

**Response to Comments on the
2013 FCRPS Comprehensive Evaluation and
2014-2018 FCRPS Implementation Plan**

Bonneville Power Administration

U.S. Bureau of Reclamation

U.S. Army Corps of Engineers

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General

This document summarizes comments received and responds to those comments on the 2013 Draft FCRPS Comprehensive Evaluation (CE) and the 2014-2018 Draft FCRPS Implementation Plan (IP). While the Action Agencies reviewed all of the comments submitted and considered all of the submissions, many of the comments were general in nature or duplicated other comments. These generalized comments do not lend themselves to a specific response, but were nevertheless considered.

Note - The “Action Agencies” refers to the Bonneville Power Administration (BPA), U.S. Army Corps of Engineers (the Corps), and U.S. Bureau of Reclamation (Reclamation).

Issue 1: General

Comment A: Based on the CE the BiOp’s all-H approach is demonstrating positive progress by addressing factors including hydro impacts and habitat improvements in the tributaries and estuary while also recognizing authorized uses of the system. A pause in litigation allowed the Action Agencies and others to make more progress by focusing time and resources in the field (PNWA).

Response A: While the FCRPS is responsible for impacts of the hydrosystem, the Action Agencies agree that the All-H approach is central to the success of the BiOp because it uses the best available science to address factors affecting salmon and steelhead across freshwater life stages. The integrated FCRPS All-H management of salmon and steelhead describes coordinated decision-making across the Hs--hatcheries, habitat, hydro, harvest and predation -- using a holistic approach to meet biological opinion goals, standards and targets. As one commenter noted, all the Hs contributed to the decline of salmon and only an All-H approach will effectively address problems while maintaining the support of ratepayers and taxpayers who fund improvements. The Action Agencies have consistently sought to focus their time and resources on positive actions and improvements that benefit listed fish throughout the region.

Comment B: The benefits of the AMIP show that its addition to the BiOp was worthwhile and should continue to provide benefits. (IPNG) The AMIP worked as planned. (CRTA)

Response B: The AMIP was incorporated into the 2013 BiOp and will remain in effect for the remainder of the BiOp period.

Comment C: The CE should recognize the massive expenditures by northwest utility customers in support of BiOp implementation. The BiOp’s costs are unmatched in magnitude anywhere in the country. (NWRP)

The CE also needs to recognize the massive financial contribution being made by Northwest families and businesses to implement the BiOp to provide a complete picture of this remarkable effort. (NWRP)

Along with IPNG support for the growth in habitat projects, we think that the CE would be strengthened if it presented effectively the total capital costs of hydro system improvements during the period of this BiOp. (We also would favor at least a footnote describing what longer term financial commitments were made by ratepayers and from appropriated funds to improve fish passage at the FCRPS dams.) (IPNG)

Response C: As pointed out by these comments, the Action Agencies have spent significant dollars on All-H improvements to benefit listed fish. While spending is not a reporting metric under the BiOp, the Action Agencies regularly, and will continue to, cite ratepayer and taxpayers contributions in places such as the Citizen's Guide to the Comprehensive Evaluation.

Comment D: The CE should recognize that the Columbia Basin Fish Accords diverted funds to remove plaintiffs from BiOp litigation and stifle the work and dissent of biologists. The discussion in the CE of collaborative relationships is misleading because the Fish Accords are actually "hush money" and "bribes." (Pace)

Response D: The Action Agencies disagree with the commenter's characterization of the Fish Accords. The parties to the Fish Accords agree that the Accords provided important long-term commitments of funding for BiOp actions that help protect Northwest salmon and steelhead. The solid commitments of funding have improved the efficiency and effectiveness of work under the BiOp and provide a degree of assurance for implementation of habitat actions. The collaborative relationships that have arisen from the Fish Accords have provided an effective means for robust discussions among biologists and other scientists concerning the implementation of BiOp actions; such scientific dialogue remains central to the research-driven, collaborative approach of the BiOp. For example, biologists and other local watershed experts make up the series of expert panels that assess the effectiveness of habitat improvement projects funded by the Action Agencies, many of them through the Fish Accords.

Comment E: The commenter questions the value of diverting funds and staff from work to meet BiOp targets to instead prepare a dam breaching Plan of Study. (PNWA, IPNG)

Response E: As the commenters note, the Plan of Study was a required element of the AMIP. The Corps of Engineers completed and released the Plan of Study in March 2010.

Comment F: The real problem facing salmon is in the ocean. Habitat and dam improvements will not improve salmon numbers without reducing fishing impacts and improving feeding grounds. (Kinzer)

Response F: Ocean conditions do contribute to variations in salmon abundance, and the FCRPS RPA focuses on improving survival across freshwater life stages within the scope of this consultation. The Action Agencies believe that dam improvements and habitat protection and restoration actions, in conjunction with the myriad of other RPA actions being implemented, can improve and has improved the status of listed salmon and steelhead stocks in the Columbia River Basin. These improvements will in turn allow healthier stocks of fish to benefit from favorable ocean conditions when they occur. Other biological opinions address the effects associated with other Federal actions, such as the *US v Oregon Harvest* BiOp.

Comment G: The IP should commit the Action Agencies to developing an explicit decision framework for contingency planning with triggers tied to performance expectations of the BiOp. (OR)

Response G: The comprehensive evaluations required by the BiOp assess whether the RPA is providing the anticipated biological benefits and prompt additional action if it is not. In addition, the Adaptive Management Implementation Plan outlines a contingency framework on page 15. This includes triggers linked to the status of the fish and an enhanced contingency process designed to provide an additional safety net, as presented in the Action Agencies' Rapid Response and Long Term Contingency Plan.

Comment H: The CE does not demonstrate whether the RPA is being implemented as planned or is providing the anticipated benefits, nor what steps the Action Agencies are taking to address any shortfall (SOWSC).

Response H: The Draft CE includes detailed descriptions of the Action Agencies' progress under each of the 73 RPA actions. Section 2 provides the greatest level of detail for each of the RPA actions and includes narrative explanations, tables and charts. For example, the CE, Section 2, Table 35, columns 6 and 7 report Habitat Quality Improvements achieved through 2009 and 2011, while columns 4 and 5 report the respective planned metrics. These are the same metrics (combined with hydrosystem, hatchery, and other habitat, harvest, and predator control benefits) used in the ESU/DPS level analysis in the 2008 BiOp.

The CE does specify where additional steps by the Action Agencies are needed to achieve full targets under the RPA. For example, the CE states that additional tributary habitat improvements will be necessary to meet Habitat Quality Improvement targets for certain populations under RPA Action 35 (see Appendix A of the CE). The IP contains additional details on the 2014-2018 tributary habitat project list.

Comment I: The CE is well written and organized and demonstrates progress in BiOp implementation. This helps to communicate the huge amount of work that is being undertaken in implementing the 2008/2010 BiOp by the federal Action Agencies in collaboration with states, tribes, local communities and other parties, and the numerous positive results being seen halfway through its implementation. (NWRP, CRTA)

Response I: The Action Agencies appreciate the recognition of their collaborative work with states, tribes and local organizations throughout the Columbia River Basin.

Comment J: Performance standards for juvenile passage at FCRPS are insufficient because they do not account for impacts of the FCRPS on other parts of the salmon and steelhead life cycle and lack appropriate interim benchmarks. (OR, SOWSC, Levy)

Response J: These comments are outside the scope of the CE, which reports on progress toward meeting the standards and requirements in the Biological Opinion, and the Implementation Plan, which outlines Action Agency plans for implementing the BiOp. Because the commenters take issue with the performance standards established in the BiOp itself, their comments would be more appropriately focused on the draft BiOp. The Action Agencies are required to meet the BiOp criteria, but the Action Agencies note that in addition to juvenile dam passage performance standards, the BiOp does include an in-

river survival performance metric that assesses overall juvenile in-river survival against the estimates provided by NOAA's COMPASS model.

While some commenters suggest the use of smolt-to-adult returns (SARs) to measure passage improvements in the hydro system, the Action Agencies do not agree. SARs reflect many other factors that are outside the control of the hydro system such as ocean conditions that exert greater influence over salmon returns. In addition, SARs do not account for the All-H mitigation approach taken under the BiOp, by not reflecting the habitat improvement in the natal streams where these salmon spawn and rear.

Comment K: The CE should explain the selection of time periods used to assess trends. In many cases they seem to be selected to portray positive benefits or improving conditions. (Oregon)

Response K: The time period for abundance trends was the same period used for the FCRPS BiOp short term trend. Additional clarification was added as a footnote in the CE to explain the rationale for the time periods that were selected for abundance trends and comparisons between time periods.

Comment L: Research, monitoring and evaluation should focus on measurable actions with a strong science basis and RME activities without measurable benefits should be reduced or eliminated. (NRU)

Response L: The RM&E outlined by RPA actions have a strong science basis. RM&E proposed and funded in support of the BiOp is reviewed by the Northwest Power and Conservation Council's (NPCC) Independent Scientific Review Panel (ISRP) and Independent Scientific Advisory Board (ISAB) to ensure best practices are used. The Corps' Anadromous Fish Evaluation Program (AFEP) includes the design and construction of configuration improvements made at Corps dams to improve the survival of juvenile and adult salmon. The AFEP also consists of research and monitoring efforts to evaluate the effectiveness of completed actions. Regional sovereigns provide recommendations on configuration designs through the Fish Facility Design Review Work Group (FFDRWG) and on research and monitoring study designs through the Studies Review Work Group (SRWG) to ensure projects that will have a measurable benefit to salmon are prioritized accordingly. In addition, BPA has developed tools to document the high quality science processes through the public website monitoringresource.org.

Comment M: It is disconcerting that the primary tool for tracking effectiveness of BiOp actions via periodic check-in reports is under discussion (p. 5). This requirement should be maintained.

Response M: The Action Agencies will continue to report on implementation as called for in the BiOp.

Comment N: "...neither the Army Corps of Engineers nor the Bureau of Reclamation nor Bonneville Power Administration intend to comply with the August 2011 court order that dam removal, additional flow augmentation, reservoir modifications or other "more aggressive" actions to improve life cycle survival and reduce destruction and adverse modification of critical habitat for listed species as part of the portfolio of actions NOAA Fisheries will evaluate between now and January 1, 2014, when it must issue a new biological opinion for configuration and operation of the Federal Columbia River Power

System and the federally-owned and operated reservoirs in the upper Snake River basin.” (Pace)

The Action Agencies have not complied with the Court’s order to consider more aggressive actions such as dam removal, reservoir modifications, and additional sources of water supply for flow augmentation and spill. (Pace)

Response N: In *National Wildlife Federation v. National Marine Fisheries Service*, 829 F.Supp.2d 1117 (D. Or. 2011), the Court’s opinion (in contrast with the Court’s order, *id.* At 1131-1132) directed NOAA to prepare a biological opinion that “consider(s) whether more aggressive action, such as dam removal and/or additional flow augmentation and reservoir modifications are necessary to avoid jeopardy” *id.* at 1130. In satisfaction of the court remand order, NOAA is in the process of developing a supplemental BiOp that will determine whether the existing 2008/2010 RPA is likely to avoid jeopardy to the listed species and adverse modification to their designated critical habitat or, alternatively, whether a new RPA with additional, “more aggressive action” is necessary. The Action Agencies’ CE and IP, which report on current RPA Action implementation progress and plans, are not the appropriate vehicles for documenting NOAA’s findings and conclusions with respect to its jeopardy and adverse modification determinations.

Comment O: “Unless I have misread all that I have read, a critical flaw reveals itself in the salmon plan. A long-term performance target is set as "an expected increase in total juvenile system survival associated with the Hydrosystem Action" using the COMPASS model. Then annually, the COMPASS model is recalibrated with "the most recent years' empirical survival data." Okay. So then what? I mean, if the long-term performance target is not met by the year 2018, what then is to occur? Is any further action triggered? Do contingency actions move forward?” (Levy)

Response O: The Biological Opinion (in contrast to a salmon recovery plan) includes performance standards that the Action Agencies are to accomplish by 2018 to meet their ESA responsibilities under Section 7(a)(2) to avoid the likelihood of jeopardizing the ESA-listed species affected by the operation of the FCRPS projects. The Action Agencies are on track to meet, or have met, the BiOp juvenile dam passage performance standards of 96 percent for spring migrants and 93 percent for summer migrants. In addition, the BiOp includes juvenile in-river reach survival targets that are evaluated annually and are also reported to be on track to meet the BiOp targets. If the Action Agencies encounter unanticipated issues and are behind schedule for meeting juvenile dam passage performance standards, then the Action Agencies will work with NOAA and other sovereign parties to adjust actions through adaptive management to get back on track. In the unlikely event that NOAA’s analysis concludes that the Action Agencies are no longer avoiding jeopardy or adverse modification to critical habitat, then the Action Agencies will reinstate consultation.

The AMIP contingency actions are triggered by different criteria related to an unanticipated significant decline in fish abundance and are distinct from the Action Agencies’ responsibility to meet juvenile dam passage survival performance standards.

Comment P: "Of course, the RPA from the 2008/2010 BiOp addresses only the harm calculated based on a jeopardy standard and analysis that is itself contrary to law. The CE does nothing to alter this illegal "trending towards recovery" jeopardy standard. (SOWSC)

Response P: This comment is outside the scope of the CE, which reports on progress toward meeting the standards and requirements in the Biological Opinion, and the Implementation Plan, which outlines Action Agency plans for implementing the BiOp.

Issue 2: Fish Status

Comment A: The CE should conduct a population-specific status analysis that empirically demonstrates sufficient improvements in the survival and potential for recovery of affected populations. It should evaluate the population metrics that were used to assess jeopardy in the Biological Opinion (productivity (R/S), population-specific trends ("BRT" trend metric), lambda, and probability of quasi-extinction). The report should be able to demonstrate whether or not the "gaps" in the Biological Opinion are being "closed" as a result of the actions taken. (OR, NPT, SOWSC)

Response A: The FCRPS RPA Action 3 calls for the Action Agencies, in the CE, to "describe the status of the physical and biological factors identified in [the] RPA" and compare them "with the expectations in the survival improvements identified in the Comprehensive Analysis or Supplemental Comprehensive Analysis." In compliance with this RPA Action, the CE examines the estimated lifestage survival improvements achieved in each of the Hs and compares those achievements with the improvements expected under the RPA. In some of the H areas, such as tributary habitat, where population-level analysis is called for in specific RPA Actions, the CE examines specific lifestage survival improvements at the population level. See, for example, Table 35 in Section 2 of the CE, which displays the habitat quality improvements achieved to date. See also Figure 17 in Section 1 of the CE, which compares the COMPASS model predicted survivals (upon which the BiOp's survival estimates were based) with actual PIT-tag estimated survival.

