Response to Public Comments Received Regarding the Proposed ESA Recovery Plan for Snake River Sockeye Salmon *(Oncorhynchus nerka)*

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Prepared by

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Introduction

The Endangered Species Act (ESA) Recovery Plan for Snake River Sockeye Salmon (*Oncorhynchus nerka*) is the product of a multi-year collaborative process involving state, tribal, and federal entities and a wide variety of stakeholders. The National Marine Fisheries Service (NMFS) developed this recovery plan by drawing on the best available scientific information provided by technical experts from NMFS; the Northwest Fisheries Science Center; NMFS' Snake River Sockeye Salmon Technical Advisory Committee; four related recovery plan modules; technical documents prepared by the Interior Columbia Technical Recovery Team (ICTRT), and NMFS' Snake River Coordination Group. The resulting plan addresses recovery of the Snake River Sockeye Salmon evolutionarily significant unit (ESU). The geographic area covered by this plan includes the historical spawning and rearing habitat in the Sawtooth Valley in Idaho including the upper Salmon River and its tributaries, Stanley Lake, Redfish Lake, Yellowbelly Lake, Pettit Lake and Alturas Lake. In addition, the plan addresses the full life cycle of the ESU in its migration corridor from its natal lakes in the Sawtooth Valley to the ocean and back again.

Preliminary drafts of the recovery plan went through multiple reviews and revisions in response to comments from the NMFS technical reviewers and members of the Snake River Sockeye Technical Advisory Committee. This advisory committee includes representatives from the Idaho Department of Fish and Game, Shoshone Bannock-Tribes, U.S Forest Service Sawtooth National Recreation Area, Bonneville Power Administration, NMFS' Northwest Fisheries Science Center and NMFS staff. Between July 21 and September 19, 2014, NMFS made the proposed recovery plan – including four modules which were included as appendices – available for public review and comment (79 FR 42298; July 21, 2014).

NMFS received a total of six comments by mail, fax, or email on the proposed recovery plan from state and federal entities, as well as interested individuals. Comments dealt with the proposed recovery plan and the modules.

NMFS reviewed all comments for substantive issues or new information and have addressed them in the following summary. For readers' convenience, NMFS has organized comments by major issue categories, addressed similar comments with common responses where possible, and, in some cases, edited comments for brevity and clarity. Detailed editorial comments or minor corrections are not summarized here but were considered and incorporated into the recovery plan as appropriate.

Salmon are important to the people, culture, economy, and ecosystems of the Pacific Northwest. NMFS recognizes that public participation is essential to the task of protecting this precious natural resource. The recovery plan is the product of much work by numerous individuals and entities, and NMFS similarly welcomes the participation of all interested parties as we work collaboratively to implement it.

NMFS adopts the recovery plan with the incorporated revisions as the final plan. The ESA Recovery Plan for Snake River Sockeye Salmon is available at the following website:

http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/snake_river/current_snake_river_recovery_plan_documents.html.

Comments Pertaining to the Proposed Recovery Plan

A. General Comments

1. Comment: The recovery plan should clearly summarize the key requirements to be incorporated in a recovery plan, as identified in section 4(f)(1)(B) of the Endangered Species Act (ESA): (1) objective, measurable criteria which, when met, would result in a determination that the species is no longer threatened or endangered; (2) site-specific management actions necessary to achieve the plan's goals; and (3) estimates of the time required and costs to implement recovery actions.

Response: The recovery plan describes the ESA requirements of section 4(f)(1)(B) for what should be included in a recovery plan in the Introduction, Section 1.2. It also identifies the ESA section 4(a)(1) five listing factors for delisting that are addressed in this recovery plan. NMFS believes this recovery plan meets these ESA requirements. In addition it describes goals, strategies, actions, research and monitoring, and adaptive management needed to recover Snake River Sockeye Salmon.

2. Comment: The fact that recovery plan implementation is voluntary limits the effectiveness of the recovery plan and its ability to address limiting factors and threats and implementation of actions to recover the species.

Response: NMFS acknowledges that recovery plans provide guidance and are not regulatory documents, with implementation being largely voluntary. However, NMFS believes that developing recovery plans in partnership with state, tribal, and federal partners, as well as others whose actions affect this ESU, will result in support for implementing recovery actions. The recovery plan also identifies how NMFS intends to use this recovery plan (see Section 1.6 of the recovery plan). This includes providing context for regulatory decisions, providing criteria for species status reporting and delisting decisions, sequencing recovery actions, and organizing research and monitoring actions. NMFS will also be an active partner in recovery plan implementation as described in Section 10, as well as in assisting partners to find funding for recovery action implementation.

3. Comment: Provide a citation for the estimated number of sockeye salmon that historically returned to the Snake River basin because the stated number seems high.

Response: The citations for the estimated number of sockeye salmon that historically returned to the Snake River basin and to the Sawtooth Valley in Idaho are cited from two different sources: Evermann 1896 and Selbie et al. 2007. These citations have been added.

4. Comment: The recovery plan should include reference to the proposed, as well as the final, 1991 ESA listing decisions. It should also include what "10 fish returning per year" represents as a functional state of the ESU.

Response: The recovery plan has been updated to include a citation for NMFS' April 5, 1991 Federal Register notice proposing to list Snake River Sockeye Salmon as endangered under the ESA. Language has also been added to the introduction clarifying that 10 fish returning per year means the Redfish Lake population was at high risk of extinction.

5. Comment: Description of the original sockeye captive broodstock program should include a summary of points from the Independent Science Review Panel (ISRP) recommendations and concerns, i.e. that given remaining genetic diversity, re-establishment was unlikely. It should also be noted that the conservation program for Snake River Sockeye Salmon implemented as part of the Federal Columbia River Power System (FCRPS) Biological Opinion does not represent a full recovery program. A recovery plan includes actions that go beyond reasonable and prudent alternatives in scope and anticipated benefits to the species, and involve multiple parties and impacts.

Response: The recovery plan describes the captive broodstock program, its goals, key accomplishments and coordinated management by the multi-agency Stanley Basin Sockeye Technical Oversight Committee. Information summarizing key points from ISRP review recommendations has been added to Section 2.3.6, Captive Broodstock Program. NMFS agrees that the conservation program for Snake River Sockeye Salmon carried out under the FCRPS Biological Opinion is not a full recovery program for this ESU. The recovery actions funded as part of the FCRPS Biological Opinion are, however, key components for the recovery of this ESU and are identified in the recovery plan.

B. Executive Summary

6. **Comment**: For the Salmon River mainstem discussion in the Executive Summary, the recovery plan needs to correctly identify the barriers that restrict Sockeye Salmon passage to the natal lakes in the Sawtooth Valley.

Response: NMFS agrees that passage barriers need to be correctly identified and the recovery plan has been edited to accurately describe passage barriers wherever this topic is addressed.

7. **Comment**: The section on Key Strategies and Actions does not discuss the need to conserve population genetics and life history diversity of the native residual and resident forms of *O. nerka*.

Response: The recovery plan is based on conservation biology principles that recognize the importance of supporting functioning ecological processes, not only for the recovery of Snake River Sockeye Salmon, but also native species within the ecosystem. Specifically, this plan supports the conservation of native residual and resident forms of *O. nerka*. Information has been added to several sections of the plan clarifying that while the focus of this plan is on the recovery of ESA-listed anadromous Snake River Sockeye Salmon, residual Sockeye Salmon and Kokanee represent important life history and spatial diversity attributes which may contribute to recovery of anadromous Sockeye Salmon.

