65, first sentence – “The population estimate was calculated as the total collection estimate divided by collection efficiency.” It is not clear if the “collection estimate” was only for the one bypass where fish were sampled. Here the report implies that this is a total estimate of the fish emigrating in the entire flow, which perhaps is termed the “passage index.” Again, a clear description of the methods used would reduce confusion.

*Specific comments:*

P 60, last two sentences – Is the point here that the passage index, although biased in various ways, is available for all the dams, whereas the population index is not (or the estimates available are of low precision)? Please clarify.

P 61-63 – It is surprising that no trap efficiencies are estimated for these upstream traps, based on marked fish released above the traps. Is this not a standard operating procedure for traps?

P 62, last paragraph – it appears the third sentence contradicts the first two. Also, it seems odd that the 2011 steelhead collection count of 4,071 is exactly the same as the 10-year average.

P 63, 3<sup>rd</sup> line – meaning of “not shorted the season” is not clear.

P 63, 2<sup>nd</sup> full paragraph – change “However, then” to “However, when”

P 63, second full paragraph – The discussion here of why sample totals are different seems less important than other comparisons, such as of passage index or population index values among years. Also, this is the first time the reader learns that most of the fish collected at the lower Snake River dams are transported. If a summary is given above, this seems important to describe.

p. 63, third paragraph – Reference to Appendix I appears incorrect due to mislabeling of Appendices.

P 63, last paragraph – This is the first mention of a “population estimate,” but the calculation is not described. The CJS method is not described in enough detail that a reader who is familiar with this method could understand what was done. Overall, perhaps more should be made of this CJS estimate, rather than describing the raw numbers of fish collected.

P 64 – Caption of Table 4.4 states that the “population indices” will be presented, but none are in the table. Likewise, the names used in the table (e.g., “collected”) are not the same as the metrics described in the text.

P 65 – It is unclear why the authors present two population estimates (“population estimate” vs. “population index”). Is it because the estimate based on CJS was done only at one dam?

General comment – Overall, more descriptive names could perhaps be used for these indices to allow a reader new to this system to understand their meaning more easily.

## F. Migration Timing

*Specific comments:*

Migration timing is adequately described in this section. One intriguing feature mentioned was the unusually late timing of age-0 Chinook passage at Rock Island in 2011 and the previous two years, in contrast to relatively early passage for age-0 Chinook at other sites. If the reason for this late timing is known, it would be worth a brief explanation.

P 67, first paragraph - No reason was offered for the later timing of all species at Rock Island Dam, even though reasons were offered for differences in timing at Lower Granite Dam in the previous paragraph.

P 69, first paragraph, third to last sentence – Should this read “...much **higher** than the 10-year average of 1.1%”? In the next paragraph a brief definition of “fall Chinook tules” would be useful.

## G. Travel Time and Survival Analyses

### Results of Hatchery and Trap Release.....

#### ***Snake River***

*Specific comments:*

Table 4.11 – The symbols H and W are not defined.

P 70-72: Survival estimates – A methods section or description of how these survival rates are calculated would be very helpful to allow results to be more effectively used. Are they simply fish recaptured divided by the number released? Do the estimates account for detection probabilities that are less than 1.0? If so, how? How are the confidence limits calculated?

## **Mid-Columbia**

### *Specific comments:*

P 73, first full paragraph – What statistical method was used to test relationships between fish travel time and index flows, and what groups were tested (i.e., what is the sample unit)? No results of tests are reported, nor methods described. The third to last sentence has incorrect grammar, and is actually two sentences. The dates 2007 to 2009 in the caption of Table 4.14 appear to be incorrect.

At the bottom of P 73 a significant weighted regression is reported, but it is unclear what the statistics are (0.975 is  $r^2$ , for example?). What is being correlated with what? Is annual survival the sample unit used, over 5 years? In the next section it becomes apparent that fish are released in cohorts, so perhaps each cohort is a sample unit? The final sentence of this subsection is unclear. What is related to fish survival?

## **H. Reach Survival Analysis**

### *General comments:*

It would be ideal to show a picture of a surface spill weir early in the report, for those who may not have ever seen this structure.