Ultimately, however, the jeopardy and adverse modification determinations, *i.e.*, conclusions as to the likelihood of survival and recovery, are made at the ESU level.

Comment B: "...the action agencies never acknowledge or address the fact that the very significant population-by-population survival increases predicted in NOAA's jeopardy analysis apparently have not materialized....As the most recent CSS analysis of SARs reveals, these survival improvements simply have not materialized." (SOWSC)

Response B: With respect to the survival increases projected in NOAA's jeopardy analysis, it is simply too early to assess the precise survival increases resulting from the Action Agencies' implementation of the RPA under the 2008 BiOp. For most populations, the most recent available adult return data end with the 2011 or 2012 return year. Implementation under this BiOp began in 2008. The salmon's lifecycle is 4-5 years in length. So the data that would support the analysis suggested by the commenter do not exist since we do not have data reflecting even one complete lifecycle under this BiOp. And given the extreme variability typically seen in salmon population dynamics, one complete lifecycle is probably not enough to evaluate the effects of BiOp implementation accurately.

The commenter also confuses the lifecycle metrics used in the BiOp (recruit-per-spawner productivity, for example) with smolt-to-adult returns (SARs). SARs are smolt-to-adult ratios representing the number of adult fish returning for each smolt (juvenile) that migrates downriver to the ocean, which is a measure of survival from the smolt lifestage to the adult lifestage. SARs are calculated by comparing the number of outbound juveniles past a dam to the number of returning adults that pass the same dam (or a lower dam depending on whether the SAR is intended to capture adult mortality through the system) and are expressed as percentages. SARs are strongly influenced by ocean conditions over which the Action Agencies have no control and do not capture or reflect any of the survival improvements resulting from the Action Agencies' extensive program of habitat improvement in the natal streams where these salmon spawn and rear. Therefore, they are not a useful gauge of the effects of the all-H mitigation approach taken under this BiOp.

Hydro

Issue 3: Spill

Comment A: Three commenters suggested that spill should be increased to benefit fish and recommended an experimental spill management program to test spilling all of the eight lower Snake River and lower Columbia River projects to the 125% TDG gas cap during the spring and increasing spill at several projects in the summer. These commenters suggest that current science demonstrates increasing spill will result in juvenile survival and adult return benefits. These commenters also criticized the CE and IP for failing to mention analyses which show that flow and spill are key variables, in addition to ocean conditions, that predict smolt-to-adult returns and first year ocean survival. (SOWSC, OR, NPT)

Response A: The IP outlines specific actions to implement the BiOp RPA from 2014 through 2018. Regarding spill, the BiOp sets forth a hydro strategy that combines the use of flow and spill operations and specific configuration improvements (providing surface passage to reduce migration delay and other improvements to increase survival) made at individual projects to improve the overall survival of juvenile fish passing through the hydrosystem. The Action Agencies, with the support of most Northwest states and tribes, are now halfway through the 10-year term of the current Biological Opinion for the FCRPS. Proposals to substantially increase spill would disrupt the improvements currently underway, undermine the careful testing and adjustment of spill to meet the performance standards and could in some instances cause harm by reducing fish survival. The Action Agencies have developed the IP to implement the BiOp's hydro strategy by systematically completing configuration actions and testing specific spill operations under varying flow conditions. As reported in the CE Section 1 (with additional details in section 2), testing shows that the projects are on track to meet the juvenile dam passage survival performance standards of 96 and 93 percent for spring and summer juvenile migrants respectively. The Action Agencies also evaluate juvenile in-river survival performance metrics and juvenile system survival performance targets annually to help confirm survival improvements are occurring as more actions are implemented.

The commenters' suggestion that spilling more water at dams is all that is really needed to protect juvenile fish passing the dams is not supported by data from past studies of juvenile fish passage and survival at dams. Years of spill evaluation have shown that each dam is unique and that spill operations need to be tailored to each project's configuration to facilitate safe downstream passage of juvenile salmon, while not delaying upstream adult salmon passage.

Significantly increasing spill could have deleterious effects on both juvenile and adult salmon. Higher spill levels than those currently implemented will:

- Divert juvenile fish away from passage routes with higher survival.
- Create hydraulic conditions at the dams that may cause passage delays for adult and juvenile fish.
- Increase adult fallback.
- Increase total dissolved gas that may be harmful to salmon and other aquatic organisms.

The Corps has made substantial passage improvements to all passage routes at the dams, including improvements to turbines, screened bypasses, and surface passage systems. These passage improvements, coupled with tailored spill operations at each project, have been designed, tested, and implemented to meet the BiOp juvenile dam passage survival performance standards of 96% for spring migrants and 93% for summer migrants. Results of the testing to date indicate surface passage systems make spill more effective by passing more fish with a given volume of water. Additionally, surface passage systems allow fish to pass near the surface of the river where they naturally migrate, thereby reducing passage delay. Increasing spill levels at dams above those currently implemented will also divert juvenile fish away from surface passage routes, thereby reducing their overall dam passage survival, since fish that pass through conventional spillways often have lower survival than fish that pass through surface passage routes, as shown in the graphic figures in CE section 2, RPA actions 18-24.

Increased levels of spill at some dams create unbalanced tailrace hydraulic conditions which can delay downstream egress of juvenile fish once they pass a project and can increase predation by avian and piscivorous predators. Furthermore, increasing spill at some dams has been shown to alter flow patterns near ladder entrances and delay, or in some cases block, upstream adult passage. Increased levels of spill also increase the potential for adult fish to "fallback" through the dam's spillway once they have successfully ascended the dam's ladder. Increased fallback of adult fish reduces the survival or conversion rate of fish that fallback, thereby reducing the number of adults that successfully return to spawn.

High levels of spill also cause increased total dissolved gas (TDG) levels that are harmful to adult and juvenile salmonids and other aquatic organisms. Current national water quality standards, adopted by Oregon and Washington, are 110 percent total dissolved gas. As noted above, in order to meet the juvenile survival dam passage performance standards, the Corps spills for fish passage at levels above applicable water quality standards as coordinated with state water quality agencies (115 percent TDG in the forebay and 120 percent TDG in the tailrace). A 2008 literature review of the biological effects of total dissolved gas (TDG) by the Washington Department of Ecology found that "research

shows that exposure to TDG levels greater than 120 percent harms aquatic organisms consistently enough to omit review of higher TDG concentrations.” Spilling to 125 percent TDG in the tailrace, as proposed by the commenters, will further increase the occurrence of gas bubble trauma and adverse impacts on salmonids and other aquatic species. The referenced 2008 literature review also found that fish cannot detect TDG as quickly as they can temperatures and other environmental factors and that at higher TDG levels, fish can die without first showing signs of gas bubble trauma.

Some commenters pointed to recent research (CSS 2012 and Haeseke et al. 2012) that shows a correlation between smolt-to-adult returns (SARs) and increased levels of spill as justification for significantly higher levels of spill than what is called for in the BiOp or included in the IP. Haeseke et al. examined fish passage data and average spill from 1998 to 2006, which does not accurately reflect current passage conditions at the dams because the data preceded many configuration actions and operational improvements that were completed and implemented in accordance with the 2008 BiOp.

In an independent review of Haeseke et al. 2012, Dr. John Skalski of the University of Washington found several concerns in the Haeseke analysis. For instance, Dr. Skalski noted that increased spill also correlates with increased adult returns of transported fish, which receive no benefit from spill. This suggests that spill levels must have correlated with other factors, such as ocean conditions, that were also experienced by transported fish. This correlation conflicts with the notion that simply providing more spill is the key driving factor to increase juvenile survival and boost adult returns, and suggests that ocean conditions and other variables (e.g., harvest, climatic factors) contribute to variations in SARs. Salmon have a complex life cycle, spending the vast majority of their life span in tributaries or in the ocean; and only a fraction of time is spent migrating through the system.

Recent findings identify that greater than 50 percent of the variation observed in adult salmon returns was found to primarily be explained by large scale ocean and atmospheric variables, such as PDO and sea surface temperature, and salmonid growth and feeding as described by Burke et al. (2013). This suggests that these larger-scale variables are a significant factor affecting adult returns.

While the commenters propose a 10-year test with a comprehensive assessment after 5 years of testing, Dr. Skalski’s analysis pointed out that a systemwide spill test could take 28 years or more to discern a measurable difference (80 percent chance of detecting a 10 percent change) in SARs between the current BiOp recommended spill levels and commenter-proposed spill levels.

NOAA has reviewed and included their assessment of the commenters’ proposed spill test in the 2013 draft BiOp and determined that several substantial weaknesses in the analysis exist that would need to be resolved prior to further consideration of any operational study of this magnitude (see section 3.3.3.5 (System Survival) of the 2014 BiOp). The results of juvenile dam passage survival performance standard testing indicate the Action Agencies are on track to meet the expectations of the Biological Opinion by 2018, and changing course at this time is not warranted.

Comment B: The CE continues to avoid a discussion of the effects of the court-ordered spill program. The report should explicitly document progress toward implementing the annual spill program. Instead, the only references to spill focus on the installation of surface passage structures and concerns about dissolved gas (pages 41-42, CE Section 1, also pages 59-61 CE Section 2). The CE should clearly and explicitly affirm the Action Agencies' commitment to the court-ordered spill program, now and in future years. The report should also make it clear that the Action Agencies consider the court ordered spill program to be the presumptive path for the spring and summer spill. The CE fails to discuss the benefits of Court-ordered spill. (OR, NPT)

Response B: Spill operations were implemented for fish passage from 2008-2012 consistent with the court's annual spill orders and the effects of these operations are reported in the CE . Spill levels during these years generally followed the initial planning spill levels first identified in the 2008 BiOp. Under RPA Action 29 on pages 127-132 of the draft CE Section 2, a summary and discussion describes the spill operations provided for fish passage from 2008-2012. Additionally, spill operations coupled with fish passage configuration improvements made at each dam and the resulting effect or benefit on juvenile dam passage survival at each project where available is documented in CE Section 2, RPA Actions 18-25. The CE only reports progress through 2012 in implementing the BiOp; not what actions or spill operations will be implemented prospectively from 2013-2018. For prospective spill operations planned for remaining years of the current BiOp, see the discussion of proposed spill under RPA Action 29 in the 2014-2018 Implementation Plan. The Action Agencies will continue to conduct performance standard testing and adjust operations as needed to meet the performance standards.

Comment C: Facility operations that improve in-stream passage and reduce the number of powerhouse experiences are necessary to realize recovery goals. Spill weirs have been installed at all dams (ASW, RSW, TSW...) but do not include enough total dissolved gas (TDG) abatement enhancements to provide for an adequate amount of flow (kcfs) to consistently meet the fish waiver upper boundaries set for spring and summer spill criteria for fish, and thus continue to under shoot spill targets for these periods. For example the Action Agencies continue to manage for a Snake River TDG level of 110% even though they have stated that increased levels of spill have resulted in better passage survival for juveniles during spring and summer spill seasons. (OR)

Response C: As stated in Issue 1 Response O, the Biological Opinion (in contrast to a salmon recovery plan) includes performance standards that the Action Agencies are to accomplish by 2018 to meet their ESA responsibilities to avoid the likelihood of jeopardizing the ESA-listed species affected by the operation of the FCRPS projects. The recovery planning process is the appropriate forum for the commenters to provide input on actions to achieve recovery.

As described in CE Section 2 RPAs 18-25, the Action Agencies have made significant structural modifications at each of the dams to improve fish passage conditions. These improvements, in combination with spill, are expected to allow the Action Agencies to meet juvenile dam passage performance standards at the eight lower Snake and Columbia river dams. In order to accomplish performance standards, the Corps works with both Oregon and Washington to spill for fish above the states' standard of 110

percent TDG. This process results in spill for fish passage at these eight dams at levels of TDG up to 115 percent in the forebay and 120 percent in the tailrace.

Fish passage spill is either a percent of total river flow or a prescribed level of spill needed to meet dam passage performance standards. Based on the results to date, the Action Agencies are on target with the current spill program to meet performance standards.

Total dissolved gas abatement enhancements have already been added to each spillway weir and each conventional spillbay at seven of the eight FCRPS dams (the Dalles does not require this enhancement due to the physical configuration of the project).. These improvements have enabled the Action Agencies to meet the juvenile dam passage performance standards and be consistent with the Clean Water Act. Adding more total dissolved gas abatement to spillway bays equipped with spillway weirs is not necessary to meet performance standards.

Comment D: [Regarding RPA action 30 and the May 7 - 20 time period] "While the action agencies state that "there is no longer a presumptive operation for the May 7-20 time period or during low flow years," Draft IP at 42, it follows equally that there is no commitment to continue the existing spring spill levels during this period. The agencies are apparently suggesting that Snake River B run steelhead benefit from increased collection and transportation, despite damage likely to other Snake River stocks and consensus science indicating that steelhead and Chinook both benefit significantly from expanded spill and associated better in-river conditions. (SOWSC)

The conclusion that transport will provide the best overall benefit even to steelhead is not supported by a qualitative or quantitative analysis that employs all of the available and relevant information. (SOWSC)

In light of the agencies' continued insistence on maximized transportation of steelhead, it is unlikely that the spring spill measures in place under Court order since 2006 and supported by the Independent Scientific Advisory Board ("ISAB") will continue under the action agencies' plan. (SOWSC)

Response D: The commenters are correct; data from NOAA NW Science Center and Fish Passage Center show that steelhead benefit from increased collection and transport. The Action Agencies seek to balance this benefit to steelhead with other considerations included in the ISAB recommendations, such as potential effects on other species. Consistent with the AMIP spill will continue at Snake River dams during the spring as it has in the past to facilitate safe passage of juvenile steelhead. Additionally, spill and transportation operations will both occur at the same time during spring; as they have in the past. Additional information comparing transport vs. in-river migration is necessary to determine whether the configuration actions completed so far that provide surface passage at all dams and facilitate safe in-river passage lessens that benefit. See IP Table 2 (pg. 42). The "maximum transport" operation contained in the 2008 BiOp is not included in the IP. Instead, an annual review of transport by the RIOG will occur to determine an optimal transport operation for the year. See IP pg. 43 for proposed transport operations from 2014 to 2018. The overall goal of the proposed transport operations is to achieve a 50/50 split of transport vs. in-river migration of Snake River steelhead.

Comment E: The Draft IP should retain the current process for determining the date for initiating juvenile fish transportation at Lower Granite Dam rather than specifying a fixed date of April 21st. Oregon recommends the Corps continue to coordinate annually with state, tribal, and federal salmon management agencies to specify a transportation start date beginning no earlier than April 21st at LGR. (OR)

As explained in more detail by the State of Oregon's comments, the Agencies' proposal to alter the "planning dates" for spring and summer spill, and the related proposal to begin transport operations at Lower Granite Dam on April 21st, will result in significant reductions in current spring spill levels and will result in greater than 50% transport rates for wild spring Chinook migrants. (SOWSC)

Response E: Regarding transition from spring to summer spill, NOAA is developing 95% criteria to ensure that 95% of spring fish have out-migrated prior to transitioning to summer spill.