8. **Comment:** The encumbrance within Yellowbelly Lake Creek is not a "rock fall," but a 'lag deposit' – the stream flows through and under a glacial boulder field. In this case it is approximately ¼ mile long. It is referred to erroneously in several places as a “rock fall” and should be corrected. Also, since nothing has changed at this encumbrance, and sockeye passed it on occasion historically, is there a different contemporary question?

Response: NMFS agrees with this recommended correction in order to accurately describe the encumbrance within Yellowbelly Lake Creek. This correction has been made throughout the plan. Regarding the question about how the plan addresses potential future passage into Yellowbelly Lake, the plan identifies a recovery strategy that acknowledges as adult returns increase it is likely that Sockeye Salmon may return to Yellowbelly Lake through straying and natural recolonization. A recovery strategy question has been added to the strategy addressing improving passage to the natal lakes: Under what migratory conditions (e.g., timing, water flows, temperature) and how often can Sockeye Salmon currently migrate through the lag deposit boulder field?

C. Biological Background

9. Comment: The recovery plan should clarify what Evermann actually observed during his seasons in Idaho, versus what he was told about the existence of sockeye runs in the decades preceding his studies, but never observed. He was actually assigned to "investigate the alarming decrease in salmon within the Columbia River drainage."

Response: The recovery plan will clarify this point as recommended.

10. Comment: The recovery plan should clarify the statement about when the ESU can be considered to be recovered under the Endangered Species Act.

Response: The recovery plan's Section 3, Recovery Goals and Delisting Criteria, describes the biological and threats criteria, together with the delisting process evaluation considerations, that will be used for future ESU delisting evaluations. The recovery plan will be edited to make sure it accurately and consistently describes the criteria and information that will be used to evaluate the status of the ESU. The following text was added: "However, the ESU cannot be said to be recovered until it is made up of natural-origin fish spawning in the wild and surviving their two-way journey in far greater numbers. This plan identifies the minimum required number of annual natural returns and spatial distribution to natal lakes."

11. Comment: The map of the Sawtooth Valley, Idaho, which includes Sunbeam Dam, should also identify the dates of previous barriers on Pettit and Yellowbelly Lakes, as well as the Busterback diversion on Alturas Lake Creek.

Response: NMFS agrees that Figure 2-3, Map of the Sawtooth Valley, Idaho, should be revised to show the previous barriers identified by the commenter. The map has been updated.

12. Comment: It would be helpful to have a diagram depicting sockeye salmon life cycle and full life cycle migration range map.

Response: The recovery plan includes a life cycle diagram for Snake River Sockeye Salmon in Section 2.3.2, Life History, and NMFS will include reference to this section earlier in the Plan in Section 2.2, Sockeye Salmon Overview, so the reader will know this is described in more detail specific to Snake River Sockeye Salmon. Due to the current low abundance of this ESU, there is no information about its migration route or distribution in the ocean. This important information can be collected as abundance increases in the future.

13. Comment: It would be helpful if the recovery plan included photos of the different forms of *O. Nerka* described in this recovery plan.

Response: There is very little visual distinction between the different forms of *O. nerka* for this ESU; therefore, NMFS has not included any photos of the different forms found in the Sawtooth Valley. However, NMFS did identify the need to clarify and update the descriptions of the three forms of *O. nerka* in Section 2.3, Snake River Sockeye Salmon. This is especially important for description of the early stream spawning kokanee in Alturas Lake which produce smolts that can return as anadromous adults. This clarification was made throughout the recovery plan.

14. Comment: The recovery plan should include a reference for the source of the data on adult Sockeye Salmon returns to Alturas Lake in Section 2.3, Snake River Sockeye Salmon, on page 84.

Response: The recovery plan has been updated to add the reference from the Idaho Department of Fish and Game (IDFG) for date found in Table 4-1. This table has also been updated with the most recent IDFG return data for 2014.

15. Comment: Regarding non-game fish barriers on natal lakes, the recovery plan should clarify that Hell Roaring Lake was also considered for a barrier similar to those previously located on Yellowbelly and Pettit Lakes. Some evidence exists that a "barrier" of sorts, constructed with native materials, may have been established which persists.

Response: NMFS agrees it is important to include background information about past activities undertaken to chemically treat and/or establish barriers at the natal lakes in the Sawtooth Valley. Personal communication from fish biologist Mark Moulton, Sawtooth National Recreation Area, who visited the site, indicates that a fish barrier may have also been constructed at the outlet stream to Hell Roaring Lake using natural materials. It still remains uncertain, however, whether a migration barrier was established within the outlet. NMFS added this information to the plan in Section 2.1.3, Recent History.

16. Comment: The recovery plan should clarify whether the Columbia River commercial and tribal sockeye salmon fishery harvest data cited for the period from 1960 to 1973 is an annual number of total fish caught each year.

Response: The recovery plan has been updated in Section 2.3.1, Recent History, to state that the fishery harvest data is an annual average per year figure for the period from 1960 to 1973.

17. Comment: The recovery plan needs to clarify the definition and use of the terms "juvenile" and "yearling" Sockeye Salmon.

Response: NMFS agrees that the recovery plan is not consistent in the use of the terms "juvenile" and "yearling." NMFS updated the plan to add new definitions for each life stage to clearly differentiate between the two terms. NMFS reviewed the plan to assure appropriate use of the terms juvenile and yearling, and made clarifying edits as needed.

18. Comment: The recovery plan needs to clarify the intent of the barrier at Stanley Lake and the commenter questions whether the barrier was constructed to raise the lake elevation.

Response: Based on updated field information from the Sawtooth National Recreation Area staff, NMFS is editing the recovery plan to delete any reference to the artificial fish barrier below the Stanley Lake outlet as having any hydraulic control on the lake elevation.

19. Comment: It would be helpful for the recovery plan to include a table showing fish species present in each natal lake. In addition, the recovery plan should identify that bull trout are present in all the natal lakes, including a recent observation in Stanley Lake.

Response: NMFS agrees with this recommendation and has added a new table to Section 2.3.5, Other Fish Species, listing which native and non-native fish species are present in each lake. Native fish species found in the natal lake system include: sockeye/kokanee salmon *O. nerka*, steelhead/rainbow trout *O. mykiss*, Chinook salmon *O. tshawytscha*, cutthroat trout *O. clarki* lewisi, bull trout *Salvelinus confluentus*, mountain whitefish *Prosopium Williamson*, sucker *Catastomus spp*., redside shiner *Richardsonius balteatus*, dace *Rhinichthys spp*., northern pikeminnow *Ptychocheilus oregonensis*, and sculpin *Cottus spp*. Non-native species include brook trout *S. fontinalis*, rainbow trout *O. mykiss*, and lake trout *S. namaycush*.

20. Comment: The recovery plan needs to clarify that the outlet streams from the natal lakes *do not* generally cross private agricultural lands before entering the Salmon River, *except for Alturas Lake Creek*. Instead, it is the tributaries from the east that support agriculture in the Valley.

Response: NMFS agrees with this clarification and has edited the recovery plan accordingly in Section 2.3.7, Watershed Land Use and Demographics.