The graphical presentation of data in this section is quite effective.

An explanation of how these reach survival estimates are calculated would be useful. The reader must begin reading and interpreting the data without knowing how they were derived.

### *Specific comments:*

P 75 – The “relative migration rate” is not clearly defined, and the caption for the figure panel that reports this metric cannot be easily understood. The definition given on the next page is not entirely clear either. Is relative migration rate computed as the fish migration rate in km/d, divided by the water travel time in km/d?

P 80, first incomplete paragraph – relative fish travel rate (same as “relative migration rate”?) is again defined, but is again unclear. The significance value of “ $p=0.0000$ ” is unclear. Perhaps it should be  $p<0.00001$ ?

p. 83 – The sentence, “This cohort did not experience the high flows and spill that came later in the arrived later in May in the Columbia River” should be revised.

P 84, Figure 4.8A and B – the meaning of the red symbols is not defined.

p. 86, last paragraph – Revise, “Fish travel times were faster average in 2011.”

P 88, third paragraph – First sentence is a run-on sentence and needs to be rewritten. It was unclear to one reviewer how bird predation causes survival to be biased low, but perhaps this was the reviewers lack of understanding of where fish are released and detected.

The upward trend in steelhead migration rate relative to water flow over the past 13 years (Figure 4.4E) is dramatic and is explained as likely due to the installation of surface weir devices at the Snake River dams. That seems a reasonable explanation: are any alternative hypotheses also feasible? Relative migration rates for steelhead have also increased in the mainstem Columbia River in recent years (Figure 4.7 E). Can that change also be related to the installation of surface weir devices?

## **I. Overall conclusions from SMP chapter**

*Specific comments:*

This section is important and would benefit from careful editing to improve clarity.

p. 88, last paragraph – Is it only the below average spill proportions that give rise to poorer migration conditions?

## **References**

Petrosky, C.E. and H.A. Schaller. 2010. Influence of river conditions during seaward migration and ocean conditions of survival rates of Snake River Chinook salmon and steelhead. *Ecology of Freshwater Fish* 19:520-536.

Scheuerell, M.D., R.W. Zabel, and B.P. Sandford. 2009. Relating juvenile migration timing and survival to adulthood in two species of threatened Pacific salmon (*Oncorhynchus* spp.) *Journal of Applied Ecology* 46:983-990.

## **V. Adult Fish Passage**

*General comments:*

Abundance and migration timing of adults and jacks in 2011 are documented and illustrated graphically to facilitate comparison with statistics for the previous year (2010) and the 10-year average. Unusual observations that warrant further investigation are highlighted appropriately.

Tables and figures have been improved relative to previous reports and are generally useful and easy to understand.

The introduction provides some methods for counting adult salmon at dams, but they are described only briefly. Are there some references that could be added that provide additional detail on counting and estimation methods? Information on video counting methods is particularly sketchy.

The summary of how fish counts are made is very useful. It would be useful to define “direct counting” as counts made by observers at specific points in the fish ladders, the first time it is used. The description of adult runs by species and race, and maps of how many pass over each dam (and by implication, where they spawn), were also very useful.

*Specific comments:*

P. 90, Section V. title: change 2010 to 2011.

P. 90, 1st paragraph: It would be helpful to summarize the salient differences between direct and video counts. The paragraph reads awkwardly and sentences about differences in temporal coverage among agencies should be rewritten with parallel structure to improve clarity.

p. 90, 1st paragraph: Dates in text differ from dates in Table 5.1. Text: "Grand Coulee (completion by 1941)" - Table 5.1 gives completion date as 1942, and text: "Brownlee, Oxbow, and Hells Canyon (completion by 1958)" - Table 5.1 gives completion dates of 1961 for Oxbow, 1959 for Brownlee, and 1967 for Hells Canyon.

The text and Table 5.1 provides very brief information "yes" or "no" on adult fish passage facilities at Columbia River Dams. More detailed information on adult fish passage facilities or references to reports with details would be useful.

P 90-92 – The table of dams and their characteristics is very helpful. A page reference to a map showing the locations of dams would be convenient for readers.

p. 92 - The paragraph briefly describes differences in adult fish counting methods (e.g., direct counts vs. video counts). Are there differences in counts depending on methods and, if so, how are these evaluated?