Comment noted. The language in the Implementation Plan is being changed to the following: Steelhead continue to show a benefit from juvenile transport ($T:I > 1$) under the current spill and project configurations. The percentage of wild steelhead transported during the years 2007 – 2013 has averaged 40% and ranged from 28 to 49 percent. Data indicate increasing the percentage of steelhead transported should increase steelhead adult returns. TMT will review the results of transport studies annually and provide an annual recommendation on how to operate the juvenile transport program to achieve the goal of transporting 50% of juvenile steelhead. Planning dates to initiate juvenile transport at Lower Granite Dam will be April 21 to April 25, unless TMT recommends a later start date (NLT May 1) and accompanying alternative operation in their annual recommendation to achieve the goal of transporting 50% of juvenile steelhead. If TMT does recommend a later start date, the Corps will review the TMT information as well as the best scientific information available and will make a determination when to initiate transport.

Comment F: The commenter suggests that the Action Agencies are proposing a juvenile passage trigger that could terminate summer spill in the Snake River as early as August 1 each year. "This spill cut-off proposal is once again made without consideration of its ecological/evolutionary impacts, notwithstanding the fact that this issue was identified as scientifically important to assess fully by the ISAB in its 2008 spill/transport analysis." (SOWSC)

Response F: Spill in August would continue for the duration of August as it has in the past, unless juvenile fish passing Snake River dams falls below a threshold of 300 fish collected per day for three consecutive days. Typically, when/if this low fish collected threshold is achieved, greater than 95% of subyearling Chinook have already passed through the system and received the benefit of spill. Research has shown that many of those remaining fish that are still in the hydrosystem in August are no longer attempting to migrate to the estuary or ocean and instead spend the winter in the FCRPS reservoirs. These fish are part of the same single population that makes up the Snake River ESU as the fish that migrate earlier in the season. For these fish that remain in the system later into the summer, spill in August may simply relocate fish within the Snake River projects rather than aid their migration.

Comment G: The draft Comprehensive Evaluation shows that the current operations scheme needs adjustment as high spill and flows can provide adverse effects on adult fish and are often needlessly wasteful. The report stated that adult fish passage survival for three Snake River ESUs over the last five-year period is less than expected. It appears that high spill and flow operations are a cause. (PPC)

NRU's members recognize that actions to improve the overall survival of fish passing through the hydro system are an essential component of the BiOp's implementation. We are pleased that the portfolio of hydro projects is on track to meet or exceed the survival targets established in the BiOp. The major investments and improvements documented in the Evaluation have achieved rigorous performance standards for both dam and in-river survival for juvenile fish. NRU members strongly encourage the Action Agencies to move forward with reducing voluntary spill that goes above and beyond the levels listed in the BiOp. The Evaluation points out that high flows and high spill levels can impede the progress of returning adults. Specifically, high spill levels can cause fallback, increasing straying and harvest-related mortality. NRU members support further monitoring and research if necessary to examine the impacts of high spill levels on returning adults. As the implementation of the program of actions progresses at the federal dams, we expect to see the benefits from the study and implementation of reduced spill as originally contemplated in the BiOp. (NRU)

Spill operations appear to be reducing the survival of adults migrating upstream: Adult fish passage upstream is shown in Figure 22 on page 49 and shows high numbers of missing adult fish as they return upriver through the hydropower system. The basic operations of the ladders that provide upstream passage at each dam have not significantly changed – except for systematic improvements in how fish find the ladders and pass the dams. The only dam-related operation that could be causing reduced survival of adults migrating upstream is increased spill which can make it difficult for adults to find the ladders and has caused fallback of adult salmon and steelhead. When adult fish are sucked back through the spillway and have to climb the ladder again it reduces their energy reserves and ability to migrate and successfully spawn. There are other hypotheses that would also explain the reduced adult fish survivals and these include illegal harvest (poaching), straying of hatchery fish and increasing temperatures at some times of year that present thermal blockages. (NWRP)

The draft Comprehensive Evaluation notes that high flows and high spill levels delay adult migration upstream and increase the incidence of fallback after fish have successfully passed dams. The Action Agencies must modify flows and the spill regime to assure that adult are not adversely affected while returning to their place of origin. (PPT)

Response G: High spill levels above the targeted fish passage spill levels for spring and summer can cause adult passage delay and "fallback" of adult fish over spillways which can have a deleterious effect on migration success. Fallback at Bonneville Dam may also increase pinniped predation on adult salmonids. Current target fish passage spill levels at the dams were formulated to facilitate safe passage of juvenile fish downstream, while not impacting or delaying upstream adult passage. Although spill levels over the target fish passage spill levels may be contributing to adult conversion rates falling below the BiOp performance standards, other factors are also likely contributing to the shortfall.

Pinniped predation and harvest are obvious factors that may contribute to the shortfall in the lower Columbia River. To further investigate the shortfalls, the Corps added additional PIT tag monitoring at The Dalles Dam in 2013 to help isolate where adults are being lost. Once the area of loss is determined, the mechanism for loss may be more readily identified and remedied.

Issue 4: Navigation

Comment A: Two commenters expressed concerns that higher flows or increased spill could hinder safe and efficient navigation and adversely impact shipments of Northwest products, petroleum and other cargo.

Response A: The Action Agencies are aware of the potential impacts to navigation safety and efficiency with higher flows and spill. The FCRPS dams are managed for multiple purposes, including navigation. The Action Agencies strive to find an appropriate balance between the various purposes while complying with the requirements of the Endangered Species Act. The planned operation described in the IP does not call for actions to increase flows or spill.

Comment B: Several commenters urged the Federal Agencies to maintain maximum flexibility in operating Lower Granite to provide safe navigation operation and maintain service to the docks/ piers in the pool, until dredging takes place and to maintain operational leeway for changes for safety and or efficient cargo movements near the approaches or departure lanes of navigation locks throughout the system.

Response B: The Action Agencies are aware of the issues in the Lower Granite reservoir and potential concerns for barges entering and leaving the locks. As described in the Draft IP, under RPA Action 5, Adaptive Management Column, the Action Agencies anticipate continuing the current variable MOP operation at Lower Granite as needed to provide additional depth and ensure safe navigation until remediation of the shoaling in Lower Granite reservoir. Where specific navigation issues occur at a dam, the BiOp allows for operational changes to continue safe navigation.

Comment C: Several commenters noted that TDG and water temperature responses under RPA Action 15 – Water Quality Plan for Total Dissolved Gas and Water Temperature in the Mainstem Columbia and Snake Rivers can create a ripple effect that could impact navigation safety. They noted the reference to RPA action 5 in the IP for RPA Action 15 regarding operation of the Lower Snake River projects at MOP and welcomed the recognition of these potential impacts. (CRTA, PNWA, IPNG)

Response C: The Action Agencies are mindful of the importance of maintaining safe navigation and will consider navigation safety when making operational decisions that also impact water quality.

Comment D: Status and implications of the COE dredging plan is mischaracterized (pp. 8-9). (NPT)

Response D: IP language in RPA 5 has been modified to show that the Corps is developing a Programmatic Sediment Management Plan and EIS and a Record of Decision is planned for 2014.

Issue 5: Operations

Comment A: The Nez Perce Tribe suggested the CE fails to describe operational decisions made during 2008-2013 that were not consistent with the intent of the BiOp. One example provided was alteration of pool elevation for the Lower Snake River dams, with the Tribe suggesting the changes were made more frequently than anticipated in the BiOp. (NPT)

Other commenters noted that the Action Agencies implemented RPA Action 5 Lower Columbia and Snake River Operations appropriately and captured both the process followed and the outcomes reached in operating the pool elevations in the CE. (PNWA, IPNG)

Response A: These operational changes are consistent with RPA Action 5 and the adaptive management provisions of the BiOp. RPA Action 5 provides for operations to ensure safe navigation. Variable MOP operations have been implemented at Lower Granite Dam due to considerable sediment accumulation in the navigation channel. This operation has been coordinated through the regional collaborative processes such as the Technical Management Team.

Comment B: The Nez Perce Tribe suggests that the CE fails to discuss issues such as juvenile descaling and mortality rates at Bonneville Powerhouse 2, where priority was transferred to Powerhouse 1 and Powerhouse 2 units were throttled back to decrease descaling. (NPT)

Response B: The descaling issue at Bonneville Powerhouse 2, is discussed in the CE section 2, RPA Action 18. As noted in the IP, under RPA Action 18, Adaptive Management column, modification to the original bypass system succeeded in diverting more fish away from the turbines but also resulted in increased gatewell turbulence and descaling. Additional structural modifications are being pursued to remedy that effect and are being coordinated through regional forums (e.g. Fish Facility Design Review Work Group FFDRWG). The problem was first observed in 2008, and actions were taken to reduce the potential impact as described in RPA Action 9- Fish Emergencies. In subsequent years, operational changes to address the situation were coordinated through the TMT. (For example, see minutes from the June 6, 2012 TMT meeting at <http://www.nwd-wc.usace.army.mil/tmt/agendas/2012/>)

Comment C: Oregon proposed that the flow program should include a presumptive path to operate lower Columbia River mainstem reservoirs at minimum operating pool (MOP) April 10-September 30 while ensuring irrigation and navigation benefits are maintained and impacts to hatcheries, wildlife and recreation are mitigated. (OR). Other commenters opposed any changes which would require lowering the operating pool to MOP. (PNWA, IPNG, Port of Morrow)

Response C: The RPA does not include operating Lower Columbia reservoirs at MOP because measurable benefits to listed juvenile salmon have not been demonstrated. In addition, there would be negative impacts to operating fish facilities within NOAA fish passage criteria, and actions to accomplish other project purposes would be impaired.

Issue 6: Flow Objectives and Minimum Operating Pool (MOP)

Comment A: The CE does not present information about the spring and summer flow objectives in the Columbia and Snake rivers.

Response A: The CE includes information about spring and summer flow objectives (see Section 2, RPA Action 5). The Action Agencies operate as called for in the RPA (see CE Section 1, Water Management for Anadromous Fish, and CE Section 2, RPA Action 4).

Comment B: Provide flows (minimum 11.5 ft. tailwater) for chum the first week of November through emergence. Decisions concerning chum flows should not be based on fall forecasts because they are unreliable. (OR)

Response B: The Action Agencies operate to approximately 11.5 feet tailwater below Bonneville Dam from the first week in November (or when chum arrive) as described in the BiOp and the Water Management Plan (WMP). The Action Agencies do not make decisions to reduce below 11.5 based on a fall forecast; any decision to drop below 11.5 would not be made until late winter/early spring and would be made in conjunction with TMT.

Comment C: Establish weekly average targets for flow volume and water velocity that are at least equivalent to the flow objectives provided in Table 3, below, recognizing that achieving targets is largely dependent on annual runoff conditions. (OR)

The Draft IP should ensure flows or water velocity is maintained or enhanced relative to the levels indicated in Table 3, below. (OR)

The flow program should further: Include a presumptive path to operate lower Columbia River mainstem reservoirs at minimum operating pool (MOP) April 10-September 30 while ensuring irrigation and navigation benefits are maintained and impacts to hatcheries, wildlife and recreation are mitigated. (OR)

All flow objectives were established as minimum thresholds, below which impacts to migrating juveniles begin to increase. The BiOp no longer strives to meet the flow objectives, even on a seasonal average basis, allowing flows to drop below these minimum thresholds frequently and for extended periods (Bowles PI Decl. 16-27). The Action Agencies need to ensure, and demonstrate in the CE, that flows or water velocity through the Snake River and lower Mainstem Columbia are maintained or enhanced sufficiently to provide decreased travel time and increased fish survival. This should be done by establishing weekly average targets for flow volume and water velocity. If flow reductions occur, they should be offset by other measures to augment flow or water velocity. Oregon's recommended offset action is that lower Columbia River mainstem reservoirs be maintained at minimum operating pool (MOP) April 10-September 30.

Oregon further recommends the Action Agencies provide minimum flows for chum the first week of November through emergence. (OR)

Response C: The Action Agencies operate the FCRPS storage projects for flow management to aid anadromous fish per RPA Action 4. As explained in the 2007 Biological Assessment, the flow objectives are not physically achievable in all years because there is not enough water in the system, not enough storage in the system, and little carryover storage. Flow objectives are used for planning purposes to help shape release of water from storage projects for spring and summer flows. Flow objective information is provided in annual progress reports and the Comprehensive Evaluation in Section 2, RPA Action 5.

Establishing weekly average flow targets, equivalent to flow objectives in table 3 throughout the spring and summer fish migration periods have been analyzed and would result in inability to refill the reservoirs in many years. Most importantly, effects due to reduction in carry over storage would likely impact the ability to augment flows in the spring and summer of the following year and potentially in subsequent years. These physical impacts would result in a host of other consequences such as adverse impacts to ESA-listed salmon in some years including chum and adverse impacts to cultural resources at the reservoirs.

See Issue 5 for discussion on mainstem reservoir operations.

Comment D: The CE appears to portray Dworshak flow augmentation as an action against climate change (Section 1, p. 30). This flow augmentation was implemented and continues to be implemented to address contemporary temperature issues - not those that will be exacerbated with a changing climate. Further, the abilities of the reservoir to serve this purpose in the future are not a certainty.

Response D: The mention of Dworshak flow augmentation has been removed from the climate change section of CE Section 1.

Issue 7: Forecasting

Comment A: Ensure that forecasting (including collection of snow pack data) is done frequently, at least bi-weekly during periods of changing forecast, to help ensure reservoirs are operated at rule curves at all times. (OR)

Response A: Operations are a moving target based on the dynamic nature of the hydrologic state; not only is the forecast ever changing but so are the reservoir inflows and storage levels. Operations (releases) need to be constantly monitored and adjusted as appropriate in order to meet the rule curve requirements. However, those adjustments must be balanced with other factors and system constraints. A deliberate approach is necessary to avoid over reactive changes. That is, operational changes should be made only after a discernible and reliable trend has been established, and supported by weather and river flow forecasts, to avoid unnecessary swings in operations. For these reasons, the projects are not necessarily operated at rule curves at all times. Other system constraints and objectives also need to be considered, such as treaty obligations, power operations, limiting TDG production, O&M, etc. As reported in the CE section 2, RPA 7, The Columbia River Forecast Group was formed to promote and support the advancement of

forecasting skill, products, and techniques in the Columbia River Basin with the goal of improving reservoir operations for the benefit of the region. The Action Agencies encourage participation in the CRFG annual workshops and other meetings where improvements to forecasting methods (including forecasting frequency) are considered and discussed.