21. Comment: The recovery plan should include a map of Snake River sockeye salmon designated Endangered Species Act critical habitat.

Response: The recovery plan includes a narrative summary description of the designated ESA critical habitat for Snake River Sockeye Salmon in Section 2.4, Critical Habitat. NMFS is currently working to generate geographic information system mapping data for this ESU in order to map its critical habitat. NMFS will update this recovery plan when the new critical habitat map becomes available.

22. Comment: The recovery plan should clarify Section 2.5.1, Evolutionarily Significant Units (ESUs) and Distinct Population Segments (DPSs), to explain how the hierarchical levels of salmon population structure presented in Figure 2-11 are used to describe the Snake River Sockeye Salmon ESU. It is recommended that the recovery plan include a second diagram that depicts the Snake River Sockeye Salmon ESU structure to demonstrate how this concept is used and discuss why this situation makes the Snake River Sockeye Salmon ESU endangered. In addition, Chapter 3 should also discuss the relationship between the extant ESA-listed Snake River sockeye salmon ESU and historical populations of Sockeye Salmon that spawned elsewhere in the Snake River basin. Does this recovery plan address recovery of these other historical populations?

Response: NMFS agreed that the explanation about salmon hierarchical structure in Section 2.5 should be expanded to describe how this applies specifically to this listed Snake River Sockeye Salmon ESU. In addition, information will be added describing how this listed ESU relates to historical Sockeye Salmon populations that existed in the Snake River basin. NMFS will also reemphasize, as described in Section 1, Introduction, that the focus of this recovery plan is on the ESA-listed ESU and not the historical populations that spawned elsewhere in the Snake River basin.

D. Comments on Recovery Goals

23. Comment: The recovery plan needs to include information on contingency planning in Chapter 10, Implementation. Establishing a contingency process is described as part of the recovery strategy in Chapter 3 and it states that development of a contingency process will be included in Chapter 10.

Response: NMFS agrees that Chapter 10, Implementation, needs to include information about how the contingency process will be addressed. A description has been added to Section 10.1, Implementation Framework, describing that the Snake River Sockeye Salmon Implementation and Science Team will develop a contingency process as part of its recovery tasks.

E. Comments on Biological Viability Criteria

24. Comment: The recovery plan should give further consideration on the continued role of hatchery supplementation after delisting/recovery and its relative contribution to viable populations.

Response: The Recovery Plan for Snake River Sockeye Salmon identifies strategies to re-colonize historical habitat and provide for the development of local adaption and the rebuilding of natural population structure. Hatchery-origin and natural-origin abundance, productivity, diversity and spatial structure metrics will be evaluated to "trigger" management decisions about reducing/eliminating the captive broodstock programs in the future.

Uncertainties remain about the ability of the habitat to sustain levels of abundance and productivity consistent with delisting criteria. While NOAA and program managers are optimistic that demographic and fitness gains associated with program implementation will be long-lasting, uncertainties associated with ocean productivity and climate conditions (among others) may result in population declines that necessitate the maintenance of some configuration of hatchery supplementation over time. NMFS believes the recovery plan adequately addresses the role of hatchery programs which can be adjusted over time based on future population viability status.

25. Comment: The recovery plan should further explain the risk rating for a viable population as it relates to Snake River Sockeye Salmon, particularly given that there is only one extant population in this ESU (Redfish Lake). Further description of the role, if any, of the two (Alturas Lake and Pettit Lake) to four (Stanley and Yellowbelly Lakes) historical populations should be outlined here.

Response: NMFS agrees that the Executive Summary should include a discussion of the viability criteria presented in Table ES-1, particularly regarding risk ratings for spatial structure and diversity, and role of historical populations regarding viable or highly viable populations. Section 3.2.2, Biological Viability Criteria, has a detailed explanation of each viability criterion, including the important role of other historical populations toward improving viability. This information will be summarized and added to the Executive Summary.

26. Comment: The recovery plan should portray how population viability attributes are expected to respond to the FCRPS Biological Opinion's reasonable and prudent alternatives and describe how additional site-specific recovery actions, across the full Snake River Sockeye Salmon life cycle, will lead to a recovered status.

Response: The commenter raises an important issue regarding NMFS' ability to monitor, analyze and report on the changing status of Sockeye Salmon viability over time, as well as having predictive capabilities to test hypotheses about how Snake River Sockeye Salmon will respond to recovery actions across their full life cycle. NMFS believes the recovery plan describes comprehensive recovery strategies and actions that address the full range of limiting factors and threats, as well as detailed research, monitoring and evaluation as recovery actions are implemented over time allowing for adaptive management during each phase of recovery. First, Section 6.3 describes the comprehensive recovery strategy including future prioritization of recovery actions and establishment of a contingency process if the species' status does not continue to improve over time. Second, there are two recovery strategies and actions (6.3.2.3 and 7.3.3) that relate specifically to this comment, and call for updating appropriate life-stage inputs into the Snake River Sockeye Salmon life cycle model to test hypotheses regarding whether strategies described in this plan, including FCRPS Biological Opinion actions, will be adequate to achieve recovery objectives. Third, Section 8, Potential Effects of Proposed Recovery Actions, describes that due to the current low abundance of natural-origin Sockeye Salmon modeling, viability responses to recovery actions is not possible at this time. However, as numbers of natural-origin fish increase, monitoring data will be available in the future to calculate abundance and productivity over time. Fourth, Section 11, Research, Monitoring and Evaluation for Adaptive Management, includes sections such as Objective 8 in Section 11.1.3 that identify key information needs and monitoring questions to determine what factors may be limiting freshwater survival. Finally, NMFS' 2016 ESA Five-Year Review for this ESU will

update viability information and implementation actions which can provide a framework for future life cycle modeling. Adaptive management is the key recovery strategy that will allow resource managers to adjust actions over time based on changes to viability status over time.

F. Current Status:

27. Comment: The recovery plan should include more discussion about adult migration survival, particularly related to Table 4.2. Specifically, there should be discussion about the differences in numbers between Bonneville Dam and Lower Granite Dam across all years rather than just the specific reference to the August 2013 high temperature incident at Lower Granite Dam. There should also be more consideration of additional factors, aside from dams, that may be influencing adult survival estimates. An expanded presentation of the tributary PIT-tag detection data in the Salmon River would be relevant here, as well as mentioning water temperature in the Salmon River because it is included in Section 5 as a limiting factor.

Response: NMFS agrees that the discussion in Section 4.1.2, Productivity, on adult migration survival between Bonneville Dam and Lower Granit Dam, can be expanded to include discussion about adult survival information available from Crozier et al. 2014, which is consistent with the Bellerud 2014 findings described in Table 4-2 of the recovery plan. NMFS has also added information to this section about potential additional limiting factors which may be affecting adult survival in the Salmon River such as water temperature.

28. Comment: The recovery plan analysis of Sockeye Salmon survival by life stage is insufficient. A full life-cycle measure must be added, to assess factors that are not apparent in individual life-stages, e.g., delayed mortality and diminished fitness. The commenter recommends adding the smolt to adult survival rate (SAR), or other life cycle measure as an overall measure of success (calculated from smolts leaving the Sawtooth Valley and adults returning to the Sawtooth Valley). Further, the commenter recommends that the recovery plan specifically identify what SAR is required to recover Snake River Sockeye Salmon. The commenter states that the appropriate SAR should be 2% or greater, measured from Sawtooth Valley back to the Sawtooth Valley. The FCRPS hydropower configurations and operations must be further adjusted to achieve a 2% or greater SAR. Recent work by Fish Passage Center scientists indicates sufficient benefits may be achievable through expanded spill. Additionally, most fishery biologists agree that the necessary SAR can be achieved by removing the four lower Snake River dams.

