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MEMORANDUM

TO: Rich Alldredge, ISAB Vice Chair

FROM: Michele DeHart, Fish Passage Center Manager

DATE: August 21, 2012

RE: Response to "Review of FPC 2011 Annual Report to suggest analyses for further review and to provide comments to improve the Annual Report"

Following are the FPC responses to ISAB comments and recommendations on the 2011 FPC DRAFT Annual Report. The ISAB comments have been helpful in completing the annual report for 2011 and have provided helpful guidance for future reports. In the 2010 the Smolt Monitoring Program (SMP) a plan was developed to include lamprey as a target species in the SMP. The plan was implemented for the first time in 2011 and results are presented for the first time in the 2011 Annual Report. Lamprey monitoring data is available at the present time on the FPC web site. Further refinements to the Lamprey monitoring program are likely in the future.

The following is our response to each of the ISAB comments on the 2011 Annual Report. Each ISAB comment is followed by our response in bold, italic print. Once again we appreciate, the thoughtful review comments provided by the ISAB.

II. Water Supply

Specific comments:

Please identify why the January-July time period is used.

Response: *There are several time periods in which water supply forecasts and observed runoff are calculated. The January through July period is useful as it incorporates the winter period as well as the entire spring period and a portion of the summer period. Additionally, January to July runoff volumes at The Dalles and Lower Granite are available back to 1929.*

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?

Response: *The January final forecast is a water supply forecast for a specific period (i.e., January to July) at a specific location (i.e., The Dalles). The River Forecast Center issues multiple forecasts each month for each location, the Final forecast is typically the "official forecast" for a given month and include the most complete and current snowpack and precipitation information. The final (official) forecasts are used to set flood control elevations at storage reservoirs in the months of January, February, March, April, and May. Flood control elevations are recalculated each month based on the official forecast. The COE also issue forecasts at Libby and Dworshak Dam which are used to determine each reservoir flood control elevations. Aside from being used to determine April flood control elevations, the April (official) final forecasts are used to determine Biological Opinion spring flow targets at McNary Dam and Lower Granite Dam. In short, final (official) forecasts determine many operations throughout the Columbia Basin.*

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.

Response: *The significance of the 1971-2000 period can be found at the River Forecast Center website at http://www.nwrfc.noaa.gov/water_supply/ws_normals.cgi?id=TDAO3.*

According to this site:

Standards *- Every 30 years the international meteorological community comes together to produce a document that summarizes the* ***normal*** *climate for all of the nations of the world. The effort was originated by the International Meteorological Committee in 1872 as an effort to assure comparability between data collected at various stations. International agreements eventually determined that the appropriate interval for computing a normal would be 30 years. The World Meteorological Organization (WMO), which succeeded the International Meteorological Committee, defines normals as... period averages computed for a uniform and relatively long period comprising at least three consecutive 10-year periods. Normals are computed every decade by individual countries to keep up with any climatic changes that may take place, but a coordinated international effort to compile global standard normals is undertaken only once every 30 years. The National Weather Service updates these normals every 10 years. The latest global standard normals period is 1971-2000.*

Often, Water Supply, Snowpack, and Precipitation are expressed as a percent of "normal", which is currently the average of a particular variable over the 1971-2000 period. It should be pointed out that the normal period will be changing to the 30 year period between 1981-2010 possibly as soon as WY 2013. Variables as a percent of "normal" give a good indication of that

variable relative to recent conditions; whereas, the same comparison using the entire record (i.e., 83 years) would compare a variable to longer term conditions.

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?

Response: *In this case "seasonal" was meant to encompass the entire Water Year (October1-Sept30). The table includes a month-by-month break down of precipitation at the listed sites (relative to normal) as well as precipitation over the entire Water Year. The term "seasonal" has been replaced on page five with "Water Year 2011."*

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.

Response: *See answer #3. Table 2.3 displays monthly precipitation at the listed sites as well as precipitation over the entire water year; all values are expressed as percentages of normal. For example, precipitation above Grand Coulee Dam in October of 2010 was 93% of the average precipitation over October in the years 1971-2000. Precipitation above Grand Coulee Dam over all of WY 2011 was 108% of the average precipitation over the entire water years 1971-2000.*

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?