Issue 8: Performance Standards

Comment A: The metrics for passage performance standard “success” are also inadequate. (OR)

According to the CE, a demonstration of “success” relies on just two years of evaluation by acoustic tagging, out of ten years of operations. Further, Action Agencies avoid evaluation of the standards in years of sub-optimal operations (RIOG Performance Standard and Metrics, August 2012, page 4). This practice sets a very low bar, in that success need only be demonstrated over 20% of the duration of the Biological Opinion, and is selectively evaluated only in those years when success is most anticipated. Apparently in other years, COMPASS model results are being used as evidence of performance success (Figure 19-20, page 42 CE Section 1). However, it is evident from the empirical performance testing that some projects have already failed to meet the standards in some test years (Figures 19-20, page 42 CE Section 1). (OR)

The CE repeatedly utilizes a metric for passage performance success that relies on acoustic tagging from just two years of evaluation, out of ten years of operation. The CE does not reveal that there has been significant objection to this metric- with its very low bar - and that there remains significant technical disagreement with respect to its use. (NPT)

The Tribe does not agree with discontinuing monitoring of juvenile performance standards at specific dams after two years of meeting the standard; the Tribe has not had the opportunity to review the referenced document describing the Action Agency's guidelines (p. 39). (NPT)

Response A: The Action Agencies and NOAA collaboratively developed the performance standards white paper as a guidance document in conducting performance standard tests. The document also underwent RIOG review and gained consensus approval of the RIOG as a guide for conducting juvenile dam passage survival performance standard tests.

Juvenile dam passage survival performance standard test planning at a particular project begins months or even years in advance of actual testing. The commenter suggests that the Action Agencies avoid evaluation in years of sub-optimal operations or selectively evaluate in years when success is most anticipated is just not possible given the level of pre-planning and setup of equipment to conduct a performance standard study prior to the outmigration season. It is impossible to know in advance of a migration year, what the volume and shape of runoff or hydraulic conditions at a given project will be. As detailed in the performance standard white paper, performance standard tests are considered valid from a flow perspective if they fall within the middle 90% of the flow record (i.e. years that have the top 5% and lowest 5% flow conditions on record are excluded). There are other criteria (e.g. separation between actual flow, and actual shape

of the runoff) to ensure that the two years of successful performance standard testing represent a range of conditions even if they both happen to fall on one side or the other of “average” flow conditions.

As the commenter noted, some test results at some projects resulted in survival estimate that were slightly below the standard. The Action Agencies consider these “near misses” and intend to review these results on a case by case basis with NOAA and in coordination with the RIOG to determine if the test is acceptable as provided for in the performance standard white paper. This review will occur as part of the regional process for reviewing performance standard test results described in the IP. The Action Agencies have committed to achieving the performance standard of 96% average dam survival for spring and 93% for summer migrating fish at each project, but the RPA allows for averaging across projects to meet the performance standard.

See also Issue 8D.

Comment B: Protection needs to improve to cover all portions of the wild migrant runs, temporally and spatially. Performance testing is depending heavily on the peak period of presence regardless of the seasonal condition experienced by migrants, for example, by forcing summer low flow conditions during spring high flow conditions. This approach also favors hatchery release periods, thus primarily using hatchery fish to inform success. Further, there has been a pattern of culling test groups to only include the largest and healthiest juvenile fish. All these factors lead to a positive bias in any estimate because they exclude the more vulnerable components of the population. Thus calculated passage performance metrics will always deliver a higher percentage than would be expected if full representation of all conditions in the population were included in release groups.
(OR)

Response B: As stated in the above response, the Action Agencies and NOAA collaboratively developed the performance standards white paper as a guidance document in conducting performance standard tests. The document also underwent RIOG review and gained consensus approval of the RIOG as a guide for conducting juvenile dam passage survival performance standard tests.

Performance standard tests are conducted using a virtual paired-release survival model that produces a relative survival estimate of treatment fish released upstream of a project compared to control fish released below the project. The relative survival estimate describes the survival of treatment fish that pass the dam through various passage routes compared to control fish released below the dam to a preselected point downstream of the dam. The study design targets a random sample of hatchery and wild fish and attempts to encompass the middle 80 percent of the juvenile migration. It would not be practical to evaluate only wild fish due to the large sample sizes required to meet the precision levels called for in the BiOp. The design provides a relative estimate of how well test fish survived compared to how well control fish survived. Since the factors of largest/strongest or smallest/weakest would be held constant among all test fish, the factor should not affect the survival estimate.

Comment C: In 2012, the Action Agencies attempted to test minimum flow conditions during a period when higher spring-like flows were on-going (see page 44, CE Section 1, describing the

effects of high flow in 2012). This approach disregards the extent to which the research fish represent the condition and experience of the run of the river population by artificially mimicking poorer conditions when these conditions exist nowhere else in their migration experience. Subsequently, this approach provides an opportunity for the Action Agencies to remove the spring spill benefits from the later migrating components of listed spring/summer Chinook salmon. (OR)

Response C: The Action Agencies follow strict criteria when conducting performance standard testing. Every effort is made to ensure that the test fish represent the run at large. The tests are designed to evaluate a specific target spill level for a given project. During high flow years, as were observed in 2011 and 2012, these target spill levels are often exceeded due to uncontrollable spill. The 2008 BiOp calls for transition from spring to summer spill levels when summer migrants predominate. NOAA Fisheries is developing a trigger for the transition from spring to summer spill levels, based on the percentage of spring migrants that have passed, for inclusion in the new supplemental BiOp.

Comment D: The CE repeatedly utilizes a metric for passage performance success that relies on acoustic tagging from just two years of evaluation, out of ten years of operation. The CE does not reveal that there has been significant objection to this metric- with its very low bar - and that there remains significant technical disagreement with respect to its use. The Tribe does not agree with discontinuing monitoring of juvenile performance standards at specific dams after two years of meeting the standard; the Tribe has not had the opportunity to review the referenced document describing the Action Agency's guidelines (p. 39). (NPT)

Response D: In its description of the Juvenile Dam Passage Survival Performance Standard, the RPA specifies that dam passage survival is passage survival from the upstream face of the dam to a standardized reference point in the tailrace. Metrics for assessing juvenile dam passage survival, criteria for conducting performance standard tests, and a description of how the juvenile dam passage performance standards are applied to determine if the standards are being met have been described in the Action Agencies BA, NOAA's BiOp, and a collaborative performance standards white paper (referenced document that the commenter states they did not have the opportunity to review) developed by the Action Agencies and NOAA, and fully coordinated through the RIOG (of which the commenter participates). Many planning meetings have occurred to develop study designs for conducting performance standard tests with full participation by the Federal agencies as well as states and tribes.

Issue 9: Wind Integration/Load Following

Comment A: The 7-10-13 draft comprehensive evaluation released for public review fails to address the impacts of operating the FCRPS to integrate large amounts of wind-powered generation on water levels in the forebays and tailraces. As BPA officials put it, the federal power system serves as a giant battery back-up for the wind fleet in the region. When the wind comes up, the river goes down and vice versa. This variation occurs on an hour-to-hour and day-to-day basis. What this means for actual operations is that there is significantly more variation in hourly discharges from projects than would otherwise be

the case. For the Bonneville project, ramp rates due to integration of wind-powered generation have been characterized as “extraordinary” by the current, acting BPA Administrator, Elliot Mainzer. This variability has noticeable adverse impacts on fish habitat just downstream from the Bonneville project, particularly around the Ives Island/Pierce Island complex and lower reaches of Hamilton Creek and Hardy Creek. (Pace)

Response A: The integration of large amounts of wind powered generation into the power system and the actions that have been taken to mitigate the effects on fish operations are described in Appendix F to the Implementation Plan (see also response 11B). BPA has always balanced the ups and downs of resources and loads primarily with hydropower generated at federal dams. But the Bonneville Project is called upon infrequently to provide this load following / resource balancing service, and only when it can do so without compromising fish operations. The Action Agencies have no information supporting the habitat impacts described in this comment.

Comment B: Second, the Comprehensive Evaluation fails to report on the actual operation of the Federal Columbia River Power System for power peaking, load following and integration of wind-powered generation, all of which create extraordinary fluctuations in forebay elevations and tailrace discharges. None of these impacts were addressed in the 2008 Biological Opinion for the Federal Columbia River Power System or the 2010 Supplement thereto. And there is no indication whatsoever that the Army Corps of Engineers, Bonneville Power Administration or the NOAA Fisheries has any intention of addressing the impacts of such day-to-day and hour-to-hour operations as part of a “new” biological opinion that is currently being prepared. (Pace)

Response B: The commenter characterized fluctuations as “extraordinary” that the Action Agencies consider normal and included within the range of operations on which NOAA consulted. The Action Agencies operate the FCRPS for multiple purposes including the production of power consistent with the operations called for in the biological opinion. The FCRPS 2008 BiOp analysis evaluated a wide range of river flows and operating conditions to reflect the range of possible conditions faced by the FCRPS. One of the fundamental necessities of operating a reliable power system is that generation must meet load. As described in the Biological Assessment (Attachment B.1-6), operations of FCRPS dams are adjusted using automatic generation controls (AGC) that allow the generating units to instantaneously follow load requirements on the federal system by increasing or decreasing the amount of water passing through the turbines, thereby keeping generation levels matched with load requirements. As NOAA noted in response to a comment by CRITFC on the 2008 BiOp: “Available data (e.g., survival during high flow periods when load-following is impractical) do not suggest that load following has an effect on juvenile survival through the reservoir-dominated segments of the migratory corridor. In riverine sections downstream from hydro projects, efforts have been taken to limit flow fluctuations to protect incubating eggs from desiccation and emerged fry from entrapment and stranding.”

As explained in the Implementation Plan, Appendix F, BPA has the ability to reduce balancing reserves from the FCRPS when necessary to meet fish operations and applicable water quality standards. This has helped ensure that BPA can accommodate the growth

of the wind fleet and other non-federal generation in the region and continue to implement FCRPS operations as specified in the 2008 BiOp.

Issue 10: Water Temp at Lower Granite Dam (LGR)

Comment A: While the CE describes adult passage improvements, it fails to fully disclose adult passage issues that have arisen. Importantly, the CE fails to describe the very real impact that high water temperatures in the Lower Granite ladder have had, and which have precluded trapping at Lower Granite Dam. In the past, these issues have arisen in late July and early August; this year they have occurred even earlier in July. While the CE references a study that has occurred (Section 2, p. 125), the Action Agencies have failed to act further. In a joint letter, the Idaho Department of Fish and Game, Washington Department of Fish and Wildlife, and the Nez Perce Tribe have requested that this situation be addressed and remedied. (NPT)

Simply put, so long as Lower Granite Dam remains in the river it needs to be able to pass sockeye, steelhead, and fall Chinook adults when they return to the Snake River in the summer months; the ladder temperature problems that were acknowledged in the 2008 FCRPS BiOp need to be fixed so that fish can pass and do not get held up below. (NPT)

Response A: The Corps-funded a study to provide alternatives to control water temperature in the Lower Granite fish ladder that was completed in 2011. At the time, there was not regional consensus on moving forward, as there were concerns with the assumed effectiveness and the proposed cost of each alternative. Consequently, other fish passage improvement projects within the Columbia Fish Mitigation Program were given a higher priority. Because the alternatives from the 2011 study are now a few years old and there are additional data available from 2013 operations that may be used to better inform alternative development, the Fish Facility Design Review Work Group (FFDRWG) will consider whether there options could be implemented in the near term, possibly in conjunction with longer term, more reliable solutions, to minimize the effect warm water during summer months has on adult passage. The Action Agencies will continue working to improve adult passage at Lower Granite Dam as specified in RPA Action 28.

Issue 11: Kelt Actions

Comment A: After five years it is clear that this experimental action is unlikely to produce the large survival benefits NOAA ascribed to it by 2018. See CE, Section 1 at 49-50 (describing the first successful release of nine reconditioned Snake River B-run steelhead kelts). While the action agencies generally assert that “[r]ecent advances in research to improve reconditioning techniques, infrastructure improvements at the holding and hatchery facilities and plans to increase kelt collection are expected to enable the Action Agencies to meet the FCRPS BiOp goal of 6 percent by 2018,” there is no additional detail or basis for that general pronouncement. *Id.* at 49.15. When and how the substantial and actual survival increases for steelhead from this action are to be achieved—if at all—is simply not addressed. (SOWSC)

Response A: The program at Dworshak began as an experimental program designed to examine the potential for collecting and rearing post spawned steelhead. To that end, over the past few years improved reconditioning techniques have been identified and implemented. These improvements include: expanded collection opportunities in the tributaries, better collection and transport handling, upgraded water delivery, enhanced water quality monitoring, consistent water treatments, better feed rationing, and enriched (primarily lipid) feed content. In 2013, 69 natural origin female B-run kelts were released from the reconditioning program. This represents a substantial 2.3% towards meeting the 2018 6% target; combined with the credit received from winter operations at the Dalles dam, the Action Agencies are now at 3.2%. The Action Agencies expect that the number of fish released from the kelt reconditioning program will continue to increase over the next several years, and that these efforts, along with the broader kelt management program, will achieve the 2018 6% target.

Tributary Habitat

Issue 12: Status of Tributary Habitat Implementation

Comment A: Based on the solid progress to date the expectation is that the BiOp's habitat requirements will be achieved by 2018. (NWRP, PNWA)

Response A: Several commenters acknowledged the noteworthy achievement the Action Agencies, in partnership with States, Tribes, watershed groups, and other local organizations, have made in the tributary habitat program over the last 5 years. As presented in the CE, the Action Agencies have a demonstrated track record for delivering tributary habitat improvements. Actions implemented through 2011 are sufficient to meet or exceed the specified 2018 HQIs for nearly two-thirds (>60%) of the populations in Table 5. The Action Agencies have also identified sufficient actions through 2018 that are projected to meet or exceed the remaining HQIs. The Action Agencies and regional partners will continue to focus resources on the populations and areas with the greatest needs as identified in RPA 35 Table 5 of the 2010 FCRPS BiOp. The Action Agencies appreciate this acknowledgment and believe we have developed a thorough plan to fully achieve the BiOp requirements by 2018, as described in detail in Appendices A and B of the CE and the IP.