Response: The commenter raises two interesting points: (1) recommending development of life cycle modeling capabilities, and (2) recommending adoption of a specific smolt-to-adult return (SAR) survival rate for Sockeye Salmon recovery. The first part of this comment has already been addressed in an earlier response (see Comment No. 26) where NMFS describes that the recovery plan has identified a strategy and action to develop a full life cycle model which can

be used as the numbers of natural-origin returns increases over time to the natal lakes. In addition, the recovery strategy identifies development of a contingency process if the species' status does not continue to improve in a timely way, or if there is a significant decline in status.

The second point requests that NMFS establish a smolt-to-adult return rate as a metric for Sockeye Salmon recovery. NMFS recognizes the importance of this metric for understanding life cycle survival. In fact, Kline and Flagg 2014 describe that Redfish Lake smolt-to-adult return rates for natural-origin fish have exceeded two percent for the 2004 to 2006 brood years. However, NMFS disagrees that a single smolt-to-adult return rate for natural-origin fish can be objectively determined at this time and established for this ESU. The issue of sockeye survival and recovery is more complex than simply establishing a smolt-to-adult return rate. The Interior Columbia Technical Recovery Team (ICTRT), which developed the sockeye biological viability criteria, uses productivity (adult-per-spawner return rate) as well as abundance, diversity and spatial structure as the metrics to describe a viable population or ESU. The ICTRT uses a combination of productivity and average natural abundance over time for the full life cycle to describe viability, in addition to spatial structure and diversity considerations. Productivity can be defined for each of the different life stages, i.e., egg-to-smolt survival, and when taken together with smolt-to-adult return survival rates, there are many possible combinations that will satisfy ICTRT ESU viability goals. NMFS recommends that productivity, together with smolt-to-adult return rates, and adequate lake carrying capacity must be considered together in order to know if we have enough adults to sustain productivity over time. There are currently many unknowns which need to be understood as we move forward with the Sockeye Salmon recovery program.

For example, we do not currently know the lake carrying capacity, we do not know smolt productivity, and we do not know what the long term average smolt-to-adult return rates are that result in a viable population. In fact, it may be that once all these factors are understood, the smolt-to-adult return rate needed for viability may be less than two percent. At this point NMFS does not believe it is helpful to pre-determine a specific targeted smolt-to-adult return rate. This issue will be a focus of future recovery implementation work as we seek to understand population productivity, smolt-to-adult return rates and lake carrying capacity. Future investigations will help us determine what combination of these factors best describe a situation where the population is stable and growing over time to meet ESU biological viability goals.

29. Comment: The recovery plan currently describes Sockeye Salmon survival per distance travelled. The commenter recommends an expanded analysis that uses the elevation of the migration route as an independent variable from which to plot salmon survival.

Response: The mortality per mile calculation used in the recovery plan is more relevant to the limiting factors and the threat from the hydropower system which impacts juveniles and adults as they migrate through the hydropower system. Because elevation increases steadily with

distance traveled on the migration route from the ocean to the natal lakes, the effects of elevation are already incorporated in the current mortality per mile calculation used in the recovery plan. This suggested analysis will not provide new information to help us better understand or address hydropower limiting factors and threats.

30. Comment: Research results to date indicate that the most important predictors of survival across reaches and years may be thermal exposure and fish travel time, with higher temperature exposure contributing to higher fallback rates and lower survival. As mentioned previously, adult Snake River Sockeye Salmon migrate through this long, strenuous river reach in July and August at the hottest time of year.

Response: NMFS agrees with this comment and it is addressed in the recovery plan. Specifically, the recovery plan includes information on the impacts of elevated water temperature on Sockeye Salmon survival in many sections of the plan: in Section 5.1.2.1, Sockeye Salmon migration and survival in the Salmon River; in Section 5.1.2.2, Salmon River mainstem habitat in Sawtooth Valley, Water Temperature and Sediment; and in Section 4.1.2, Productivity. Section 4.1.2 describes the impact of high water on adult migrant survival from Lower Granite Dam to the Sawtooth Valley. Based on this limiting factor, the recovery plan identifies the following recovery strategy: "Investigate and improve conditions in the Salmon River and tributaries to support increased survival of migrating Snake River Sockeye Salmon." In addition, a recovery strategy and actions to address elevated water temperatures are identified for the Columbia River estuary: "Improve degraded water quality and maintain unimpaired water quality." Recovery actions and adaptive management research and monitoring actions are included as part of the plan's adaptive management approach to recovery implementation.

31. Comment: The commenter provides additional information that in late 1894 the fishery biologist Evermann also reported seeing one sockeye carcass along the inlet stream of Pettit Lake, although evidence also suggests both likely had regular shoal spawning populations.

Response: NMFS appreciates the commenter providing additional information and the new citation regarding Evermann's 1894 Sockeye Salmon observations in the inlet of Pettit Lake. NMFS will update Section 4.2, Spatial Structure and Diversity, with information from Evermann's 1894 and 1896 publications.

G. Comments on Limiting Factors and Threats

General

32. Comment: The recovery plan should, if possible, identify the relative extent of threats and limiting factors. Not all threats have the same impact on the species. It would seem that the most important threat to survival of the species is the limitation Columbia and Snake River dams pose to migrating salmon and the risk these dams pose to survival of individuals. Yet much of the discussion centers around threats due to land management activities (grazing, forestry, recreation, etc.). The recovery plan should identify the relative impact of one limiting factor versus another and which limiting factor, if corrected, would provide the most significant recovery potential. The recovery plan should identify where our limited dollars should be spent to make the most impact on recovering the species.

Response: NMFS agrees that this comment raises the critically important issue of making sure the recovery plan clearly describes which limiting factors and threats are most important to recovery of the Snake River Sockeye Salmon, and therefore, should be the focus of recovery strategies and actions. It is our intent to do this in the plan and if it is not clearly described for the public, we agree that information should be added that clearly describes which threats and limiting factors are most important to address as high priorities. NMFS' goal throughout the recovery plan is to describe the full range of limiting factors and threats, and develop comprehensive recovery strategies and actions within the context of an adaptive management framework. The goal of this framework is to implement recovery actions based on best available science, monitor to improve the science and update actions based on new knowledge.

Based on the need to focus on which recovery actions are most important for recovery, in Section 7, Site-Specific Actions, NMFS identifies the sequencing of the top five actions for recovery and this includes improving survival for all life stages in the migration corridor. Section 7.1, Building on Current Efforts, NMFS describes that the habitat for much of the Salmon River and wilderness protection of headwaters to the natal lakes means this important habitat is in excellent shape. These habitat conditions, therefore, do not present a high priority limiting factor or threat.

NMFS continues by describing that fisheries are managed to protect Snake River Sockeye Salmon. NMFS then identifies the important hydropower-related efforts to benefit this ESU and emphasizes the need to continue to improve survival for all life stages in the migration corridor. Improving survival for all life stages and implementing research, monitoring and evaluation through adaptive management are the key actions for recovery.