P 93-94, Table 5.2 – Caption and column headings are awkward. Show full names of dams, rather than acronyms. It is unclear what “Chinook race dam” means in the caption. Likewise, “Chinook race counts” in the text is not defined. For the caption, perhaps use “Historical reporting dates for dam passage of adult salmon and steelhead.” For the column headings, perhaps use “Chinook salmon by race: Spring Chinook (SP), Summer ...” and “Other salmon and steelhead.”

Table 5.2 - In the column 3 header - steelhead is spelled wrongly.

p. 93, Table 5.2- What years are included in the "historic" reporting dates? How were the specific dates for passage of the different Chinook races determined by USACE? Why aren't passage dates for steelhead seasonal races (summer, winter) and inland summer runs (A-run, B-run) or other species in the report, i.e., sockeye, chum, pink, lamprey, listed? How are winter-run steelhead counted?

P 94, first paragraph – the term “conversion rates” is not defined.

p. 94, last paragraph: "to the Pacific Ocean, where they grow from juveniles to mature adults" - note that spring Chinook and stream-maturing (summer-run steelhead) are immature when they enter the river from the ocean.

P 95, Section B. Presumably the goal in this section is to provide information on the spawning distribution of the various categories of salmonids that are counted passing the dams. Although the background text provides useful facts on life history types, ages at migration and maturity and run timing, the facts are not easy to extract quickly. Clarity could be improved by first carefully defining the life history and run timing categories that are being counted as distinct entities. For example, how is a Summer Chinook distinguished from a Spring Chinook? How are tule fall Chinook distinguished from bright fall Chinook - by their color (as implied here) or run timing (as suggested on p 153)? If not essential to category definition, the additional information about ages at juvenile and return migration is not directly relevant here, but would still be useful to summarize (perhaps in a table) to facilitate interpretation of abundance and distribution data. For example, it would be very helpful for interpreting trends and anomalies to point out the year of ocean entry for each counted category – that is, what year the fish returning in 2011 had migrated through the hydrosystem and into the ocean.

p. 95, "Summer Chinook return to the Columbia River Basin in the fall" - correct to "in the summer" p. 95, In describing summer Chinook life history, the authors state: "The adults return later (McCann, 2012)." Please clarify, i.e., later than what? According to Galbreath (1966), summer run Chinook salmon adults return from mid-May to mid-July. There is no mention of the large overlap in run times of seasonal races in the text.

The reference to “production” (as on p. 95 “tributaries with spring Chinook production”) is vague; it is not clear whether this term refers to spawning or rearing or both.

Please use consistent spelling of “fresh water” or “freshwater”

p. 96, Fall Chinook, 1st sentence - the sentence refers to a 1992 NMFS report. Add a citation to the report.

p. 96, Coho: The two citations are inappropriate. Cone (1999) provides life history information only for Oregon coastal coho salmon. Ball (2011) is a sport-fishing forum website that provides

very brief (sometimes incorrect) descriptions of salmon life history. Some of the draft FPC report text is copied word-for-word from this website without using quotation marks: "After living in the stream for a year, they drift down to the sea where they feed for 16 to 18 months. Their age at maturity is normally three years. Some male coho attain sexual maturity at the end of their first summer in the ocean, and return to the spawning grounds as jacks" (<http://www.piscatorialpursuits.com/wafish.htm> - Coho). It doesn't inspire confidence in the contents of the rest of the report that this is where the FPC obtains information on Columbia River salmon life history, and that some of the text of the report is simply copied from the website of a sport-fishing forum. The "drift down" concept in the text from the Piscatorial Pursuits website is somewhat misleading in the context of fish passage at Columbia River dams. Juvenile life history information does not need to be provided in this section. In the sentence that follows this description, "They" seems to refer to the previous sentence that discusses jacks. For clarity, "They" should be changed to "Adult coho salmon." In several places the text refers to "turn offs" - what are "turn offs"? This section would be improved by using an authoritative source, e.g., Weitkamp et al. (1995), for Columbia River Basin coho salmon and providing information relevant to adult counts at dams (e.g., age at return, run timing, and spawning distribution information).