Response: *Again, the averages are calculated against "normal," which currently includes the years 1971-2000. According to notes at the bottom of each daily NRCS snow update:*

> *The SNOW WATER EQUIVALENT Percent of Average represents the snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day.*
> *Reference period for average conditions is 1971-2000.*

Are April 10th BiOp FC elevations (mentioned on p. 8) the same as April 10th 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.

Response: *All April 10 BiOp Elevations do refer to Flood Control Elevations. The Action Agencies calculate Flood Control Elevations based on Final Water Supply Forecasts. Flood Control Elevations are typically issued for the beginning of the month, mid-month, and end of the month. The April 10th BiOp Flood Control elevations are linearly interpolated between the April 1 and April 15 Flood Control Elevations calculated using the March Final Water Supply Forecast. Operators of storage reservoirs attempt to be very close to the April 10 Flood Control Elevations as reaching these elevations aid in achieving a high probability of refill by*

early July as well as ensuring that reservoirs are as high as possible on April 10th and therefore do not have to aggressively refill during the spring flow periods.

What is the Spring Flow Objective period related to? What is Initial Controlled Flow (ICF)? Is it for hydropower, flood control or fish issues?

Response: *Spring Flow Objectives are in place at McNary Dam, Priest Rapids Dam, and Lower Granite Dam. With the exception of Priest Rapids Dam, flow objectives at McNary and Lower Granite are variable and depend on April Final Water Supply Forecasts. The spring flow objective at Priest Rapids is 135 Kcfs (April 10-June 30) in all years, the McNary Flow objective (April 10-June 30) varies between 220-260 Kcfs dependent upon on the April Final Water Supply forecast at The Dalles Dam (April to August period), and the Lower Granite Flow Objective ranges between 85-100 Kcfs and is dependent upon the April Final Water Supply Forecast at Lower Granite (April to July period).*

The Initial Control Flow (ICF) is a storage reservoir refill trigger. Refill begins on the date that the forecasted unregulated flow at The Dalles reaches a computed flow called the "Initial Controlled Flow."

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.

Response: *Comment noted, added transitional sentence.*

Define SOR and TMT or direct the reader to Appendix L.

Response: *SOR: System Operation Request*
TMT: Technical Management Team

Identify what months are included in the Spring flow objective and Summer flow objective?

Response: *See previous response.*

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.

Response: *Noted, changes made.*

In the first bullet in general conclusions, is the "average runoff between 1971 and 2000" just for the months of January to July?

Response: *Yes. This has been clarified in the text.*

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.

Response: *We agree that the significance of spill for fish survival is described in detail in several published papers and reports. The intent was to introduce the reader to some of the important findings. The citation was corrected. The language was modified to specify the findings of the model analysis.*

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.

Response: *It is correct that the Scheurell and Zabel 2007 is an unpublished NOAA Fisheries Science Center manuscript. The analysis and paper were developed and provided to the region in the development of the 2008 Biological Opinion.*

Specific comments:

Actions that are implied by "action required" mentioned later should be defined on page 25.

Response: *The language was added to describe the "action required".*

Specify dates to be included in the spring and summer seasons in Table 3.1

Response: *The dates were added to the table caption.*

Define "gas cap."

Response: *The definition has been added to the Table 3.1 caption.*

Consider including the abbreviation "DWR" after Dworshak in the caption.

Response: *The abbreviation has been added.*

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?

Response: *The statement is meant to describe the change in the spill that has occurred at Lower Granite Dam. You are interpreting the statement correctly, that SPE is similar under the two operations. There is no intention to determine if that change was a "good thing" since the document does not take into consideration other factors, such as a reduction in forebay delay. It only points out that a comparison of 24 hour spill without the RSW versus 24 hour spill with the RSW has not been conducted.*

For figure 3.2 – suggest adding the abbreviation "LGR" to the caption for clarity (same comment for all other dam figures in this section)

Response: *Abbreviations have been added.*

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)?

Response: *The reference to "all with RSW in place" was meant to indicate that the studies showing a decrease in SPE associated with the implementation of the "study-like" conditions in the rolled over operation were conducted under the same configuration that existed (RSWs in place) in the 2011 migration season.*

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.

Response: *Similar figures of historic data have been added for other dams. The figures are to simply provide a historic reference for spill. The captions have been fixed.*

Table 3.3 caption – suggest including definitions of the name abbreviations used in the table.

Response: *All of the project name abbreviations used in this section is included in the list of acronyms as an appendix in the document.*

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?