NFMS agrees that the recovery plan can be strengthened by clarifying which limiting factors and threats are most important for recovery and to put these in the proper perspective relative to other limiting factors and threats. NMFS will add this clarifying information to the following sections of the recovery plan: (1) the Executive Summary section on limiting factors and threats; (2) Section 3.3, Listing Factors; (3) Section 5, Limiting Factors and Threats; (4) Section 6, Recovery Strategy - add actions to develop and implement a recovery action prioritization plan; (5) Section 7, Actions - add sentences to 4th bullet clarifying which recovery actions are most important; (6) Section 10, Implementation, add a task to develop and implement an action prioritization plan.

33. Comment: Have any conclusions been made regarding the recovery impact to the genetic elements of the Snake River Sockeye Salmon ESU by the contemporary control of resident native kokanee populations, particularly at Alturas Lake?

Response: This comment is related to Comments 7 and 13 where NFMS responded by agreeing that it is important to protect all forms of *O. nerka*, including resident native kokanee, especially in Alturas Lake. NFMS clarified that kokanee represent an important genetic, life history, and spatial diversity component which may contribute to recovery of anadromous Sockeye Salmon. This issue needs to be further investigated so that kokanee management actions can be adapted over time. The recovery plan was edited in several places to clarify the role and need for information regarding the importance of kokanee, especially in Alturas Lake.

Habitat

34. Comment: All permitted and approved activities on the National Forest undergo rigorous environmental review. The Sawtooth Forest Plan requires stringent protection measures for threatened and endangered species. The identification of current land use (page 173) as one of the most important threats in the Salmon River does not acknowledge the extent to which the Federal agencies work to improve, protect, and restore habitats for special status species, federally ESA listed salmon species in particular.

Response: NMFS acknowledges and thanks the U.S. Forest Service staff for their dedication to protect, restore, and manage the Sawtooth National Recreation Area (Sawtooth NRA), including important work with private land owners in the upper Salmon River watershed. The recovery plan describes the near pristine habitat conditions within the Sawtooth NRA and the importance of maintaining wilderness designations in the headwaters of the natal lakes. The Sawtooth NRA staff are a key partner in Sockeye Salmon recovery work and many recovery actions are identified for implementation in the Sawtooth NRA as funding becomes available. The summary of threats and limiting factors that the commenter refers to in Section 5.1.2.4 is for

the whole Salmon River watershed. The recovery plan hypothesizes that historical and current land use, road and erosion control, floodplain development, barriers to migration, and elevated sediment levels are potential limiting factors. The majority of these limiting factors are outside the boundary of Sawtooth NRA and lower in the watershed. This includes the impacts of all land use activities in the full Salmon River mainstem to the confluence with the Snake River. The recovery plan identifies this wide range of limiting factors as "potential" limiting factors, which highlights the need to collect more information to better understand the impact of different land use practices on habitat processes and Sockeye Salmon. NMFS believes the current summary of land use as a threat and potential limiting factor is consistent with the information presented for the Salmon River watershed in Section 5.1.2.

35. Comment: One commenter recommended consideration of a moratorium on new pond developments in the Sawtooth Valley to address detrimental water quality impacts. The commenter described the practice of private landowners continuing to acquire water rights for both aesthetic and irrigation ponds, even when there are other means to deliver their existing water rights. Working with the State of Idaho to prevent the permitting of new ponds would reduce unnecessary losses to evaporation, eliminate unnecessary heating of water that may be returned to streams, and eliminate new entry points for aquatic invasive species.

Response: NMFS appreciates receiving this comment which provides new information to the recovery planning process about the existing and emerging threat of new pond development in the Sawtooth Valley which may degrade water quality and potentially introduce invasive species to the aquatic environment. NMFS will add new information highlighting this issue to the relevant sections of the recovery plan. New information will be added to several parts of Section 5.1, Habitat, which describes limiting factors and threats to habitat in the Sawtooth Valley and Salmon River mainstem in the Sawtooth Valley. These limiting factors include water temperature and sediment caused by land use activities that require water diversion. New information has been added to Section 5.1.1.5 identifying the threats of water diversions and the potential future threat of new pond development. Section 5.1.2, Salmon River, has been updated by identifying the potential impacts of new pond development. In addition, recovery strategy 6.3.1.13, Maintain Unimpaired Water Quality and Improve Water Quality, identifies the need to protect water quality in the Sawtooth Valley. Several corresponding recovery actions in Section 7 address this issue and related stream flow limiting factors. This includes recovery action 7.2.3-7 which identifies the need to collect information about new pond development and stream flow, and recovery action 7.2.13-7 which recommends collecting information about effects of pond development and identifying next step actions to address this issue. The recovery plan already includes recovery strategy 7.2.13-9, which recommends "investigating options for how to curtail threats from temperature pollutants via a moratorium on new pond development."

36. Comment: The recovery plan should mention the effects of dewatering Alturas lake Creek by the Busterback diversion for many decades.

Response: NMFS agrees with this recommendation and has added language in the Alturas Lake description in Section 5.1.1.4, Land Use and Other Human Activities, identifying this historical impact.

37. Comment: For the listing factors and threats criteria identified in Section 3.3, the commenter refers to Factor A.1, (addressing passage obstructions) and recommends that this factor include the major limitations imposed by mainstem river dams. In addition, the commenter asks if it is possible to provide information about the relative importance of various threats described in the plan. For example, passage obstructions are a greater impact compared to invasive plant species. The recovery plan should describe that the more detrimental threats are being focused on more intensely for recovery efforts.

Response: Listing Factor A. 1, which addresses removal or modification of passage obstructions to improve survival and restore access to historically accessible habitat where necessary to support recovery goals, identifies dams, weirs and culverts as examples of passage obstructions. This listing factor, therefore, does include the Columbia and Snake River mainstem dams, and any other obstructions that prevent recovery. Furthermore, the recovery plan identifies hydropower dams as a threat and limiting factor to the recovery of this ESU and identifies recovery strategies, actions and research, monitoring, and adaptive management to address this issue. The extent to which this listing factor is addressed will be evaluated in future five-year reviews and delisting determinations, as well as through other Federal ESA review processes.

The second part of the comment is related to Comment No. 32 which also recommends NMFS clearly describe the relative importance of different threats and ensure that the most important factors are being addressed first. As we responded to Comment No. 32, we agree that the recovery plan can be strengthened by clarifying which limiting factors and threats are most important for recovery and to put these in the proper perspective relative to other limiting factors and threats. Please refer to Comment No. 32 for the specific additions we will make to the recovery plan to guide future actions for setting priorities and guiding implementation.

38. Comment: The Stanley Lake Creek watershed conditions assessment conclusion of "at risk" by the US Forest Service is derived primarily from the lack of connectivity as a result of the IDFG barrier, not due to the reasons listed in the recovery plan, i.e., roads, and developed and dispersed recreation.

Response: Based on this new information, NMFS will add the barrier at the outlet of Stanley Lake Creek to the other factors identified in the recovery plan.

39. Comment: The recovery plan should include information about how sheep and cattle grazing practices have changed over time in the Sawtooth Valley, with resulting improvement to habitat conditions.