Comment B: The Action Agencies have not demonstrated that they have a plan to address the tributary habitat projects for the most relevant "priority populations" identified in the 2008 BiOp, including Catherine Creek. (SOWSC, OR, NPT) The CE asserts that "The AA and their partners fully expect to meet the 2018 Table 5 HQI's for Catherine Creek Chinook by 2018 through a combination of projects evaluated by the expert panels from 2007 to 2018, a menu of supplemental projects, and expansions of projects described below." (Section 2, Appendix, page A-17). This assertion does not conform to what is presented in the CE, Section 2, Table 35, page 151. (NPT)

Response B: Some commenters questioned whether the Action Agencies can achieve the BiOp requirements by 2018. As these commenters point out, the last expert panel evaluations projected that six priority populations and one remaining Table 5 population would fall

short of the BiOp HQI requirements by 2018. All other populations were projected to meet BiOp targets. For populations where additional improvements are necessary, the Action Agencies follow the Adaptive Management Strategy described in Appendix A of the 2013 CE to make up the difference.

The Action Agencies have further outlined their plans for tributary habitat improvement projects in appendices to the 2014-2018 IP that are also responsive to this critique. Appendix A includes the details of projects and associated actions that were evaluated by the 2012 expert panels. Appendix B includes a comprehensive menu of supplemental habitat actions identified by the Action Agencies and their tribal and watershed partners to meet the HQIs for those populations that require additional improvement. The Action Agencies estimated the approximate benefits of these supplemental actions by comparing them with actions previously evaluated by the expert panels as depicted in Appendix B of the 2013 CE. Like all Action Agency funded actions, these supplemental actions will be fully evaluated with all other actions in the next set of expert panel workshops. The Action Agencies are confident that they will implement actions sufficient to address the HQIs for all populations. For the Catherine Creek population, which has presented a particular challenge, the adaptive management strategy pursues supplemental actions and the Atlas process, described in Appendix A of Section 2 of the CE. The Atlas process identifies biologically significant reaches based on limiting factors, habitat condition, and fish use. Through an examination of existing data and with input from local experts the process facilitates identification of restoration opportunities and orders them based on feasibility. The product of the Atlas Process can be used to refine those specific actions based on biological need and feasibility of implementation that will be carried forward, reviewed, and verified during the next round of expert panels. The Atlas process is a detailed and organized framework for evaluating biological condition based on data and input from local and regional technical experts from state/tribe and feds.

The Action Agencies developed supplemental actions such as those for Catherine Creek in cooperation and consultation with local stakeholders and project sponsors. Sponsors submitted these projects for review by the NPCC's ISRP as part of the 2013 Categorical Geographic Review. Details not specified or readily identifiable in the sponsor proposals will be included as work elements and corresponding metrics in statements of work when the projects are contracted and will then be publicly accessible through BPA's online project tracking system. The NPCC Categorical Review becomes the basis for a five-year funding recommendation to BPA. Likewise, BPA's decision to adopt the NPCC recommendation represents a five-year commitment to support the projects needed to meet or exceed the HQIs by 2018.

Appendix C of the IP further describes the overall Tributary Habitat Adaptive Management Plan, which summarizes the steps the Action Agencies are taking to keep tributary habitat improvement projects on track. Appendix D outlines a precautionary strategy in the event that any priority population is later determined to require additional improvements to meet the BiOp requirements. The strategy describes a methodology for "replacement projects" as anticipated in RPA Action 35.

In addition to the plan by Action Agencies and regional partners to focus resources on populations and areas with the greatest needs as identified in the BiOp, the BiOp requires “check-ins” on the progress in achieving the HQIs. For example, changes to projects that occurred after the 2012 expert panels completed their evaluations will be evaluated in the next Expert Panel workshops, with the results included in the next comprehensive evaluation. The Action Agencies will continue to review and update their progress through these periodic check-ins to ensure the BiOp requirements are met and transparency is maintained regarding the status of implementation. As presented in the CE, the Action Agencies have demonstrated a strong track record for delivering tributary habitat improvements and have already met or exceeded 2018 HQIs for almost two-thirds of the populations in Table 5.

Comment C: Habitat improvement projects are not clearly described or assured of being completed. (OR, NPT, SOWSC)

Response C: The 2014-2018 tributary habitat improvement projects are clearly described in the IP, Appendix A Tributary Habitat Project List. Project lists included in the implementation plans describe the fish population affected, the limiting factors involved, metrics describing the planned actions (such as miles of stream with improved complexity) and projects associated with the metrics. The plans also include web links to further details of habitat projects in BPA’s online project tracking system, cbfish.org, which includes details of actions funded by the Action Agencies in the form of sponsor proposals, statements of work, NPCC funding recommendations, funding decisions and metrics. The project tracking system allows anyone to examine, sort and analyze information in many different ways, making the complex information more accessible. This information is publicly available, providing a high degree of transparency both with respect to habitat project components and the rate of habitat action completion.

Issue 13: Tributary Habitat Program Methodology

Comment A: The expert panel process is subjective and lacked basic ground rules for comparing projects and evaluating their benefits through time. Members were not provided with adequate information. The Action Agency derivation of HQIs is not transparent. (OR, SOWSC)

Response A: The Action Agencies disagree with this comment for the following reasons. The expert panel process combines the best available science with professional judgment of experts knowledgeable about local watershed processes, habitat conditions and fish populations. During development of the FCRPS BiOp, the Habitat Collaboration Workgroup (HCW) (consisting of state, tribal, and federal biologists) recommended the process as a structured approach to estimating the benefits of habitat improvement projects given the limited empirical data. It is structured to ensure consistency across the basin, while also recognizing inherent differences in habitat conditions and limiting factors from one watershed to another.

The process is rooted in science: It relies on established connections between limiting factors, habitat quality and fish survival improvements and draws upon empirical relationships between habitat quality and salmon/steelhead survival. Limiting factors were drawn from recovery plans, subbasin plans and other best available information. The expert panels have been provided with recent relevant data and information. Available information for the 2012 workshops included:

- Limiting factor maps developed for the expert panels that provide a rapid visual overview of habitat conditions affecting populations. Charts included on the maps illustrate the weight of each limiting factor for individual populations, as well as improvements to date and potential for further improvement.
- Tributary and reach assessments, which evaluate baseline geomorphic, hydrologic, hydraulic and vegetation conditions.
- Latest conclusions of research, monitoring and evaluation under the Biological Opinion, including habitat status and trends monitoring and results from Intensively Monitored Watersheds that are evaluating the relationship between habitat condition and fish survival.
- Habitat project “action effectiveness” research and evaluation, looking individually and collectively at the response of fish to projects such as in-stream flow improvements, barrier removal and reconnection of wetlands.
- Recent science on the relationships between fish habitat and survival.

A website maintained by the Action Agencies for expert panel members provides much of the information described above as well as guidance for evaluating habitat improvement projects and the latest science on related issues including climate change, toxics and evaluation of habitat conditions.

Expert panels participate in the first stage of a two-stage process for evaluating the benefits of habitat projects for fish. The first stage applies the professional judgment of experts within a structured set of steps and rules to “value” habitat actions relative to the applicable limiting factors. Each panel also validates the importance of each limiting factor affecting each anadromous fish population and the importance of local sub-areas occupied by each population. The panels consider that the most severely degraded limiting factors are weighted most heavily. For example, streamflow would be weighted higher than riparian condition if these were the two identified limiting factors being evaluated by a panel, but there was not enough streamflow to support riparian vegetation. The weighting recognizes that habitat improvement projects that address the most degraded limiting factor will provide greater benefits to anadromous fish than a project addressing a less degraded factor. The tributary habitat occupied by each anadromous fish population is segregated into two to several sub-areas that exhibit unique combinations of key limiting factors. Each sub-area is assigned a weight that recognizes that, given the combination and status of limiting factors in each sub-area, some areas have greater capability to support anadromous fish than others. Weighting factors for limiting factors and sub areas validated by the expert panels are incorporated into the HQI calculation. The expert panels refer to the sub-areas as assessment units.

In the second stage of the process, the Action Agencies use the expert panel outputs to calculate HQIs based on scientific evidence of the relationship between habitat condition

and fish survival.¹ The State and Tribal members of the HCW recommended that the two stages of the process be separate and the Action Agencies implemented the recommendation. These HCW members were comfortable with their respective expert panel technical staff estimating changes in habitat limiting factors, but agreed that the Action Agencies were responsible for converting limiting factor changes to HQI using the methodology developed by the HCW. This methodology employs a mathematical relationship based on research connecting the chain of effects at the core of the tributary habitat strategy, which targets limiting factors through habitat improvement, in turn improving habitat quality and fish survival. The separation of roles also serves to minimize the potential for bias in the results. A step-by-step explanation of how the HQIs are calculated has been added to the final CE as Appendix D, Attachment 3.

The process does not guarantee or assume estimates of future benefits but relies on “look forward” and “look back” evaluations by experts with knowledge of local habitat to estimate future benefits in advance and then revisit habitat actions later to verify that the projects were completed as planned and adjust their benefits if not completed as planned. The process is administered consistently across the Interior Columbia River Basin. Future (look forward) actions evaluated by expert panels are assigned initial estimates of benefit. These estimates are refined and finalized three years later during the look back after projects are completed. This ensures that credit is afforded only for completed, effective actions. Panels are expected to account for declines as well as estimate progress in their evaluations of habitat improvement actions and limiting factors.

The development and application of the expert panel process is described in detail in the March 2013 publication, “Science and the evaluation of habitat improvement projects in Columbia River Tributaries: Regional Science Review & the Expert Panel Process.” (BPA and Reclamation 2013a). The publication includes examples of the detailed habitat information provided to expert panels and a specific example of how expert panels evaluated habitat improvement projects.

NOAA responses to comments on the 2007 draft FCRPS Biological Opinion (Memorandum to the Administrative Record, D.R. Lohn, May 2, 2008, issues #9A-9D and #10A-10-F) also provide further details on the expert panel process that addresses many of these comments.

Comment B: The panels were not well organized or facilitated and lacked documentation and transparency. A participant on the tributary expert panels felt that the meetings were poorly facilitated, with inconsistent participation. (OR) Participants were expected to evaluate habitat projects with inadequate information, discussions were cut off before issues were resolved and members did not review final products. (OR, SOWSC, NPT)

¹ Although the processes are separate, they were both developed by the HCW and informed development of the 2007 BA and 2008 BiOp. Both processes are described in detail in Appendix C of the 2007 Comprehensive Analysis.

Response B: Documentation, transparency and effectiveness are all critical objectives that the Action Agencies have sought to implement in the expert panel process. The Action Agencies believe that the record reflects that these objectives are being accomplished.

The Action Agencies have prepared for, convened and facilitated 20 expert panel workshops throughout the Columbia River Basin since the 2008 FCRPS BiOp was issued. The workshops built on a foundation of regional planning and habitat improvement that began under the Northwest Power and Conservation Council (formerly Northwest Power Planning Council) Fish and Wildlife Program and NOAA's recovery planning processes. States, tribes and local watershed groups have long participated in these processes, developing expertise in local habitat issues, and continued their involvement through participation in the expert panels.

The Action Agencies worked closely with local watershed groups that have been implementing habitat improvement projects since at least the early 1980s to plan and organize each workshop, holding several advance meetings to develop information and agendas. While time constraints limited planning for the first series of workshops in 2007, the Action Agencies began planning the second round of workshops in 2009 at least six months in advance and planned the most recent set of 2012 workshops beginning a year ahead of time with input and assistance from local watershed groups. The Action Agencies held orientation meetings three months before the last set of workshops and developed a dedicated website to provide materials in advance.

Experienced facilitators led each workshop, which were scheduled to last from one to three days. Since the facilitators allowed substantial time for questions, dialogue and information sharing, though, all of the panels required additional time and reconvened either in person or through conference calls until they completed their assessments. Expert panel discussions were captured on-site, in real time, in a database. Additional notes were also collected and are included in the Record. The Action Agencies shared spreadsheets containing all of the habitat improvement actions, assessment unit and limiting factor values, and associated comments with all expert panel members for review and comment before finalizing them. This provided a final opportunity for participants to raise questions or concerns. While one commenter indicated that requested datasets were not provided, the Action Agencies have no record of this issue being raised during the review opportunity. The Action Agencies strived to improve the organization, design and effectiveness of workshops in response to feedback from participants and will continue to do so.

For more details on the Expert Panel Process, see the Action Agency publication, "Science and the evaluation of habitat improvement projects in Columbia River tributaries: Regional Science Review & the Expert Panel Process" (BPA and Reclamation 2013a)

Issue 14: Tributary Habitat Research and Monitoring

Comment A: Effectiveness monitoring is needed to demonstrate empirically the actual level of benefits and fish population improvements that occur. (OR)

A related issue was also raised in relation to ongoing status and trends monitoring of both fish populations and their associated tributary habitat. "Several projects funded by BPA are collecting fish population status and trends data, which can be used to test or refine fish-habitat relationships. These data, combined with fish-habitat relationships, can also be used to help answer the question: "Are habitat actions effectively helping salmonid populations?" CE, Section 2 at 354. Of course, the RPA is built on the assumption that not only is the answer to this question "yes," but also that the relationship can be specifically quantified. It is less than reassuring to know that we are only now beginning to collect the data that might allow us to actually answer this fundamental question." (SOWSC)

- Response A:** An extensive program of Research, Monitoring and Evaluation accompanies the habitat improvement program at multiple levels, from answering the basic question of whether specific habitat projects are completed to more explicitly documenting the relationship between habitat quality and fish survival. The BiOp recognizes the inherent benefit of improved habitat for fish and focuses additional research on more clearly gauging that benefit. Descriptions and examples of this monitoring and the initial results are included in the Action Agency publication, "Benefits of Tributary Habitat Improvement in the Columbia River Basin: Results of Research, Monitoring and Evaluation, 2007-2012" (BPA and Reclamation 2013b) released in summer 2013 and publicly available on salmonrecovery.gov. The publication describes the foundation of previous studies and reviews that supports the BiOp's habitat strategy, explains the research priorities under the BiOp and reports on the results so far. For example, the report describes research within Bridge Creek, an Intensively Monitored Watershed on a tributary of the John Day River that has documented connections between habitat improvements and fish abundance and survival, providing evidence of the biological benefits associated with habitat improvements. Detailed tributary RME required by the BiOp is further discussed relative to RPA Actions 56 and 57 in the CE.
- Comment B:** Projects that provide quantitative fish population status and trends data are an important component of this RPA. At this time, however, there does not appear to be an effort on the part of the project sponsors to use the fish status and trends data to develop fish habitat relationships. Id., Section 2 at 354 (emphasis added). In other words, it is not even clear whether the data that is necessary to assess survival trends is actually being collected. (SOWSC)
- Response B:** The Action Agencies are collecting the data necessary to assess survival trends at the population level (see Response A as well as the Tributary Habitat RME Framework (BPA and Reclamation 2013c) and Tributary Habitat Benefits (BPA and Reclamation 2013b) documents). The Action agencies have an extensive RM&E program that addresses the question of linking fish status and trends to habitat improvements in the tributaries. Along with several IMW programs detailed in the Tributary Habitat Benefits paper, another section to note would be the Columbia Habitat Monitoring Program (CHaMP) habitat status and trends program. CHaMP was designed to complement existing fish status and trend monitoring with the express intent of empirically linking habitat condition to fish performance. Recognize however, that the jeopardy and adverse modification determinations, *i.e.*, conclusions as to the likelihood of survival and recovery, are made at the ESU level.