P. 97, Sockeye: Again, some of the text for a brief description of sockeye life history is copied from the Piscatorial Pursuits website without using quotation marks: "In their third year of age while they are at sea they begin sexual development, and between this time and their sixth year they return to their natal spawning stream. Mature four-year-old sockeye average six pounds and older age groups reach 12 pounds" (<http://www.piscatorialpursuits.com/wafish.htm> - Sockeye). The first sentence is incorrect. The start of sexual development (probably they mean sexual maturation) of Columbia River sockeye salmon at sea is not known, but clearly maturation does not begin 3 years before adults return to the river. This should be restated in terms of the range of ages at return of adult Columbia River sockeye (e.g., 3 to 6 years old; age 3 are jacks, adults are predominantly age 4). The size at age information provided in the Piscatorial Pursuits text is not specific to Columbia River sockeye salmon (includes Alaska salmon). Again, authors could rewrite this section using an authoritative source of sockeye salmon life history information specific to the Columbia River Basin, e.g., Gustafson et al. (1997), and focusing on life history information relevant to adult counts at dams.

P. 97, the short paragraph on Kokanee could be deleted, as it is not relevant to counts of anadromous adults at dams.

P. 97, last sentence under the sockeye section: "The population of sockeye within the Snake River are" - change "are" to "is" and "RedFish" should be "Redfish"  
Delete or correct reference to Ball 2011 (some of cited information is incorrect, as noted above, and the hyperlink provided is out of date).

p. 97, " Studies have shown that 61% of steelhead passing Bonneville will stage one or more times in these cooler water refuges as they migrate upstream to their spawning areas, resulting in long upstream migration timing." Add citation(s) and reference(s) to these studies.

p. 98, "Steelhead from the Columbia River Basin usually smolt after 2 years in fresh water." Note: this pertains specifically to naturally-spawning steelhead, which migrate as smolts in the spring of their third year.

p. 98, "Hatchery conditions have been shown to allow steelhead to smolt in 1 year (Busby et al, 1996)." This might be revised to state that most Columbia River hatchery steelhead are released in the spring of their second year.

p. 98, "For most steelhead populations, total age at maturity can be estimated by adding the smolt age and saltwater age." To follow the same age designation method used in previous salmon life history sections (total age at return), one year needs to be added to the smolt age + ocean age.

The inclusion of age data for regions outside the Columbia River Basin is not relevant to adult fish passage in the Basin and could be deleted, i.e.: " Southern populations in Oregon and California have higher frequencies of age-1-ocean steelhead than populations to the north, but age-2-ocean steelhead generally remains dominant (Busby et al, 1996)." Here, the ocean age designation refers to the number of winters spent in the ocean. Note that ocean age-1 is the dominant age group of A-run inland summer run steelhead in the Columbia River Basin.

p. 98, "Coastal steelhead in Washington and Oregon have an average total age at maturity of 4 years." Does this average include both summer- and winter-runs? Presumably, this last statement refers to naturally-spawning wild populations of coastal steelhead in Washington and Oregon.

P. 106, "A University of Idaho and NOAA study collected data on radio-tagged fish that allowed them to estimate harvest for the studied fish in the main stem Columbia and Snake Rivers." The reference to this study UI and NOAA (2011) links to a UI web page, but not to a published report. A more specific citation to a report or publication would be helpful.

P. 106, "They estimated that harvest for the studied fish averaged 9% for spring–summer Chinook salmon, 22% for fall Chinook salmon, and 15% for steelhead within the CRB." Over what period were these averages estimated? How much variation is there in the annual estimates?