Response: NMFS agrees and has added more information to the introduction of Section 5.1.1.4, Land Use and Other Human Activities, describing the types of changes made to reduce sheep and cattle grazing impacts since 1993. The following text was added as a second paragraph in the introduction of Section 5.1.1.4, Land use and other Human Activities, and before the sub-heading Land use**: "***Intensive sheep and cattle grazing occurred within the watershed for a century until the 1993 Record of Decision for Grazing in the Stanley Basin mandated changes in grazing management. These changes included reduction in numbers, exclusion of grazing in some areas to protect salmon habitat, fencing, limitation on duration of grazing and monitoring of riparian conditions. Since that time, many of the stream channels have shown significant recovery.*"

40. Comment: The recovery plan includes details about recreational facilities in the Sawtooth NRA which seems to imply that developed recreational sites are a major contributor to impacts to Snake River Sockeye Salmon habitat.

Response: NMFS agrees that the recovery plan includes a disproportionate amount of detailed information about Sawtooth NRA recreational facilities at each natal lake relative to the impact of these facilities on overall Sockeye Salmon current status and recovery. It was not NMFS' intent to imply that these facilities have a greater impact relative to other limiting factors and threats affecting each life stage. The recovery plan does describe the relatively pristine quality of the upper Salmon River watershed which protects processes and functions of the natal lakes. NMFS agrees with the Sawtooth NRA staff that utilizing developed sites provides less impact than uncontrolled dispersed sites. Lake shorelines can be best protected through management of developed access points.

Based on this comment, the recovery plan will be edited to remove the summary tables describing the recreational facilities at each lake, while keeping the current narrative

descriptions. The Sawtooth NRA staff recommended adding language concerning shoreline impacts from uncontrolled access points due to mooring and language will be added to include this point.

41. Comment: The recovery plan discusses the potential impacts of stocking non-native fish on Sockeye Salmon. It should also include the potential impact of rainbow trout anglers wading through spawning areas and trampling salmon redds.

Response: This comment is very applicable to stream spawning fish like Chinook Salmon, but Snake River Sockeye Salmon are primarily lake spawners and should not be affected by wading trout anglers.

42. Comment: The recovery plan should identify specific locations where invasive species check points could be established in the Sawtooth Valley to comprehensively address this issue.

Response: NMFS agrees that the recovery plan can recommend where invasive species check points could be added to comprehensively address the threat of invasive species. The following sentence will be added to Section 5.1.1.4, Land Use and Other Human Activities, under the heading "Introduction of Aquatic Invasive Species:" *"The extreme risk posed by the potential for aquatic invasive species could be mitigated by setting up check points at the three portals entering the Sawtooth Valley (Hwy 75 from Ketchum, Hwy 75 from Challis and Hwy 21 from Boise)."*

43. Comment: One commenter states that in the summary of limiting factors to Sockeye Salmon productivity in the natal lakes, Section 5.1.1.5, the recovery plan identifies recreational use and development as one of the key limiting factors. The commenter agrees that recreation is an impact, although not one of the most important. They identify other impacts not mentioned in the recovery plan such as stocking of non-native fish, the legacy of lake poisoning and restocking with non-native fish that also need to be included as limiting factors and threats.

Response: NMFS agrees with this comment and a similar point made in Comment 38 about the relative impacts of recreation relative to other natal lakes threats and limiting factors. We agree that recreational impacts in the Sawtooth NRA are minimal relative to the scale of threats and limiting factors affecting each life stage in the full life cycle of this ESU. Recreational use impacts do occur from activities that directly and indirectly affect shoal habitats in all lakes. While the Forest Service concludes that the most altered shoal habitats are not currently utilized for Sockeye Salmon spawning, they may be used in the future as populations expand. In response to this comment, NMFS will revise Section 5.1.1.5 to add lake poisoning and stocking of non-native fish to the Threat for "legacy impacts from historical land use and

mining practices." In addition, see our response to Comment 30 where NMFS describes development of recovery prioritization criteria to identify the high priority recovery actions that should be implemented first based on relative impacts of different limiting factors and threats.

44. Comment: The recovery plan does not adequately describe past the stream flow and passage impacts of the Breckenridge/Busterback Ranch irrigation diversion on Alturas Lake Creek. The commenter describes that this diversion dewatered Alturas Lake Creek every season. A description of this diversion is more applicable to Sockeye Salmon recovery than the two Breckenridge/Busterback Ranch irrigation diversions located upstream on the Salmon River.

Response: NMFS agrees that the recovery plan does not accurately describe the location of the three different historical Breckenridge/Busterback Ranch irrigation diversions in Section 5.1.2.2, Salmon River Mainstem Habitat in Sawtooth Valley. Most importantly, it does not describe that the irrigation diversion on Alturas Lake Creek had the most significant impact on stream flow and passage for Sockeye Salmon. The plan does describe action taken by the Sawtooth NRA to address these stream flow issues. The paragraph has been rewritten to clarify the previous streamflow and passage limiting factors on Alturas Lake Creek.

45. Comment: The recovery plan does not discuss blocked access due to dams on the mainstem Snake River.

Response: The recovery plan addresses mainstem corridor migration and passage limiting factors and threats due to the hydropower dams on the Snake River in Section 5.2, Hydropower. Limiting factors and threats are described in Section 5.2 for migrating juveniles (Section 5.2.1) and migrating adults (Section 5.2.2). Recovery strategies to address hydropower limiting factors and threats are described in Section 6.3.2.1. Recovery actions to address hydropower are identified in Section 7.3.1. Also, research, monitoring, and evaluation actions specific to the hydropower system are described in Objective 7 in Phase 3 Monitoring in Section 11.1.5.

Ocean Module

46. Comment: The recovery plan would benefit by including high level points from the Ocean Module, including limiting factors and a summary of threats.

Response: NMFS agrees that a more robust description of key summary points from the Ocean Module will strengthen the recovery plan and information will be added to appropriate sections in the plan.

Fisheries

47. Comment: The recovery plan should include more discussion about potential incidental take of Snake River Sockeye Salmon across all fisheries, i.e., given the disparate abundance of Upper Columbia and Snake River Sockeye Salmon.

Response: NMFS is currently engaged with *United States v. Oregon* policy and technical representatives to examine current methods for determining inter-dam loss, improving monitoring of fishery-related mortality estimates, and rectifying processes or protocols related to harvest monitoring as needed to improve precision and accuracy of ESA incidental take estimates. New language has been added to Section 5.4, Fisheries, addressing this comment: *"For the near term, fisheries currently incidentally impacting Snake River Sockeye Salmon should be managed, with accompanying adequate monitoring programs, to minimize their impacts on the ESU."*

Hydropower System

48. Comment: The recovery plan describes that warm water temperatures and delayed travel time are "the most important predictors of survival" for Sockeye Salmon. The commenter states that both of these limiting factors are a result of reservoirs and dams whose impacts need to be addressed.

Response: The recovery plan identifies warm water temperatures as a limiting factor impacting several Sockeye Salmon life stages as discussed in the response to Comment No. 29. The plan describes that relatively high water temperatures and delayed travel times are factors that influence survival of adult Snake River Sockeye Salmon through both the hydrosystem (Bonneville to Lower Granite Dam) and free-flowing reaches between Lower Granite Dam and the Sawtooth Valley. However, this threat is not simply the result of "big reservoirs and dams" as suggested by the commenter.