Response: *The graphs were modified to include the 15% criteria. The text was modified to address the types of action that may be taken when the criteria are exceeded.*

Define terms in the figure caption such as GBT and TDGS. How is TDGS different than TDG?

Response: *The terms are defined both in the text and in the list of acronyms in the document appendix. TDG (total dissolved gas) and TDGS (total dissolved gas saturation) are used interchangeably to describe the same measurement. Technically, the saturation of gas is being measured so we have changed the text to use only TDGS.*

Table 3-4: What is RIS?

Response: *All of the project abbreviations used in this section are included in the list of acronyms (Appendix L) in the document. RIS stands for Rock Island Dam.*

B. Gas bubble trauma monitoring and data reporting

Specific comments:

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.

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.

Response: *We have tried to address this concern by adding explanations in the figure captions.*

Page 51, first paragraph of the discussion. In the monitoring of the total dissolved gas levels what is considered biological monitoring or physical monitoring?

Response: *Total dissolved gas levels are considered physical monitoring. Language has been added to the text to clarify.*

Editorial comments:

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

Response: *Correction made.*

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.

Response: *Section D has been rewritten to include a brief methods section that describes the methods used to calculate the various indices and analyses used for this section of the annual report.*

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.

Response: *These survival estimates are from the acoustic tagging studies. We have provided extra language to these sections for clarification.*

The methods of capturing, tagging, and detecting these fish should be described in the text or summarized in an appendix.

Response: *References were added to this section to better inform reader of methods. These references are: Ploskey et al 2012 and Skalski 2009.*
The meaning of "spillway effectiveness" is not defined.

Response: *The latest report on these results (Ploskey et al 2012) did not include these metrics, so they were removed and dam passage survival estimates were updated.*

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.

Response: *This section is simply an overview of the results. Methods for these analyses are provided in detail in Section D.*
Dam names are shown as acronyms, instead of spelled out, in one place.

Response: *For clarification of acronyms, we have added acronyms for each dam to the site headings in Section B.*

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.

Response: *This section is an overview of the results. Detailed methods for these analyses are now provided in detail in Section D.*

Specific comments:

Should the title of this section be "… under 2011 conditions"?

Corrected

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.

Response: *It appears that the conclusion was taken out of context. However, for clarification, the statement has been changed to: "Given the above environmental conditions, it appears that the high survivals and shorter fish travel times observed for all spring migrants were likely due to cooler temperatures, high spill proportions, and the presence of surface passage weirs at all projects in the Snake River".*

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.

Response: *We disagree that this section is out of place, as it provides an overview of the SMP for 2011. As can be seen in this section, several changes were implemented in 2011 (e.g., incorporation of lamprey as target species).*

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.

Response: *Section D has been significantly re-written. This section now provides a general overview of the SMP in 2011, as well as providing methods for the many metrics and analyses that are conducted for this chapter of the annual report. The methods for each metric/analysis are provided in easily identified sub-headings.*

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.

Response: *As mentioned above, the purpose of this section is to provide an overview of the SMP activities for 2011. This above statement is necessary in order to inform the reader as to why lamprey juveniles were made target species in 2011. Prior to 2011, collection estimates were not possible for lamprey juveniles. Section D.2 defines what collection is and how it is estimated.*

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.

Response: *We have re-written Section D to include the definitions and methods for calculating collection, passage index, population index, and population estimate to*

Section D (D.2 through D.4). We hope that this new "methods" section alleviates the confusion.

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."

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.

Response: *A "daily collection" is simply the Collection estimate, which is estimated on a daily basis.*

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.

Response: *Collection estimate is now defined in the beginning of Section D.2. The collection estimate is an estimate of the "total number of juvenile salmonids calculated to have entered the bypass at a particular dam". Dividing the daily collection estimate by a detection probability provides an estimate of the number of fish that are passing the project.*

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?

Response: *Refer to Section D.2 and D.3 for a detailed explanation of the passage index and population index. The reference provided in Section D.3 explains, in even greater detail, how the population index is estimated. Given that these data have been presented since 2007, we feel that this level of detail is no longer necessary for this report. If detail is needed, we would suggest reading the referenced memo.*

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.

Response: *For clarification, we have changed this statement to: The population estimate was calculated as the total collection estimate divided by an annual estimated detection probability.*

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.