P. 106, A statement taken from the UI website: "accurate estimates of harvest are difficult to collect and verify because unreported and illegal harvest does occur in the basin." Does this refer specifically to legal and illegal harvest of radio tagged fish in this particular study? This should be clarified, because commercial, sport, and tribal fisheries in the Columbia River Basin

are strictly regulated, and accurate harvest data for many or most fisheries are available. How big a factor is illegal harvest?

p. 106, Table 5.3 caption, change 2010 to 2011. The listed estuary and river fisheries below Bonneville Dam do not seem relevant to adult fish counts at Columbia River Basin dams.

p. 107, 2nd paragraph: "For instance, Map 5.6 shows the spatial distribution of coho" - change 5.6 to 5.4.

p. 108: lines 4-7: The comparison between Chinook and steelhead is confusing. What do the terms "a significantly high percentage" and "a significant percentage" mean and what is the point being made?

p. 108, " Figures 5.1a through 5.1e graph the 2010 water temperatures " - change 2010 to 2011

p. 108, provide some methods on how water temperatures shown in Figs 5.1a through 5.1e were measured (instrument used, time of day, water depth, etc.)

p. 109, Fig. 5.1 c, in figure caption change 2010 to 2011.

P109 – Temperatures are shown here in Fahrenheit, whereas distances described previously were reported in kilometers. Is there a reason that metric units are not used throughout? It would be useful to show the temperature threshold on Figures 5.1a through 5.1e.

p. 111, "The following were some general recommendations suggested to improve fish passage conditions follow." - delete the word "follow" at the end of the sentence.

p. 111, what is "FPOM"?

P. 112, Section E - Adult fish counts

Throughout the results, an evaluation of the statistical significance of the differences in the counts being compared would be useful. The text summarizes results shown in Tables 5.5 a-f by geographic location of groups of dams, i.e., lower to mid-Columbia (BON to MCN), Snake River (IHR to LGR) and upper Columbia (PRD to WEL). The text would be easier to follow and compare to counts for individual dams in the tables, if the first column of the table included subheadings for these groups and an additional row for each group with the group averages discussed in the text. The text in the bullets largely repeats numbers in the tables, which really isn't necessary. A simple and clear description of the major trends and whether differences between 2011 and previous years are statistically significant would more effectively convey results.

The first bullets for each species/seasonal run provides only figure and table numbers. These bullets do not report any results and could be deleted if table and figure numbers were cited in the subsequent bullets that report the results.

p. 113, Last sentence regarding Spring Chinook: It is not clear what is implied by the sentence that "...counts are determined by run schedules established by personnel at dam operating agencies." Is the point that counts for the various races of Chinook are confused because personnel use different run timing definitions or that the standard run timing definitions may not be biologically appropriate in a particular year? Truncated curves in Figures 5.2 and 5.4 do suggest that the date for distinguishing Spring and Summer Chinook runs was about 5 days late in 2010 and 2011, as well as for the 10-year average. Perhaps this truncation warrants comment or explanation.

p. 113, last bullet under Spring Chinook: "The length of 90% passage duration at Bonneville Dam (hereafter referred to as duration) of the 2011 adult spring Chinook run was significantly shorter than the duration of the 2010 run by 17 days and was shorter than the 10 year average run by 21 days (Table 5.5a)." The correct table number is 5.6a.

p. 115, Fall Chinook last bullet: "The duration of the 2011 adult fall Chinook run was longer than the length of the 2010 run by 4 days and longer than 10 year average run by 6 days." Table 5.6c shows 2011 run was longer than 2010 run by 7 days and longer than the 10-year average by 6 days.

p. 115, Tule Fall Chinook: "In the lower Columbia River, the estimated number of adult "tule" fall Chinook at Bonneville Dam in 2011 was 61,458 (Figure 5.12) with 17,058 "tules" arriving at Spring Creek NFH, located in the Bonneville Dam pool (Ahrens, 2012)

" - The correct figure number is 5.13 (p. 136). Figure 5.13 shows only the counts for Spring Creek Hatchery - so the citation of the figure should follow "Spring Creek NFH".

p. 115, Upper Bright Fall Chinook, "The bright component of the fall Chinook run are bound for Little White Salmon" - change "are" to "is"

p. 115, "The 2011 count of adult fall Chinook (Bright component) that arrived at McNary Dam (Figure 5.13)" - the correct figure number is 5.14 (p. 136)

p. 115, Coho, 2nd line: "the up mid-Columbia" - is this a typo? The comparison in the next sentence seems to be for the lower Columbia - but location is not identified.