Comment C: Quoting from the CE: "At the population (watershed) scale, there are no results to report because the bulk of restoration actions are scheduled to be implemented beginning in 2012. Thus, to date, only pre-treatment data have been collected. At the reach scale, however, current results indicate that previously implemented restoration structures (engineered log jams and rock barbs) provide deeper and slower flowing habitat for Chinook and steelhead than untreated stream reaches, and these factors contributed to increased fish density. However, large variation was observed in fish abundance between early- and late-season sampling events . . . This suggests that fish responses to habitat restoration should not be based solely on density. Post-treatment data, which will be collected over the next several years, will determine if the restoration structures result in a population-scale response." Id., Section 2 at 368 (emphasis added). Even where relevant data apparently is being collected, drawing conclusions will require many more years of research. (SOWSC)

Quoting from the CE: "ISMEP and CHaMP are working together to address this RPA. There is currently no information on trends in habitat condition, and there were no significant trends in Chinook or steelhead juvenile survival or smolt production during the first several years of the study. Several habitat treatments (primarily instream flow) have been or will be completed by 2012, but there has been no trend in freshwater survival rates over six years of monitoring. To date, the only increase was in number of juvenile Chinook produced per redd in the Lemhi River and Hayden Creek, but there are only three years of data, and the trend was the same in both streams. It is too early to determine if the restoration actions will be successful." Id., Section 2 at 371 (emphasis added). Finally, evidence of actual survival increases from tributary habitat actions is years away and we are unlikely to know whether the tributary habitat efforts actually produced the predicted survival improvements in a time frame relevant to the jeopardizing effects of FCRPS operations. (SOWSC)

Response C: These quotes are taken out of context as they refer only to Integrated Status and Effectiveness Monitoring Program (ISEMP) results in the Entiat and the Lemhi to date. There are additional studies addressing the issue of survival increases from tributary habitat actions. Population level data are being combined with habitat data to develop tributary habitat relationships for several watersheds. This information will be available for the next expert panel habitat assessment process and CE. Several of these fish survival and habitat relationships are identified in the report "Life-Cycle models of salmonid populations in the interior Columbia River Basin" (Zabel et al 2013). See also the Action Agency's Tributary Habitat Benefits paper, "Benefits of Tributary Habitat Improvement in the Columbia River Basin: Results of Research, Monitoring and Evaluation, 2007-2012," (BPA and Reclamation 2013b) and NOAA's 2014 BiOp (Section 3.1.1.8.3) for more information on the benefits of habitat actions.

Comment D: As the Tribe has previously emphasized in its comments on the Draft Comprehensive Evaluation, Lolo Creek and the Imnaha have been identified as the one population to be monitored for status and trends monitoring through CHaMP. In addition, the South Fork Clearwater has also been identified as an important population to implement CHaMP based on its expansive habitat restoration program, large HGQ (14%) target, and fish-in fish-out monitoring. For all three population areas, the Nez Perce Tribe has been identified as the agency to lead the effort. To date, none of these CHaMP projects have

been started. The Tribe believes that the 2014-2014 Implementation Plan should include ESA's commitment to funding and implementing these CHaMP projects, as they are important for many reasons. (NPT)

Response D: This response is specific to the points regarding implementation of CHaMP. In 2014 the results from the three-year CHaMP pilot will be evaluated for the utility in integrating and correlating CHaMP data with fish population data. Consideration of CHaMP and other RME programs will be evaluated for future implementation. Results from the pilot may result in adaptive management changes from the one population per MPG requirement in order to be more representative of specific species interactions with unique environments. Because the RPA and AMIP commitments to habitat monitoring do not require monitoring to be completed solely through CHaMP any expansion beyond the CHaMP pilot would be coordinated with other regional entities involved in watershed scale RME. The RME program will continue to be implemented in such a way as to meet RPA and AMIP objectives.

Comment E: The commenter believes that the Draft CE represents a good snapshot of both the successes and the hiccups over the years under examination. Inasmuch as we are told that it is the most far-reaching and expensive ESA-listed recovery program ever, some hiccups were inevitable. For example, we had hoped that the estuary and tributary habitat programs could have been begun earlier and been farther along than they are. We recognize the reasons for the slower start, and believe that these projects will continue to accelerate as the Federal partners develop models that work well and show promise. (We also acknowledge that the slower pace at the beginning probably kept some less robust and sketchy projects from ever starting.) Of course, what we want, in particular, are estuary and tributary habitat projects that not only show strong positive impacts in providing clear and direct habitat benefits to fish, but also can be copied and then applied elsewhere within the system to increase chances for such later projects' success using that model. We also think that strong RM&E efforts must accompany habitat projects, along with their adequate funding. (IPNG)

Response E: The Action Agencies agree that it is important to identify which actions show the greatest benefits to fish. The BiOp RM&E program approaches this through both Project Level and Watershed Level Action Effectiveness monitoring. In addition, a habitat and fish status and trends program is used to develop habitat and fish relationships. This information will provide critical information for identifying the limiting factors in habitat and the expected benefits of various actions to address those factors.

Issue 15: Other Comments on Tributary Habitat Issues

Comment A: The CE needs to accurately acknowledge all parties' roles. (e.g., Section 2, Appendix, page A-26: "The SRSRB, Accord partner CTUIR, USFS, Washington Department of Fish and Wildlife (WDFW) and the local SWCD's are using tributary and reach assessments and other updated scientific information to...." The Nez Perce Tribe has been active and participated with the SRSRB and the other regional partners since 2010. (NPT)

Response A: Comment noted. The text of the draft CE has been revised in the final CE to include the Nez Perce Tribe in this list of participants.

Comment B: The Nez Perce Tribe's 2007-393-00 "Protect and Restore Northeast Oregon" was expanded in 2010 to include Southeast Washington, and has been working with the Snake River Salmon Recovery Board to secure funding for passage project in Pataha Creek, a tributary to the Tucannon; this project needs to be reflected in "Projects Associated with Metrics evaluated by the 2012 Expert Panel" for the Tucannon River (p.156), the Grande Ronde River Lower Mainstem Tributaries (p. 170) and Tucannon River and Asotin Creek (p. 173). (NPT)

Response B: Comment noted. The draft IP, p. 173, was revised in the final IP to respond to the comment regarding Lower Snake River Steelhead, Tucannon Population. The Pataha Creek barrier removal was reviewed by the expert panels during the 2012 workshop. Work proposed in Pataha Creek for Assessment Unit TUS1C will benefit the Tucannon River Steelhead Population. The oversight in including the Protect and Restore Northeast Oregon project name under the "Projects Associated..." column was a function of a modification to the Assessment Units to include the Pataha Creek Unit (TUS1c) in December 2012. The modification was requested by the local Expert Panel. Prior to this, two assessment units were identified for Tucannon steelhead (TUS1A and TUS1B). The modification added a new assessment unit (TUS1C) specifically for Pataha Creek. There are no Chinook in the Pataha Creek per an email from the Snake River Salmon Recovery Board Executive Director to the Action Agencies.

Estuary Habitat

Issue 16: Estuary Action Timeframes

Comment A: One commenter noted the gains resulting from habitat improvement projects in the Columbia River Estuary and said the projects demonstrate strong cost to value benefits, although some benefits may appear more slowly (IPNG). Others stated that estuary projects are behind schedule and questioned whether the Action Agencies can develop replacement projects and implement additional projects in time to meet Survival Benefit Unit (SBU) targets for ocean and stream-type fish by 2018 (SOWSC).

Response A: The Action Agency restoration strategy for the Columbia Estuary Ecosystem Restoration Program (CEERP) anticipated that research and experience would increasingly inform actions and therefore has an adaptive management component to adjust accordingly. The program's focus has evolved as advice from restoration experts and more than 10 years of research, monitoring, and evaluation (RM&E) have better identified the most effective types of habitat improvement projects. It is important to note that scientific understanding of estuary habitat and its role in the life cycles of salmon and steelhead developed later than similar understanding of tributary habitat and continues to develop. The Action Agency strategy has responded accordingly with a pipeline of projects prioritized according to recognized scientific criteria for actions expected to produce the greatest benefits for fish.

The Action Agencies have paid particular attention to the evaluation of potential habitat projects by the Expert Regional Technical Group (ERTG), a panel of experts in habitat

restoration and estuarine science who apply both expert judgment and current science to assess the benefits of projects. The Action Agencies have in recent years applied several restoration principles noted by the ERTG to identify prospective projects with more pronounced benefits for fish. These principles indicate that the greatest benefits should be expected from projects that are geographically larger and closer to the Columbia's main stem and thus more accessible to migrating fish. The principles also indicate that restoring historic channels is preferable to excavating new ones and that more complete hydrologic reconnections provide greater benefits overall.

Based on this guidance, the Action Agencies have concentrated increasing effort on floodplain reconnections and wetland channel improvements close to the mainstem. For example, the Action Agencies have shifted away from tide gate replacements, which provide limited hydrologic connections, and placed a higher priority on dike breaches that more fully restore those connections and the natural processes that come with them. Projects outlined in the 2014-2018 Implementation Plan reflect this shift, with lower priority projects replaced by others expected to yield greater benefits for fish. In addition, some projects that proved infeasible have been replaced by new projects. The 2013 Comprehensive Evaluation documents the accelerated delivery of benefits from estuary habitat projects (see Figure 41, page 74, Section 1 of Draft CE); the additional benefits became increasingly evident in 2013 and are expected to continue through the remaining term of the BiOp.

Given this improved focus on and delivery of projects with additional benefits, the Action Agencies expect to meet the BiOp's SBU targets for both ocean-type and stream-type fish. This is true even though SBUs for stream-type fish have proven more challenging to obtain than originally envisioned; ERTG scores to date indicate that stream-type benefits are accruing at about half the rate originally envisioned in the BiOp. The Action Agencies have recognized this and as described in the 2014-2018 Implementation Plan are developing projects that will meet stream-type benefit targets and will likely significantly exceed SBU targets for ocean-type fish.

Comment B: Estuary habitat improvement projects described in the Implementation Plan lack important details such as location and specific descriptions (SOWSC).

Response B: The majority of Action Agency projects require a private landowner willing to support habitat improvement, often through the sale of land or conservation easements. The Action Agencies have a responsibility to protect the privacy and personal information of such landowners as well as the confidentiality of financial negotiations, which limits how much detail we can provide about future projects. Land acquisitions, for example, can be complicated and require extensive negotiations and coordination with local officials, neighboring landowners and others long before the start of any restoration. Additional details about these projects will be available in future Annual Progress Reports (APRs).

Issue 17: Estuary Action Benefits

Comment A: Some commenters indicated that survival benefits expected from estuary habitat improvements were too optimistic and questioned whether the anticipated projects will produce the biological benefits described in the BiOp, especially for stream-type fish. The method and process for estimating SBUs needs independent science review (SOWSC, OR).

Response A: As the Action Agencies have refined and accelerated habitat improvement actions in the Columbia River estuary, an intensive research, monitoring and evaluation program has tracked and assessed the results of such actions. Scientists have consistently found that the estuary habitat supports an important segment of the juvenile salmon life cycle and that the estuary habitat improvements benefit migrating salmon and steelhead that occupy the habitat as well as others that feed in the estuary as they migrate through it.

These results are included in several reports describing the findings of research, monitoring and evaluation in the Columbia River estuary. For example, in “Evaluation of Cumulative Ecosystem Response to Restoration Projects in the Lower Columbia River and Estuary, 2010,” published in 2012, the seventh and final annual report of a seven-year project, the Pacific Northwest National Laboratory (PNNL) examined the cumulative effects of habitat improvements in the estuary. PNNL “found that the stronger the (hydrologic) connection, the better the flow of materials and species between the habitat and the broader ecosystem.” “These and other findings verified that site-specific habitat restoration actions benefit offsite conditions, and that many projects would result in an overall improvement in the ecosystem” (Johnson et al. 2012).

In addition, PNNL and NOAA Fisheries scientists in January 2013 prepared a synthesis memorandum in which they summarized the state of the science of salmon ecology and habitat restoration in tidally influenced areas of the estuary. PNNL and NOAA Fisheries concluded that that fully reconnecting habitat to the estuary is “correlated with increased opportunity, capacity, and realized function, which provide benefits to juvenile salmon in the lower river and estuary,” and that projects targeting floodplain habitat “are showing immediate benefit to juvenile salmon by providing access to habitats as well as processes supportive of ecosystem services of benefit to the entire estuary.” (Thom et al. 2013)

The U.S. Geological Survey and Army Corps of Engineers examined the results of a project that reestablished about 94 acres of wetland and channel habitats at Crims Island in the estuary. They estimated that 11,000 to 13,000 subyearling Chinook salmon used the site following restoration and concluded that a “95 percent increase in available habitat coupled with the large numbers of subyearlings with high condition factors collected post-restoration indicate that the project was largely a success in creating suitable rearing habitat for subyearlings.” (Haskell and Tiffan 2011)

Finally, PNNL and NOAA Fisheries assessed the cumulative effects of restoration in the estuary for the Corps of Engineers in a report that was released in December 2013. They concluded “that hydrologic reconnections restore access for fish to move into a site to find prey produced there. Reconnections also restore the potential for the flux of prey from the site to the main stem river, where our data show that they are consumed by salmon.” (Diefenderfer et al. 2013)

In “Benefits of Habitat Improvements in the Lower Columbia River and Estuary: Results of Research, Monitoring and Evaluation,” (BPA and the Corps 2013b) the Action Agencies summarize the ecological role of the estuary as well as recently emerging results of habitat improvements. It also describes the ecosystem approach to restoration outlined by the Columbia Estuary Ecosystem Restoration Plan (CEERP 2013b), which is the Action Agency blueprint for habitat actions in the estuary.

The ERTG considers the results of the latest research when evaluating the benefits of prospective habitat projects for both ocean and stream-type fish. This provides an objective application of the science to the specifics of each project so that the anticipated benefits are reasonable and realistic. The ERTG process is currently scheduled for ISAB review in January 2014.

In summary, habitat improvement actions in the estuary contribute benefits for both juvenile salmon and steelhead that temporarily occupy estuary habitat and others that pass through the estuary. Habitat estuary improvements benefit juvenile stream-type and ocean-type fish. Continued research will provide additional details and definition of the extent and significance of those benefits.