Summer temperatures in the Snake River (prior to the construction of the lower Snake River dams) usually exceeded 72°F in late July and August. *"The Snake River reaches a temperature in excess of 72°F in August and less than 35°F in the winter. In August, it is 8.5°F warmer than the Columbia River at its confluence and in December it is 8°F colder. In late July of 1956 (a warm summer), afternoon water temperatures exceeded 77°F" (Sylvester 1958, p. 44). (In Peery and Bjornn 2002 – pg 12)*

Since Dworshak Dam began releasing cool water in the mid-1990s, temperatures in the lower Snake River have generally been moderated to around 70°F during the summer months. Reduced temperatures in the mainstem migration corridor should positively affect adult migrants.

Contrary to common belief, the median migration rates of adult Sockeye Salmon through the hydrosystem are generally faster than through free-flowing reaches (12 to 13 days from Bonneville to Lower Granite Dam, compared to 35 to 43 days from Lower Granite Dam to Sawtooth Valley). NMFS clearly detailed the passage blockage in 2013 at Lower Granite Dam because this was an anomaly which is meant to be prevented in the future. The Corps of Engineers is working with NMFS, tribes, and other regional co-managers to address this issue. The interim measures enacted in 2014 appear to have been effective. More permanent passage solutions are being developed and should be implemented prior to the 2016 migration.

NMFS is also concerned about increasing temperatures due to climate change that could further stress adult migrants, especially in the undammed Salmon River where there are no ready means of moderating existing or future water temperatures.

49. Comment: Only half of the juveniles complete the Columbia and Snake River mainstem river dams' obstacle course. Delayed and depleted on their migration to the ocean, Idaho's Snake River Sockeye Salmon juveniles arrive at Bonneville Dam two weeks behind the rest of the greater Columbia River run. Now with the aid of a free flowing river, the Sockeye Salmon speed through the estuary. In two or three days they arrive at the ocean with its food-rich plume – two weeks late for the finest of dining, but just in time for a predators' second helping.

Response: Snake River Sockeye Salmon must migrate past eight mainstem dams to reach the ocean. Sockeye Salmon from the upper Columbia River basin must migrate past seven or nine dams to reach the ocean. Based on median passage dates of PIT tagged juveniles detected at Bonneville Dam from 2009 to 2013, Snake River fish (May 25-June 2) are passing roughly 10 days later that Upper Columbia River stocks (May 15-22) (Columbia River DART website – queried Dec. 9, 2014). Median passage dates of Snake River Sockeye Salmon arriving at Lower Granite Dam range from May 15 to May 23 (2009-2013). Median passage dates of Upper Columbia sockeye stocks are arriving at Rock Island Dam (only 2012 and 2013 data are available), range from May 8 to May 13. About 7 to 10 days earlier than the Snake River fish – roughly the same difference observed at Bonneville Dam.

Beginning in 2009, NMFS' Science Center estimated that Lower Granite to Bonneville Dam survival rates for juvenile Snake River Sockeye Salmon have ranged from about 47 to 57 percent, which is similar to survival rates observed for Upper Columbia River Sockeye Salmon stocks migrating from Rock Island to Bonneville Dam (Faulkner et al. 2013). Survival rates for juvenile sockeye from Sawtooth Valley to Lower Granite Dam are more variable, and can be quite low in some years (e.g., 20 to 25 percent for natural origin smolt in 2013).

Taken together, NMFS does not believe that the hydropower system is differentially affecting Snake River Sockeye Salmon compared to Upper Columbia Sockeye Salmon stocks. In addition, the Columbia River plume and nearshore ocean environment is a very dynamic system.

There is no evidence to support the assumption that food is always more abundant when Upper Columbia stocks enter the ocean and that predators are always more abundant when Snake River Sockeye Salmon enter the ocean approximately 10 days later.

50. Comment: The commenter refers to recovery strategy 6.3.1.5, which calls for "investigation and development of strategies for future actions to support Sawtooth Valley Sockeye Salmon reintroduction and adaptation phases for Pettit Lake." This strategy describes the working hypotheses behind the reintroduction program for Redfish Lake and future phases of natural adaptation for reintroduction to Pettit Lake. The commenter then questions how this strategy can be implemented based on the proposed hydropower system recovery strategies. The commenter states that the FCRPS Biological Opinion permits the federal hydrosystem to kill two thirds of Idaho's Snake River Sockeye Salmon run. Neither the Hydro Module nor the proposed Snake River Sockeye Salmon Recovery Plan expects much more from passage improvements through the hydropower system. According to these documents, the only benefit yet to come is from a small increase of water from the Salmon River headwaters, implemented for the sake of Chinook salmon.

Response: The 2008 FCRPS Biological Opinion (as amended in 2010 and 2014) has required a series of actions (construction and operation of surface bypass structures, 24-hour spill, relocating bypass outfalls, etc.) intended to improve migration conditions and ultimately the survival of juvenile salmonids, including Snake River Sockeye Salmon. Recent survival estimates indicate that reach survival rates are generally higher and less variable (the floor is much higher) than survival estimates in the late 1990s and early 2000s, and appear to be similar to those for recently estimated unlisted Upper Columbia River stocks (Faulkner et al. 2013). These estimates of direct survival do not capture potential indirect benefits (improved fish condition) resulting from these measures that could result in increased fitness in the ocean. NMFS and its regional co-managers are evaluating adult return information as it becomes available. A recent paper (Kline and Flagg 2014) indicates that the fitness of naturally produced Sockeye Salmon appears to be increasing relative to hatchery smolts and the observed smolt-to-adult return rates for natural-origin fish from brood years 2004-2006 "have exceeded the minimum 2% rate we estimate is required for population self-sustainability." The FCRPS BiOp is set to expire in 2018. Prior to that time, NMFS expects that there will be additional regional discussions to assess what, if any, additional actions are necessary to meet the Federal Action Agencies' responsibilities under the Endangered Species Act.

Predation

51. Comment: The recovery plan identifies that warm water reservoir habitat in the lower Snake River watershed benefits introduced exotic predators such as smallmouth bass, channel catfish and walleye. How does the recovery plan propose to address predation caused by non-native fish species in the lower Snake River?

Response: Though population levels and dynamics of non-native predators are not well known, they are certainly a source of mortality for migrating juvenile salmon and steelhead – both within the hydropower system and throughout the rest of the Columbia River basin. Estimates of juvenile survival rates between juvenile fish traps and mainstem dams include many mortalities occurring as a result of predation.

Simply assuming that non-native predators are only a problem in the mainstem reservoirs is not accurate or advisable. Small mouth bass, for example, are found in large numbers within the lower Salmon River and the Hells Canyon reach of the Snake River between Lower Granite and Hells Canyon dams, and are undoubtedly preying on juvenile Sockeye Salmon and other salmonids in free-flowing segments of the Snake River basin. Some radio-telemetry studies have recently been undertaken to assess if juvenile losses are occurring within specific free-flowing river segments. In addition, multiple PIT tag arrays have been established within the mainstem Salmon River. These tools should allow managers to better isolate where mortalities are occurring (from either predators or other factors) and develop strategies for reducing these impacts.

H. Comments on Recovery Strategies

52. Comment: The commenter recommends that the recovery plan's long-term goal statement for Sockeye Salmon recovery and the captive broodstock hatchery program be described consistently throughout the plan in each section that addresses the captive broodstock hatchery program.