Response: *Yes, the population index is currently available for LGR and LGS only. We have changed this statement to: "Post-season, the daily population index remains the best estimation method of fish timing for Lower Granite and Little Goose Dams and is still limited at these dams to Chinook and steelhead smolts."*

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?

Response: *Estimating trap efficiencies is a standard operating procedure at small tributary traps. When these traps were first installed, the estimation of trap efficiencies were attempted but, because of these traps are used in larger rivers, trap efficiencies were lower than 5% in most cases and estimates were too variable to be of any value.*

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.

Response: *This was a typo and the third sentence was deleted.*

P 63, 3rd line – meaning of "not shorted the season" is not clear.

Response: *This was a typo. The word "shorted" was changed to "shorten".*

P 63, 2nd full paragraph – change "However, then" to "However, when"

Response: *This was a typo. Suggested correction was made.*

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.

Response: *Comparisons of population indices are not warranted, as they are not done for all sites. It is not appropriate to compare passage indices between years, as these estimates are highly dependent on operations which vary between 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.

Response: *We have added information on transportation operations to Section B of this chapter, as well as referencing Appendix G. "Overall probability of transport during the migration*

season ranged from 36% (hatchery steelhead) to 47.5% (wild Steelhead). Details of the number and proportion of fish transported can be found in Appendix G.

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

Response*: This has been corrected to Appendix G.*

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.

Response: *We have re-written Section D to include the methods for the various metrics/analyses used in this section. Specifically, Section D.4 provides methods for estimating the "population estimate". Furthermore, Section D.5 provides an overview of how CJS methodology was used for survival estimates.*

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.

Response: *Captions have been corrected.*

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?

Response: *As stated in this section, the population index is an in-season tool, similar to the passage index, that uses predictions of daily collection efficiency based on flow and spill percentage to derive daily population estimates. The population estimate is based on the total annual collection, divided by an annual estimate of detection probability. Both are presented for informational purposes to summarize the various methods of estimating populations at the dams.*

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.

Response: *We will continue to work on better defining these indices and estimates for future reports.*

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.

Response: *We do not know what may have caused the later migration timing of subyearling Chinook at RIS in 2011 and would not want to speculate.*

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.

Response: *We do not know what may have caused the later migration timing of salmonids at RIS in 2011. We do know that a substantial number of hatchery steelhead were released earlier above Lower Granite Dam, which would be expected to have an impact on timing at LGR.*

P 69, first paragraph, third to last sentence – Should this read "…much ***higher*** than the 10-year average of 1.1%"?

Response: *This was a typo, suggested change was made.*

In the next paragraph a brief definition of "fall Chinook tules" would be useful.

Response: *We have provided clarification that "tule" releases occur in Bonneville Pool in April and May, which skews the timing of subyearling Chinook at BON to be earlier.*

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.

Response: *The symbols H and W have been defined in the header of the table.*

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?

Response: *We have re-written Section D to include the methods for the various metrics/analyses used in this section of the annual report. Specifically, Section D.5 provides an overview of how CJS methodology was used for estimation of survival*

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.

Response: *Regression analysis was used to test relationship between fish travel time and index flows. We have added language to clarify groups and sample units.*
The third to last sentence has incorrect grammar, and is actually two sentences.

Response: *This sentence has been revised.*
The dates 2007 to 2009 in the caption of Table 4.14 appear to be incorrect.

Response: *This table caption has been revised (2008-2010)..*

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?).

Response: *We think that the results, as written, are clear. Correlation (r) was 0.975 between survival (Wells Hatchery Chinook) and Priest Rapids index flows.*

What is being correlated with what?

Response: *Survival (Wells Hatchery Chinook) and Priest Rapids index flows.*
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?

Response: *Yes. Text referenced Table 4.15 in which 5 years of data were presented.*
The final sentence of this subsection is unclear. What is related to fish survival?

Response: ***This sentence has been corrected***

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.

Response: *We have re-written Section D to include the methods for the various metrics/analyses used in this section of the annual report. Specifically, Section D.5 provides an overview of how CJS methodology was used for estimation of survivals.*

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?

Response: *We have re-written Section D to include the methods for the various metrics/analyses used in this section of the annual report. Specifically, Section D.8 provides an overview of how relative migration rate was calculated.*

P 80, first incomplete paragraph – relative fish travel rate (same as "relative migration rate"?) is again defined, but is again unclear.

Response: *Relative fish travel rate was a typo and was changed to "relative migration rate".*

The significance value of "p=0.0000" is unclear. Perhaps it should be p<0.00001?