Issue 18: Estuary Habitat Assessment Methodology

Comment A: A participant on the estuary expert panels felt that the meetings were poorly facilitated, with inconsistent participation. (OR)

Participants were expected to evaluate habitat projects with inadequate information, discussions were cut off before issues were resolved and members did not review final products (OR).

Response A: The ERTG process was developed under the BiOp to incorporate expert judgment and the latest science into a methodology for assessing the benefits of habitat improvement actions. The Action Agencies are not aware of the concerns described by the commenter about the organization or facilitation of ERTG meetings, but are and will continue to be responsive to feedback intended to improve the process. The ERTG includes five members, all of whom are considered experts in estuarine and restoration science. The ERTG process includes a distinct review of each habitat project, with a presentation and discussion with the project sponsor and, usually, a visit to the project site. This process is designed to assure that members have the information they need to objectively evaluate each project and its expected outcomes.

Hatchery

Issue 19: Hatchery Benefits

Comment A: NOAA and the Action Agencies have previously disclaimed any reliance on predicted survival benefits from hatchery reforms, see *NWF v. NMFS*, CV- 01-640-SI, Federal Defendants’ Summary Judgment Memorandum (Opposition and Cross-Motion) at 51-53 (filed Oct. 24, 2008), however the draft CE suggests that rather than address the flaws in their hatchery analysis the Action Agencies claim survival improvements from hatchery reforms. The CE’s description with respect to "estimating the benefits from hatchery reform" fails to reveal that the 2008 FCRPS BiOp adopted the Action Agencies’ preferred method for quantifying the relative productivity improvements associated with certain hatchery reforms- a method that was not accepted by the scientific community or NOAA in evaluating Hatchery and Genetic Management Plans (HGMPs). There are issues concerning the validity of the underlying assumption in the BiOp’s Appendix I that removing hatchery fish from the spawning grounds increases the relative reproductive success of natural fish and therefore provides a percentage survival increase in productivity—the method and the math behind the Stier and Hinrichsen model remain perplexing. Additionally, the hatchery section references an 11.5% to 12% “Improvement Relative to FCRPS BiOp” claim for the development of local Spring Chinook broodstocks in Catherine Creek and the Upper Grande Ronde (Table 4, page 81 CE Section 1). These broodstock changes actually occurred in the mid-1990s, 10 to 15 years before the 2008 jeopardy analysis. The Action Agencies cannot claim the benefits of actions that were implemented years before the baseline of the Biological Opinion. (NPT, OR, SOWSC)

Response A: The Stier-Hinrichsen model estimates changes in the combined productivity of a salmonid population where some of the spawners are hatchery-origin fish and where changes in hatchery practices have improved the productivity of the hatchery-origin portion of the spawning population. The model was reviewed by NOAA and staff from the Northwest Fisheries Science Center. The reviewers concluded it was a valid method for estimating the productivity improvements resulting from hatchery reform actions. Model results were incorporated into the analysis for NOAA’s 2008 FCRPS Biological Opinion. In the case of Catherine Creek spring Chinook salmon, the 2008 analysis was updated based on recent empirical data resulting from a relative reproductive success study funded by BPA. The Catherine Creek relative reproductive success study (referenced above by the commenter) finds that hatchery-origin spawners in the Catherine Creek population are on average about 83 percent as productive as the natural-origin fish in this population. The Stier-Hinrichsen model is clearly described in Appendix I of NOAA’s 2008 Supplemental Comprehensive Analysis (“Quantitative Analysis of Hatchery Actions”).

The 2008 FCRPS BiOp’s base-to-current adjustment properly estimates the effects of hatchery reform actions implemented during the BiOp’s 20 year base period (roughly brood years 1980-1999). The base-to-current adjustment estimates proportional changes in productivity resulting from a reform actions relative to the average productivity across the 20 year base period. A more thorough discussion of the 2008 BiOp’s analytical approach can be found in Chapter 7 of NOAA’s 2008 Supplemental Comprehensive Analysis.

In the Memorandum in Support of Federal Defendant's Cross-Motion for Summary Judgment and Opposition to Plaintiffs' Motion for Summary Judgment, filed October 24, 2008, at pp. 48-49, federal defendants explain the methodology used to consider species that have benefitted from hatchery reforms. At pp. 51-53, federal defendants explain that NOAA considered the effect of programmatic hatchery funding conditions, but not the effects of future hatchery consultations or site specific hatchery actions. At p. 52 federal defendants state that NOAA did not rely on the benefits of RPA 39 required HGMPs pending future hatchery consultations, citing the BiOp at 8-35.

Issue 20: Status of HGMPs

Comment A: RPA Action 39 provided for the "FCRPS Funding of Mitigation Hatcheries Programmatic" and recognized that the Action Agencies would continue to fund mitigation hatcheries and that these would be undergoing ESA consultation. The CE does not describe that NOAA has only completed seven of 44 HGMP (hatchery genetic management plan) consultations in five years. Instead, it describes what HGMPs are supposed to be but then acknowledges that so far that by the end of 2012, the August 2010 deadline set for completing all consultations in the 2008 BiOp RPA has passed. The CE makes does not mention this schedule or the consequences of a failure to meet it. The Hatchery and Genetic Management Plans (HGMPs) for Action Agency-funded hatchery programs are listed in Tables 39-41 (pages 198-206, CE Section 2). The completion of reports provides no biological benefits to salmon and steelhead. (OR, SOWSC, NPT)

Response A: The Action Agencies reported on the status of the Hatchery and Genetic Management Plan (HGMP) consultation process (RPA 39) accurately through the end of calendar year 2012 (see CE Section 1 and Section 2). We agree that the original schedule for completing the RPA Action 39 consultations was overly ambitious, given the enormous amount of coordination, writing, analysis, and review by hatchery operators, fishery co-managers, Action Agencies, and NOAA that is required to complete an HGMP and accomplish the consultation process for a hatchery program. This careful effort, albeit more time-consuming than expected, has paid off in HGMPs that adequately describe the hatchery program, are supported by all co-managers, NOAA, and the Action Agencies, and identify necessary hatchery reforms to avoid impeding recovery of listed stocks. NOAA's analysis and issuance of final Biological Opinions and Permits for hatchery programs is based on the latest scientific information on hatchery effects. The actual biological benefits of most implemented reform actions will be will very difficult to quantify but may be detected through long-term monitoring and evaluation.

Issue 21: Hatchery RME

Comment A: The NPT expressed concern on the delay of initiating AMIP Amendment 6. Stating that initiation of the CRHEET process is important and needed in order to move forward with some RPA related projects; specifically those relative reproductive success evaluations of supplementation programs. Also, the CE inconsistently references the status of CRHEET. Additionally, the "Adaptive Management" action in the IP describing that "the Action

Agencies are developing a streamlined RME approach for a framework for identification and assessment of successful hatchery reforms" might refer to a unilateral development by the Action Agencies. (NPT)

Response A: The RPA (AMIP Amendment 6) requires the Action Agencies to assist NOAA in convening a technical workgroup to discuss potential studies and potential management tools which will provide support for future hatchery management actions with the goal of reducing potential adverse hatchery effects. When NOAA is in the position to initiate the workgroup (current being referenced as "Columbia River Hatchery Effects Evaluation Team"), the Action Agencies intend to work closely with NOAA to support this effort. NOAA has indicated that they intend to begin the process of initiating the workgroups once the FCRPS mitigation hatchery ESA consultations have been completed. To ensure this message is consistently portrayed in the CE, the Action Agencies have added clarification language to Section 2, RPA

The Action Agencies' reference in the IP to a streamlined RME framework is not a reference to CRHEET (or any similar regional processes). Rather, the RME framework is a document developed by the Action Agencies to improve internal management of information compiled from existing Action Agency-funded hatchery RME projects. The Action Agencies recently produced similar Tributary Habitat RME Framework (BPA and Reclamation, 2013) and Estuary Habitat CEERP documents (CEERP 2013a and b) for the same purpose.

Comment B: Adding reference to Ad Hoc Supplementation Work Group recommendations (Beasley et al 2008) as a guide to monitoring Viable Salmon Populations would be beneficial (pp. 115-116). (NPT)

Response B: The Ad Hoc Supplementation Report is already referenced under RPAs 63.1 and 63.2 for hatchery effectiveness monitoring. With regard to VSP monitoring, the FCRPS RME Recommendations report (FCRPS, 2010) references NOAA Fisheries' ESA Viability monitoring guidance by Crawford and Rumsey, 2011.

Issue 22: Other Hatchery

Comment A: The CE and the IP fail to accurately characterize the Northeast Oregon Hatchery action required by RPA 42 of NOAA's FCRPS BiOp. NOAA's requirement in RPA 42 refers to an action that the Action Agencies will implement in the BiOp, contingent only on a NOAA-approved HGMP. However, the CE and IP state that the program will be funded "when capital funds are available." The consequences of this action not being implemented are now being felt. A catastrophic loss of spring Chinook juveniles at Lookingglass Hatchery in 2010 meant that only 62,000 juveniles of the 250,000 program were released. As a result, only 100 adult hatchery fish and 300 adult natural fish have returned to the Lostine this year; returns in the past several years have been several thousand fish. (NPT)

Response A: Section 4(h)(10)(B) of the NW Power Act requires approval from Congress before construction of capital facilities with a life greater than 15 years and an estimated cost of at least \$2.5 million. Therefore, budgeting of capital funds by BPA for hatchery

construction is necessary and requires a minimum two-year or longer Congressional approval process. This approval process can delay construction of the hatchery regardless of NOAA's approval of the HGMP.

The Action Agencies were aware that Lookingglass Hatchery encountered some water supply issues in 2010. Once entities became aware of the issue, Oregon Dept. of Fish and Wildlife (ODFW) and BPA through the Lower Snake River Compensation Plan (LSRCP) promptly committed funds which fixed the water supply issue. Since that incident, the Action Agencies have not been aware of any subsequent water supply issues and there have been no major fish losses at the hatchery since the 2010 incident.

Comment B: The CE portrays Dworshak Hatchery as being operated solely by the US Fish and Wildlife Service (Section I, p. 77; Section 2, p. 215). Federal law -- the Snake River Water Rights Act of 2004 (Public Law 108-447) -- recognizes the Nez Perce Tribe as a co-manager and operator of Dworshak Hatchery. Secondly, the CE describes upgrades at Dworshak Hatchery as being "other significant FCRPS hatchery reform accomplishments" (Section I, p. 77). These upgrades were not part of the FCRPS BiOp or the hatchery reform list. The improvements were the result of the US Fish and Wildlife Service and the Nez Perce Tribe working with Corps and BPA funded Lower Snake River Compensation Plan to find funding within their hatchery budgets, and with BPA providing additional energy efficiency funding. To the extent the CE is attempting to accurately depict what is occurring on the ground, this is appropriate; however, it is not appropriate for the CE to attribute these changes to the FCRPS BiOp. (NPT)

Response B: The Action Agencies will modify the CE language to recognize NPT as a co-manager of Dworshak Hatchery.

The Action Agencies have removed the reference to hatchery reform associated with this activity in CE Section 1, because not all of the improvements were specific to hatchery reform. The CE now describes these improvements as facility upgrades and implementation of Best Management Practices (BMPs).

Comment C: Regarding RPA 40.2 Snake River Steelhead - The Action Agencies may only rely upon actions that are "reasonably certain to occur" and therefore must demonstrate that they are providing or allocating dollars to these hatchery "reform" activities or that these actions will be funded by LSRCP without affecting the other obligations and commitments of LSRCP funds. (NPT)

Response C: The description of RPA 40.2 actions in the Implementation Plan came directly from LSRCP. Therefore, the work will not affect LSRCP's other "obligations and commitments," and LSRCP intends to carry out the action. Furthermore, the actions included in the IP description are in addition to, not in lieu of, the Action Agencies' FCRPS BiOp requirements.

Comment D: The CE incorrectly and inaccurately uses the word "stray" (e.g., Section I, Table IV). The term "stray" as used and accepted by the fisheries community is a fish that is not from that area. A hatchery fish of local broodstock is not a stray; it is returning to the river of its origin as it was meant to. The CE also incorrectly uses that term in Section I, Table 51 describing the "reform action" as a "reduction in straying"). The CE must use accurate and precise terminology. (NPT)

Response D: The Action Agencies believe that this comment is related to hatchery reform action Table 5 (not Table 51). Action Agencies will delete the reference to the “reduction in straying” and instead state “reduction in hatchery origin spawners.” (The Lostine River is supplemented with hatchery origin fish using local broodstock. When adults return, they are not “strays” from out of basin, but they do make up the proportion of hatchery origin spawners. Managing hatchery origin spawners at a prescribed level using the weir could be beneficial to productivity of the spring Chinook population. Removing out-of-basin strays at the weir would also be beneficial.)

Comment E: Nez Perce Tribe not listed as co-manager of Tucannon spring Chinook in the CE; this needs to be corrected. In addition, the "Adaptive Management" column describing RPA 41.2 regarding Snake River Spring/Summer Chinook, Tucannon River Spring Chinook "is incorrect." (NPT)

Response E: The Action Agencies have corrected the CE to include NPT as co-manager of Tucannon spring Chinook. The Action Agencies interpret the second comment to refer to a failure to recognize the NPT as a co-manager in the Tucannon River Spring Chinook program. A modification to the existing IP language has been made to identify NPT as co-manager.

Predation

Issue 23: Piscivorous Predation

Comment A: Oregon plays an important role in assessing the Northern Pikeminnow Management Program (NPMP). The CE largely focuses on reported values for changed predation rates, exploitation rates, and that “we have not found evidence of compensation by other fish predators.” These are appropriate metrics used to assess the NPMP. Some of the values are out of date and we will provide updates for the metrics reported. The statement that the NPMP has saved “3 to 5 million juvenile salmon annually that would otherwise have been consumed by this predator” is a misleading portrayal of the program’s benefits and should be removed. Predation mortality does not act independently from other mortality sources. Many of the juvenile salmon consumed may have been vulnerable due to injury or disease. If not consumed, many of the ‘saved’ fish may have died from other causes. (OR)

Response A: We do not disagree with the comments regarding compensatory versus additive mortality associated with the Northern Pikeminnow Management Program. But any human action undertaken to benefit salmonids in any of the four main H areas is subject to the same criticism regarding compensation. Very few attempts have been made to assess and incorporate compensatory mechanisms into actions that estimate salmonid survival benefits. At this time, the only known effort of this kind is with regard to avian predation by Double Crested Cormorants. Therefore, the Action Agencies believe the CE accurately characterizes this issue.