p. 115, 2nd bullet: "at most of the remaining mid-Columbia and Snake River dams the 2011 jack counts increased on average 207% when compared to the 2010 counts (with the exception of LMN (84.5%) and LGS (74%)." - value of 74% n Table 5.5d in for LGR, not LGS.

p. 116, last bullet under coho: The first sentence of the italicized caveat seems irrelevant to coho (also for sockeye and steelhead, p. 117).

p. 117, the last two bullets in the steelhead section repeat the last two bullets of the coho section, and should be deleted. Is something missing in the steelhead section? No mention is made of the "wild" steelhead counts in Table 5.5f.

p. 118, lines 4-6: Explanation of the decline of lamprey should be supported by a reference, or else it suggests an interpretation by the FPC.

p. 118, last bullet: For context, it would be useful to add how far upstream pink salmon were detected in 2010, and in what year pink salmon were last observed at Rocky Reach Dam.

p. 118, Lamprey: "The highest recorded count at Bonneville Dam is 379,509 in 1969 (Figure 5.11)." The correct figure number is 5.12.

p. 119. The last bullet of the Pink and Chum section pertains to spawning distribution. This information could be moved to Section B.

Tables 5.5 – In general, it is best to report percentages as integers, since added decimals are rarely needed or useful when percentages are greater than about 5%.

Table 5.7, page 138: Footnotes 1, \*, and \*\* appear to be missing.

p. 139: The Conclusions section is greatly improved from the 2010 draft report. Although still somewhat redundant, it does provide a simple clear summary of the salient events. Bold font to highlight the large increase in sockeye counts in the Snake River may be seen as excessive. Perhaps it would be better to highlight this interesting fact as a separate bullet, as done for the other species.

P 138-142, Conclusions - Note comments above for some corrections to conclusions.

## **VI. Columbia River Basin Hatchery Releases**

### *General comments:*

Section VI is well written and organized. It provides a reasonably detailed review of releases of anadromous hatchery salmonids in 2011 and compares these releases with those during recent decades. The inclusion of information on the percentage of each species that is unmarked in each zone is a useful addition (the ocean research & monitoring teams should find this useful). The graphics, including the maps, were good.

There are a few inconsistencies and confusing points. It would be useful to state the issue with unmarked fish in a more consistent fashion and avoid any editorializing about the future of resolving hatchery and wild fish. Production, hatchery releases, releases, hatchery production and other terms are used in the text and table and figure headings to refer to hatchery releases. A consistent terminology would help throughout.

The trend charts in figures 6.1, 6.6, etc. provide good context about trends in hatchery release numbers. The pie diagrams in figures 6.2-6.5, etc. provide a good summary of the proportions of 2011 releases by zone and life history type, but they do not show whether these proportions are changing over time. In the spirit of facilitating comparison with the previous year and the 10-year average, perhaps a different graphical representation could be considered in future reports.

The electronic hatchery release database is a valuable tool. The FPC should consider extending release data back to the 1950s or earlier (some regions) using electronic data that are available, rather than limiting the numbers to years after 1987 (below Bonneville) or 1979 (above Bonneville). It would not take much effort to do this.

Before finalizing the report, the FPC should contact the Okanagan Nation Alliance (Canada) to request the numbers of sockeye fry and yearlings (if any) that were released in 2011 into Skaha Lake. Releases of sockeye fry have been high in recent years.

*Specific comments:*

On page 151, it is confusing to state that "this section does not include eggs, fry releases, adult releases....." then state that a brief overview of these releases is provided in Section G. Simply state that Sections B to E do not include these types of releases, but that they are described in Section G. The report should define what is meant by fry releases (not reported in initial sections) versus subyearling releases that are reported. Are releases of eggs and fry incomplete in Section G? It did not mention the egg box program in the Yankee Fork.

p. 153, 4<sup>th</sup> line under fall Chinook seems to imply that tules are all early fall run whereas brights are all late fall run. The definition should be consistent with the life history summaries in Section B of chapter V. Perhaps just insert "mostly" within the parentheses.

p. 156, 2<sup>nd</sup> sentence under sockeye: Should refer to Section G for information about fry releases.

p. 180, Mid-Columbia Zone: Canadians refer to these lakes as "Skaha Lake" and "Osoyoos Lake." It would be useful to include the actual fry release numbers.