Response: *Changed to p<0.0001*

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.

Response: *This was a typo. Sentence was changed to: "This cohort did not experience the high flows and spill that came later in May in the Columbia River."*

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

Response: *This was a typo. Red symbols were removed*

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

Response: *This was a typo. Sentence was changed to: "Fish travel times were faster than average in 2011 (Figure 4.11B)".*

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.

Response: *This first sentence has been revised. The revised paragraph provided better clarity on how bird predation at the LMN outfall can bias survival estimates.*

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?

Response: *We do not have evidence to support alternative hypotheses. However, we recognize that there may be other hypotheses worthy of exploration. We revised this conclusion to add justification of this hypothesis and to include the significance of surface passage structures on FTT in the MCN to BON reach.*

I. Overall conclusions from SMP chapter

Specific comments:

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

Response: *We have revised many of the paragraphs in this section. Most significantly, we have re-written Section D to include the definitions and methods for calculating many of the metrics and analyses that are presented in this chapter of the Annual Report. It is our hope that this re-written section remedies many of the concerns that the ISAB mentioned when reviewing this chapter.*

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

Response: *Not necessarily. There are likely other factors that give rise to the poorer migration conditions. However, the latest CSS report (Tuomikoski et al. 2011) demonstrated the importance of spill in this reach. They found that "The reduction in percent spill at Wanapum and Priest Rapids dams coincided with a 12% reduction in mean survival and a doubling of the mean instantaneous mortality rate for yearling Chinook salmon (Table 3.2). The reduction in percent spill also coincided with a 4% reduction in mean survival for steelhead, although the instantaneous mortality rate remained similar (Table 3.2)."*

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.

Response: *The description of video counting and direct adult counting has been revised to include additional detail; references for adult counting methods and reference to the US Army Corps of Engineers Annual Fish Passage Reports have been included.*

Specific comments:

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

Response: *Corrected*

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.

Response: *The language has been modified to clarify the differences between video counting and direct counting.*

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.

Response: *Typographical errors in text have been corrected.*

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.

Response: *An appendix has been added to the report which includes a schematic of each project showing the location of adult fishways and fishway entrances. In addition a map of locations of projects has been included in the Appendix.*

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.

Response: *Reference to the map showing the locations of dams has been added.*

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?

Response: *There are differences in methods. The US Army Corps of Engineers and the Public Utility Districts are responsible for fish counting and evaluating count methodologies. The USACOE implements a coordination process through the Fish Passage Operations and Maintenance Committee which considers adult fish counts and fish facilities operations. In addition through the Federal Biological Opinion consultation process, NOAA Fisheries may recommend operations and counting schedules and procedures.*

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."

Response: *Captions and table headings have been revised as suggested.*

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

Response: *Correction has been made.*

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?

Response: *All years in which counts occurred beginning with the project operation are reported in the historic counting dates. For example for Bonneville Dam the counts are reported for 1938 through the present. Steelhead are counted throughout the year when they pass each project. Winter steelhead are counted from January 1 through March 31. Most Winter steelhead population groups return to tributaries below Bonneville Dam. The general dates of January 1 through March 31 are considered winter steelhead passage at Bonneville Dam. These Winter steelhead return to the Hood River. Summer steelhead returns occur throughout the Columbia and Snake Rivers and their return spans over two calendar years of dam counts with some summer steelhead that enter the River later in the year, overwintering in the reservoirs and completing their upstream migration the following spring. The USACOE Annual Fish Passage Report (2011) identifies general dates of adult passage for A-run and B-run steelhead at Bonneville Dam. The USACOE (Fish Passage Report, 2011) identifies A-run steelhead timing at Bonneville Dam as January 1 through August 25 and B-run steelhead return timing at Bonneville Dam as August 26 through December 31. The USACOE Annual Fish Passage Plan*

for 2011 identifies the passage period of Winter Steelhead at Bonneville Dam as November 16 through March 31 and Summer Steelhead timing at Bonneville Dam as April 1 through November 15.The references or basis for the determination of these specific passage periods is not provided in the USACOE reports. These dates were established by the region as a practical convention and do not represent exact run timing. There is regional recognition that run timing varies and that there is significant overlap between the periods of peak passage.

All species are counted in the same manner utilizing either direct or video counting methods. Table 5.2 reports counting dates, when the actual activity of counting is taking place not specific run timing. Run timing is reported in Tables 5.6 a-e and Figures 5.2 through 5.11.