Issue 24: Avian Predation

Comment A: With the hydro system on track to meet BiOp requirements, it is essential that harvest and other factors impacting fish are also meeting recovery goals. NRU members support actions to reduce mortality of ESA-listed fish by developing a management plan and constructing alternative habitat for Caspian terns and double-crested cormorants, continuing the northern pikeminnow management program, and identifying and implementing effective deterrents against California sea lions. We support continued cooperation between the Action Agencies, US Fish and Wildlife, and NOAA Fisheries to balance the various statutory obligations governing the treatment of predatory species. While measures to address predation occur within the BiOp, other harvest impacts on ESA-listed fish are primarily managed through the states, tribes, and federal agencies other than the Action Agencies. NRU members support continued efforts to identify and implement measures to reduce the impacts of harvest on ESA-listed natural origin fish. We will continue to work with Northwest River Partners to monitor this approach to harvest. (NRU)

The draft CE also addresses predation, where the report captures the scope of the various (and sometimes creative) projects undertaken to address these problems. It has been IPNG's position that failure to move aggressively to address predation threats erodes the broader public support for the BiOp with its significant costs. Members of the public who learn about the adverse impacts—by whatever calculations that are used—of sea lion predation, or Caspian tern, cormorant or pikeminnow predation—have reason to question the substantial overall costs elsewhere in the BiOp if they are not matched by aggressive predation reduction efforts. The value of high costs elsewhere should not be questioned by slow-moving predation reduction programs that face further challenges, or do not secure robust funding. (IPNG)

Response A: The 2014-2018 Implementation Plan identifies actions the Action Agencies will take to continue addressing predation impacts from Caspian terns, double-crested cormorants, pikeminnow, and pinnipeds. In particular, the Corps, USFWS and others, is developing a management plan for Double-Crested cormorants in the estuary, with implementation expected to begin in 2015. The Corps and Reclamation, along with USFWS, have developed a management plan for Caspian terns in the inland basin. If approved, implementation will begin in 2014 with actions at Goose Island, Potholes Reservoir and Crescent Island in the McNary pool.

Comment B: For example, the 2008 BiOp identifies only one measure to reduce the high level of tern predation from East Sand Island, reducing the area of the tern colony "to 1.5 to 2.0 acres." 2008 BiOp, RPA at 64 (RPA 45). Yet, as the CE indicates, this measure has now been implemented – the aerial extent of the colony has been reduced to 1.5 acres – but with little or no effect on predation numbers. CE, Section 1 at 84-85 (though nesting acreage has decreased to 1.5 acres, tern predation increased in 2012). (SOWSC)

Response B: The Action Agencies have addressed the consequences of avian predation in the Columbia River estuary. From 2000 through 2007 the number of nesting pairs on East Sand Island was relatively stable at about 9,000 breeding pairs. In 2008, the colony size had grown to

about 10,000 nesting pairs and juvenile salmon consumption was estimated to be 6.7 million. Since then, the managed tern colony area has been progressively reduced, with a total of 1.58 acres made available in 2012. Although nesting densities have increased as colony area has decreased, the tern colony size (number of nesting pairs) and number of juvenile salmon consumed has declined commensurately to about 6,400 nesting pairs and 4.9 million respectively; a 26% and 36% reduction since 2008, suggesting that management actions have been effective.

Comment C: While not denying the veracity of the press release, one might wonder how effective the avian deterrent action was on the long-term goal of improving juvenile salmon survival. Does the addition of more avian deterrent wire keep the birds from feeding or does it just restrict their feeding to a bit further downstream? Is a citation to credible science provided or is there any biological energetic modeling to support the contention that system survival has increased? How did all this activity (testing, adaptive management, further testing) contributed toward obtaining this longer-term goal? Once satisfied by answering these questions, next ask what was the use of the untold millions spent meeting the dam's Performance Standard? (Levy)

Response C: Dams affect juvenile fish distribution and behavior in ways that in turn can create advantages for predators as fish pass into the tailrace. Avian deterrent wires at dams are designed to mitigate for some of these effects by protecting fish from birds in the immediate tailrace areas of dams. Avian deterrent wires are designed as part of the juvenile passage systems (Juvenile bypass, surface flow outlet, spill) and their benefits are captured in the overall dam survival estimates. There is a substantial body of research to support the use of avian wires as a fish protection measure at dams. Much of this work was completed in the mid-1990's and therefore is not cited in the CE. But the CE does cite recent studies completed at John Day and The Dalles dams. Dam and system survival are both measured empirically, which in the view of the Action Agencies is a more direct, credible assessment than bio-energetic modeling (why model what you can measure directly?). As expected, in-river system survival has been increasing in recent years, coinciding with increases in dam survival. Indeed, as the commenter points out, birds will feed downstream of the wires at dams. In fact, avian predators are a natural part of the ecosystem, and even without dams, birds would eat fish in the Columbia and Snake rivers.

Comment D: Footnote 14 - "The number of smolts consumed by these birds represents about 20% of the total number of juvenile fish that survive the dams, reservoirs, and transport to reach the estuary." (SOWSC)

Response D: The Action Agencies understand the baseline conditions in the Columbia River estuary (CRE) have changed; the cormorant colony on East Sand Island has increased substantially in recent years. This occurrence has likely resulted in increased predation impacts on juvenile salmon. The magnitude of these impacts has varied from year to year. The Action Agencies have studied and characterized these changing conditions and predation impacts over the past years and are working towards implementing actions that effectively reduce these impacts. These potential actions are being analyzed per the federal National Environmental Policy Act and the Corps expects to begin implementing actions in spring 2015.

Comment E: As the agencies acknowledge in the CE, five years into the BiOp, the only plan to address cormorant predation remains—to make a plan. See CE, Section 1 at 87 (noting that a final plan may be completed by 2014 with “implementation of identified management actions is expected to begin in 2015”). (SOWSC)

Response E: The Action Agencies have addressed the consequences of avian predation in the Columbia River estuary. The Corps is working collaboratively with the other cooperating agencies, USFWS, USDA, ODFW, and WDFW, to prepare an Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act. The EIS will identify the Corps’ preferred alternative for meeting the management goal of increasing juvenile salmon survival to steelhead by 3.6% (as set forth in the FCRPS BiOp). Preparation of the EIS is in progress, and the Corps expects to sign a Record of Decision by December 2014, with implementation of the preferred alternative (management actions) beginning in spring 2015. Management actions are expected to affect the cormorant colony and their foraging impacts on juvenile salmon immediately. Benefits to improved juvenile salmon survival are expected to be realized in the first year of implementation.

Research, Monitoring, and Evaluation

Issue 25: RME General

Comment A: The research, monitoring and evaluation program should be utilized to support measurable actions with a strong scientific basis. Activities without measurable benefits should be reduced or eliminated. The program should promote accountability for the implementation of the BiOp and be utilized to identify best practices. NRU members support utilizing the research, monitoring and evaluation program to quantify the benefits of BiOp activities and to identify the most effective actions to enhance fish survival. (NRU)

Response A: The RM&E program is conducted in accordance with the RPAs, which supports a strong scientific basis for adaptive management actions.

Comment B: Central to a recovery plan is a robust Research, Monitoring and Evaluation (RM&E) module and it is here that the 2008 BiOp goes only halfway. Whereas the FCRPS migration survival of adults has both a long-term goal AND benchmarks to be met along the way, FCRPS migration survival of juveniles has only a longer-term goal. Where are the benchmarks for juvenile migration? They are absent, suspiciously so. (Levy)

Response B: There are annual juvenile survival benchmarks. The BiOp benchmarks for migration survival include 1) juvenile dam passage survival targets; 2) comparison of annual juvenile in-river survival monitoring results to COMPASS modeling estimates for validation of the BiOp assessments for expected survival; and 3) system survival targets for juveniles. See (CE Section 2)

Comment C: Cost share support for continuing PNAMP is described (IP p. 91); however, BPA has not provided the Nez Perce Tribe with the requested support for PNAMP. (NPT)

Response C: BPA provides funding to the NPT, as well as other state and tribal entities, to support regional coordination. This is funded under Project 2012-006-00 - Nez Perce Tribe Coordination. PNAMP and the Coordinated assessments participation is intended to be supported through this funding at the discretion of NPT, as recommended to all organizations under the NPCC Resident Fish, Regional Coordination and Data Management Categorical Review from 2012. In addition, as a CRITFC Member, the NPT has CRITFC representatives participating in PNAMP to aid the four CRITFC Partner Tribes.

Comment D: RPA action 55.9 is described as completed (p. 102). However, validation of PIT tag array estimates with other methods of adult escapement was identified in MERR and the Skamania process. This validation remains underway and needs to be completed. (NPT)

Response D: The Action Agencies agree that the ongoing validation of the use, applications, and environmental limitations of adult tag arrays is needed. This work is continuing, but initial highly successful results under ISEMP have led us to start planning for additional reliance and expansion of this approach.

Issue 26: Fish Population Monitoring

Comment A: Expanding the PIT tagging of adult returns to include hatchery origin fish is proposed. This concept has not been vetted regionally. A clear purpose has not been established other than general reference to stray assessment. Such a proposal will likely require additional trapping demands on Lower Granite Dam and additional funding- which should not come by reducing, other more collaboratively based projects. (NPT)

Response A: The Action Agencies believe there is potential to obtain more precise and accurate estimates of the proportion of hatchery fish on the spawning grounds and save money over existing monitoring methods by expanding the current PIT tagging of wild adults at Lower Granite to include some level of tagging for hatchery fish. In addition, for some populations, this effort has the potential to provide important information on spatial distribution and perhaps magnitude of hatchery straying. BPA intends to investigate the feasibility and cost/benefits of such an expansion through technical assessments and collaborative discussion within the Action Agencies /NOAA BiOp RM&E workgroup and regional technical forums such as the Lower Granite Trap Technical Advisory Committee and the proposed CRHEET process. Future actions will include assessments of the feasibility of using adult PIT tags at Lower Granite to support Hatchery assessments.

Comment B: Populations to be monitored for fish-in and fish-out under RPA 50.6 (page 87 - 88) are inconsistent with the "Skamania process" and MERR recommendations. Snake River spring/summer Chinook populations should be: Tucannon River, Minam River, Imnaha River, Secesh River, Big Creek, Bear Valley Creek, Pahsimeroi River, Upper Salmon River mainstem, and Lolo Creek. Snake River steelhead populations should be: Big Creek, South Fork Salmon River, Lemhi River, Secesh River, Imnaha River, Lolo Creek, and Joseph Creek. (NPT)

Response B: The Action Agencies recognize the apparent inconsistency in the IP language. In coordination with the NPT, we will be providing a revised table for the IP. This update will clarify that we are maintaining advancements in monitoring precision that have already been achieved consistent with the Skamania and Research, Monitoring and Evaluation recommendations. In addition, some minor, additional adaptive management changes from earlier recommendations were identified in the CE and these changes will also be identified in the updated IP language.

Harvest

Issue 27: Harvest RME

Comment A: The CE shows that human predation in the form of commercial and sport harvest continues to be a significant drag on efforts to rebuild salmon and steelhead populations. This is clearly illustrated by Figure 44 on page 83. The BiOp called for additional work on selective harvest techniques so that the mixed stock harvest that occurs in both the ocean and the river can be better managed and ultimately eliminated. This would provide significant benefits to adult fish listed for protection under the ESA since harvest of adults has a direct impact on the numbers of fish that can return to successfully spawn. NWRP is aware of how difficult these changes are because much of the actual decisions concerning harvest levels, tackle and timing are determined by the parties in the *US v Oregon* process that is conducted without public involvement or participation (in contrast to the FCRPS BiOp proceedings). (NWRP)

The success of the BiOp, however, should not obscure the fact that any effort like this must be holistic. While the BiOp primarily addresses the hydro, habitat, and hatchery effects on fish, continued improvements must be made on the harvest front as this “H” continues to adversely affect salmon and steelhead populations. Additional work on selective harvest called for by the BiOp must be completed to better manage mixed-stock harvest and provide significant benefit to returning adult fish. (PPC)

Response A: The BPA fulfilled the BiOp’s directive to fund selective fisheries through the Colville selective fishing Project (BPA 2007-249-00). These techniques have been adopted by researchers at WDFW as they have initiated a multi-year mortality study in the lower river below Bonneville Dam using this gear type. As Oregon implements the policy of moving the commercial gillnet fleet off the main channel and into terminal areas, it is their intention to use the live-capture technology BPA originally sponsored as the gear of choice. Also, our support of terminal area fisheries in the BPA-sponsored SAFE program has contributed to the identification and pursuit of alternative terminal fishing locations in the lower river above Astoria.

Acronyms, Abbreviations and Glossary

AMIP	Adaptive Management Implementation Plan
AFEP	Anadromous Fish Evaluation Program
BiOp	Biological Opinion
CE	Comprehensive Evaluation
CEERP	Columbia Estuary Ecosystem Restoration Program
CHaMP	Columbia Habitat Monitoring Program
COMPASS	Comprehensive Fish Passage Model
CRE	Columbia River Estuary
CRITFC	Columbia River Inter-Tribal Fish Commission
CRTA	Columbia River Towboats Association
CSS	Comparative Survival Study
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
EIS	Environmental Impact Statement
FCRPS	Federal Columbia River Power System
FFDRWG	Fish Facility Design Review Workgroup
HGMP	Hatchery and Genetic Management Plan
HQI	Habitat Quality Indicator
IP	Implementation Plan
IPNG	Inland Ports and Navigation Group
ISAB	Independent Scientific Advisory Board
ISEMP	Integrated Status and Effectiveness Monitoring Program
ISRP	Independent Scientific Review Panel
LGR	Lower Granite Dam
MERR	Monitoring Evaluation Research and Reporting Program
MOP	Minimum Operating Pool
NOAA	National Oceanic and Atmospheric Administration
NPCC	Northwest Power and Conservation Council
NPMP	Northern Pikeminnow Management Program
NPT	Nez Perce Tribe
NRU	Northwest Requirements Utilities
NWRP	Northwest River Partners
O&M	Operation & Maintenance
OR	Oregon
PIT	Passive Integrated Transponder
PNAMP	Pacific Northwest Aquatic Monitoring Partnership
PNNL	Pacific Northwest National Laboratory
PNWA	Pacific Northwest Waterways Association
PPC	Public Power Council
RM&E	Research, Monitoring and Evaluation
RPA	Reasonable and Prudent Alternative
SAFE	Select Areas Fisheries Enhancement
SBU	Survival Benefit Unit
SOWSC	Save Our Wild Salmon Coalition
SRWG	Studies Review Work Group
SRSRB	Snake River Salmon Recovery Board
TDG	Total Dissolved Gas
TMT	Technical Management Team
USFS	United States Forest Service
WDFW	Washington Department of Fish and Wildlife

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