### Editorial Comments:

P. 151 2<sup>nd</sup> paragraph last sentence could be clarified by inserting: *visibly* indistinguishable

Fig. 6.1, 6.6, 6.8, 6.9, in the heading *hatchery production* would be a more appropriate term than “production.” In the tables and figures the terminology varies about what was being released... standardization would avoid any confusion for the reader.

P. 173 4<sup>th</sup> paragraph and elsewhere “This means that distinguishing hatchery from wild .....will remain a challenge **for years to come.**” Could drop “for years to come” which is subjective, without confusing the point. In reality the time frame is finite and predictable, and the important point that wild and hatchery fish can’t be resolved needs to be stated consistently and carefully.

P. 173 last paragraph and 174 1<sup>st</sup> paragraph. The wording is confusing and a trend is not easily apparent from the table especially for the Clearwater. Also, “long volitional releases” is not a defined term and has no context. A little more detail may be needed to understand what “volitional releases” are and what “long volitional releases” are. Any trend in release date would also be much easier to see and confirm with a figure rather than a table.

P. 175 1<sup>st</sup> paragraph, last sentence: The wording “otherwise indistinguishable” is unclear. In general the problem with fish that will be difficult or impossible to distinguish from wild fish is stated in several different ways throughout the document. Suggest using “visually indistinguishable” for all the cases with fish that can’t be distinguished by external marks and “indistinguishable” for fish that are just unmarked. Other wording would be fine, but consistency would help. (see comment p 173 4<sup>th</sup> paragraph above)

P. 180 Snake River zone: the reference to “eggs and eyed eggs” is inconsistent in subsequent wording. Are these different and is there a difference in performance that is anticipated? Careful wording or additional clarification would help.

H. Conclusion. Suggest qualifying the term production consistently throughout the document... e.g., as “*hatchery production*” or “*hatchery releases*” something similar but used consistently throughout the document and the table and figure headings.

## Comments on References

Missing references in the report:

FPC, 2012 (cited on p. 111) - Reference list includes FPC, 2011, which was not cited

LCFRB 2004 (cited on p. 95)

LeFleur 2011 (cited on p. 106)

Suggested references for salmon life history cited in the ISAB review:

Galbreath, J.L. 1966. Timing of tributary races of Chinook salmon through the lower Columbia River based on analysis of tag recoveries. Oregon Fish Commission Research Briefs Volume 12, Number 1:58-80. Available from <http://ir.library.oregonstate.edu/xmlui/handle/1957/17361>.

Gustafson, R. G., T. C. Wainwright, G. A. Winans, F. W. Waknitz, L. T. Parker, R. S. Waples. 1997. Status review of sockeye salmon from Washington and Oregon. U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-NWFSC-33, 282 p. Available from <http://www.nwfsc.noaa.gov/publications/techmemos/tm33/tm33.html>.

Weitkamp, L. A., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope, R. S. Waples. 1995. Status review of coho salmon from Washington, Oregon, and California. U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-NWFSC-24, 258 p. Available from <http://www.nwfsc.noaa.gov/publications/techmemos/tm24/tm24.htm - toc>.

The reference list for section V of the report contains numerous references that were not cited in the text of the report. These should be cited in the text where appropriate or deleted from the reference list:

Fitzpatrick, Martin. 1999.

Guillen, G. 2003.

Hicks, M. 2000.

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Keefer, M. L., Caudill, C. C., Peery, C. A., and Bjornn, T.C. 2006.

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Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grand, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998.

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Naughton, George P., Caudill, Christopher C., Keffer, Matthew L., Bjornn, Theodore C., Stuehrenberg, Lowell C., and Peery, Christopher A. 2005.  
Northwest Power and Conservation Council (NPCC). 1994.  
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Paul R. Seaber, F. Paul Kapinos, and George L. Knapp. 1987.  
Scientific Review Team Independent Scientific Advisory Board (SRT). 1998.  
United States Army Corps of Engineers (USACE), Walla Walla District. 1994.