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

Response: *The definition of conversion rate has been included in the text.*

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.

Response: *The language has been clarified.*

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.

Response: *All of the text in Section B has been deleted, and summarized in table form consistent with ISAB comments, regarding the difficulty of extracting specific information from text. The purpose of section B is to generally describe the different life histories of each species returning to the Columbia River above Bonneville Dam. The descriptions of life histories are based upon the NOAA Fisheries Technical Papers developed in conjunction with the ESA listings.*
We will investigate the potential for presenting adult returns, in terms of outmigration year in the 2013 Annual Report. There is inadequate time to complete this exercise for this years report.

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.

Response: *We have added language explaining the variable overlap in timing of races of Chinook, between peak passage periods. We have also included language explaining that count dates for races of Chinook are established by convention and are not exact. We have also added language explaining that PIT tags and DNA tissue sampling as well as other tags and marks are used to identify the specific raceof an adult return.*

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.

Response: *The language refers to both spawning and hatchery production. Language has been revised to clarify.*

Please us consistent spelling of "fresh water" or "freshwater"

Response: *Language has been modified as suggested.*

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

Response: *The language has been changed as suggested to simplify the text and to make information more accessible the generalized life history information has been condensed into a table form in Table 5.4. The information is summarized from the NOAA Fisheries Technical Papers Background and History for each Species prepared by the NOAA Fisheries Biological Recovery Teams.*

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).

Response: *The reference has been eliminated. The language has been changed as suggested to simplify the text and to make information more accessible the generalized life history information has been condensed into a table form in Table 5.4. The information is summarized from the NOAA Fisheries Technical Papers Background and History for each Species prepared by the NOAA Fisheries Biological Recovery Teams.*

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.

Response: *The reference has been eliminated. The language has been changed as suggested to simplify the text and to make information more accessible the generalized life history information has been condensed into a table form in Table 5.4. The information is summarized from the NOAA Fisheries Technical Papers Background and History for each Species prepared by the NOAA Fisheries Biological Recovery Teams.*

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

Response: *Kokanee have been deleted from the report.*

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).

Response: *Language has been modified as suggested. Life history summaries are those provided by the NOAA Fisheries Technical papers developed by the Biological Recovery Teams.*

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.

Response: *In response to earlier ISAB comments all of the text in section B has been deleted and replaced with a table displaying the general life history of Columbia River stocks. The intent of section B was not to provide exhaustive review of life histories but rather a summary of life cycle periods of stocks.*

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.

Response: *Clarification language has been added.*

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.

Response: *Language has been modified as suggested.*

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 in 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.

Response: *References to stocks originating outside the Columbia basin has been deleted as suggested.*

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.

Response: *References to coastal steelhead stocks have been deleted, consistent with the previous comment.*

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.

Response: *This section has been updated to include the fact that harvest of Columbia River salmon and steelhead stocks is implemented under the auspices of the NOAA Fisheries Harvest*

biological Opinion and the US v. Oregon federal court supervised process (Impacts of US v OR Fisheries in the Columbia Rivers in years 2008-2017). The reference to the UI study is not relevant to management in this process and so was eliminated from the discussion.

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?

Response: *This section has been updated to reflect the fact that harvest of Columbia River salmon and steelhead stocks is implemented under the auspices of the NOAA Fisheries Harvest biological Opinion and the US v. Oregon federal court supervised process (Impacts of US v OR Fisheries in the Columbia Rivers in years 2008-2017).*

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?

Response: *This section has been updated to include the fact that harvest of Columbia River salmon and steelhead stocks is implemented under the auspices of the NOAA Fisheries Harvest biological Opinion and the US v. Oregon federal court supervised process (Impacts of US v OR Fisheries in the Columbia Rivers in years 2008-2017).*

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.

Response: *Sport and commercial harvests below Bonneville Dam affect the number of adult fish that arrive at Bonneville Dam and pass through the FCRPS. Sport and Commercial fisheries below Bonneville Dam harvest some proportion of adult salmon returning to areas above Bonneville Dam. The lower Columbia fisheries are also managed under the auspices of the US v Oregon NOAA Fisheries Biological Opinion for harvest (Impacts*

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

Response: *Map references have been corrected*

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?

Response: *This section has been revised to address the comment.*

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

Response: *Corrected*

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.)

Response: *Language has been added as suggested.*

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

Response: *Corrected*

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.

Response: *Temperature is reported here as it is reported by the originating agency responsible for collection of temperature data. This report follows the conventions established by the agency originally collecting and reporting the data.*

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.

Response: *Language has been modified as suggested.*

p. 111, what is "FPOM"?

Response: *The language has been modified to define FPOM, the Corps of Engineers Fish Passage Operation and Maintenance Committee. This committee is tasked with oversight and coordination of facilities operation and maintenance.*

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.

Response: *The application of statistical significance to fish counts is inappropriate here, as we are not conducting hypothesis testing with the count data. The dam counts are simply counts, and do not incorporate estimates of uncertainty or error bounds on each daily count. The differences in counts among years simply reflect changes in counts among years, and are not appropriate for conducting hypothesis testing for causal effects or hypothesis testing for trends. There is no attempt to analyze fish counts relative to any causal effect in this annual report. The report is only reporting the actual counts and displaying those counts against the Ten-year average counts to reflect relative changes, not statistical changes or their causes.*

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.

Response: *Language has been modified as suggested.*

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.

Response: *Clarifying language has been added to caution that comparison of duration of passage of spring, summer and fall Chinook is based upon the regional convention of cut-off dates for each race of Chinook at hydroelectric projects. In reality there is variable overlap between peak passage periods of each race of Chinook so this should be kept in mind in consideration of passage durations of each race of Chinook.*

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.

Response: *Corrected.*

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.

Response: *Corrected.*

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)

Response: *The language has been modified as suggested.*

" - 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".

Response: *Corrected.*

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

Response: *Corrected.*

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)

Response: *Corrected.*

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.

Response: *Corrected.*

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.

Response: *Corrected.*

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

Response: *Corrected.*

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.

Response: *Corrected.*

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.

Response: *Brostrom et al. 2010 is referenced to language regarding decline of lamprey and causes of decline.*

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.

Response: *Language has been revised as suggested.*

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.

Response: *Corrected.*

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

Response: *Chum and Pink Salmon have been added to the Table that has replaced 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%.

Response: *Noted and modified as suggested.*

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

Response: *Corrected.*

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.

Response: *Modified as suggested.*

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

Response: *Noted.*

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.

Response: *The FPC received these data from the Okanagan Nation Alliance after the Draft Report was posted for review. These data have been incorporated into the final report.*

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.

Response: *FPC staff inserted clarification that sections B through F do not include egg, fry, or adult releases, but that section G does. FPC staff also inserted language stating that the designation of an egg, fry, or adult release is typically left to the releasing agency and the FPC follows this designation when entering data into the hatchery release database. According to release data obtained from IDFG, we are unaware of any egg box releases made in 2011 to the Yankee Fork.*

p. 153, 4th 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.

Response: *As suggested, FPC staff added the work "mostly" within the parentheses.*

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

Response: *Added sentence: For information on releases of sockeye fry, eggs, and/or adults in 2011, see Section G.*

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.

Response: *The FPC received these data from the Okanagan Nation Alliance after the Draft Report was posted for review. These data have been incorporated into the final report.*

Editorial Comments:

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

Response: *Corrected, as suggested.*

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.

Response: *Changed heading in figures 6.1, 6.6, 6.8, and 6.9 to "Hatchery release totals…" Also changed heading in Tables 6-2, 6-4, 6-6, and 6-9 to "Hatchery release totals for the ...". Headings of tables and figures are more consistently worded.*

P. 173 4th 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.

Response: *Removed "for years to come" from statements throughout document.*

P. 173 last paragraph and 174 1st 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.

Response: *For the 2011 Draft, the FPC staff reorganized this table, in order to conserve space. However, the newly reorganized table made some of these patterns less obvious. Per the ISAB comments, the FPC staff has gone back to the older version of this table, which makes the patterns referenced in the text easier to follow. The FPC staff has also defined the term "volitional" and provided additional context for this discussion.*

P. 175 1st 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 4th paragraph above)

Response: *Added "visually" throughout document for clarification.*

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.

Response: *In this instance, IDFG identified the 2011 sockeye egg releases as being "eyed-eggs". However, to eliminate confusion, the FPC has removed the term "eyed", as we are unaware of any expected differences in performance.*

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.

Response: *Have made an effort to more consistently use the term "hatchery releases" throughout document.*