Response: NMFS has reviewed each of the sections addressing the recovery plans' long-term recovery goals related to the captive broodstock hatchery program. While the goal statements vary slightly in different sections of the plan, we believe that overall they are consistent in stating the recovery goals. In order to make sure the goal statements use even more consistent language, NMFS will add the following goal statement from the beginning of the hatchery recovery actions Section 7.2.1, to the beginning of hatchery discussion in Section 5.3.1, Snake River Sockeye Salmon: "The goal of this Snake River Sockeye Salmon Recovery Plan is the restoration of natural Sockeye Salmon populations in Sawtooth Valley lakes."

53. **Comment**: The recovery plan should identify additional biological opinions rather than just citing the FCRPS Biological Opinion to provide mitigation to address ecosystem imbalances in predation, competition, and disease. Other references could include biological opinions for federal lands, the biological opinion for pesticides and herbicides, and the fishery harvest biological opinion.

Response: NMFS agrees that this recovery plan should refer to a broad range of biological opinions and their associated reasonable and prudent alternative actions (addressed in recovery strategy 6.3.2.7 and recovery action 7.3.7) in order to address ecosystem imbalances, rather than just the FCRPS Biological Opinion. Other biological opinions will be referenced in Recovery Strategy 6.3.2.7 and its associated recovery action in Section 7.3.7.

Habitat

54. **Comment:** The recovery plan's recovery strategy and actions seem to defer mainstem Salmon River habitat improvements to activities that are implemented pursuant to the FCRPS Biological Opinion. BPA is currently involved in and funding FCRPS implementation activities that are consistent with elements of this recovery plan, as "off-site mitigation" for the dams. There is a focus on limiting factors of impaired water quality, low flow, lake access, and predation. In-river impairments to fish are concluded to be a consequent of impaired water quality, low flows, barriers to passage, and land use. However, it should be noted that land use and other existing and legacy actions on the habitat have a significant effect on this species and eventual recovery. The management and administration of federal and private lands and water resources (for mining, grazing, recreation, and access) are beyond FCRPS Action Agency jurisdiction, authority and purview, but certainly deserves adequate and thoughtful consideration well beyond the scope of the FCRPS Biological Opinion.

Response: NMFS believes that all parties that contribute to threats or limiting factors affecting Snake River Sockeye Salmon survival and viability need to take action to improve Sockeye Salmon survival. In addition, the recovery plan urges all citizens to learn about Snake River Sockeye Salmon and take action to recover this species. The recovery plan, therefore, does not limit its focus to recovery actions that are only implemented as part of the FCRPS Biological Opinion. NMFS agrees with the commenter that many different management agencies and private land owners will need to be involved in salmon recovery. Implementation of this recovery plan will include public education, as well as continued work with all relevant parties, to implement this recovery plan.

55. **Comment**: The recovery plan should include action items to address the ongoing role for both land acquisition and conservation easement acquisition on the Sawtooth National

Recreation Area for protection of fisheries values. These are opportunities that are time sensitive because properties of interest typically become available for purchase in short, unpredictable time frames. Once the properties are developed the opportunity for protection is usually irreversibly lost. Ongoing funding set aside specifically for this purpose could help achieve these objectives that frequently are not achieved because of the inability to acquire funding in a timely manner.

Response: NMFS agrees that there is an important ongoing role for land acquisition and conservation easements not only in the Sawtooth Valley, but throughout the migration corridor. In fact, land acquisition and conservation easements are recovery actions in other ESA-listed salmon and steelhead recovery plans and these actions are another important conservation tool to protect and manage salmon habitat. NMFS also supports funding for these programs. Even though this recovery plan does not have specific funds dedicated to fund implementation actions, NMFS will work with local and regional partners to seek funding as appropriate. We will add language to the local and regional level recovery strategies, as well as the recovery actions, in response to this comment.

56. Comment: The recovery plan should include strategies and actions to address instream flow designations. The current lack of state-sanctioned minimum instream flows on the reaches of the Salmon River and its tributaries within the Sawtooth NRA presents an ongoing challenge to threatened and endangered fish recovery. New development on private land regularly challenges the many years and substantial public investment in keeping water in the Salmon River and its tributaries. Specific State recognized “minimum stream flows” is the current mechanism to directly give instream flow thresholds legitimacy. Minimum instream flow designations could perhaps prevent many of these new applications from being permitted.

Response: NMFS agrees that protecting existing stream flows from future development is an important aspect of protecting existing habitat. This comment is also related to Comment No. 35 which raised the issue of pond development impacts on water quality, stream flow and potential introduction of invasive aquatic species in the Sawtooth Valley. Based on this comment NMFS will add information to relevant parts of Section 5.1, Habitat Threats and Limiting Factors, identifying threats due to water diversions and describing the need to protect existing instream flow levels. This new information is consistent with Recovery Strategy 6.3.1.13, Maintain Unimpaired Water Quality and Improve Water Quality as Needed. New language has been added to this recovery strategy, where water quality standards are not being met, to include promoting the use of minimum instream flows as another tool to promote use of best management practices, improved land use strategies and habitat restoration to address elevated water temperatures and impaired sediment processes. Several recovery strategies in the plan already address instream flow issues including recovery strategy 7.2.3-6 “Improve instream flows in the Salmon River above the Sawtooth Hatchery to Alturas Lake Creek by improving

irrigation efficiencies, using Idaho Department of Water Resources water bank and other conservation tools." Designation of minimum instream flows is another conservation tool that may be used during recovery plan implementation. Another recovery strategy in the plan that addresses instream flow is strategy 7.2.13-6: "Increase stream flow to improve hydrology by implementing water conservation measures, improved water delivery and improving water storage function of riparian areas and wetlands." Additionally, recovery strategy 7.2.14-4 recommends "identifying specific actions and responsible parties/entities to improve water quantity and the quality of juvenile and adult migration corridor habitats and monitor the actions." While implementation of recovery plans is voluntary, there are many strategies identified in this plan that can support improved instream flow through a variety of measures and future actions implemented through recovery partnerships.

57. Comment: The recovery plan should sequence actions to improve Sockeye Salmon passage to natal lakes. Any changes to the *natural* passage conditions in Yellowbelly Lake Creek should only be considered after all other *man-made* barriers to the ESU (e.g., Stanley Lake barrier) have been addressed.

Response: NMFS has noted this comment and deleted the previous recovery strategy question about the passage at Yellowbelly Lake in Section 6.3.1.3, Improve Sockeye Salmon passage at Natal Lakes. Investigating passage at Yellowbelly Lake is not a primary recovery action for this plan. However, there are interesting contemporary questions about passage into Yellowbelly Lake that would be valuable to investigate. We have added the following new recovery strategy question to Section 6.3.1.3, Improve Sockeye Salmon Passage to Natal Lakes, "Under what migratory conditions (e.g., timing, water flows, temperatures) and how often can Sockeye Salmon currently migrate through the lag deposit boulder field at the outlet of Yellowbelly Lake?"

58. Comment: The recovery plan should clarify that Evermann observed stream spawning sockeye in 1895 and 1896, but left the lake in both years before shoal spawning would have got underway. Nevertheless, he observed one pair of Sockeye Salmon localized on an Alturas shoal just as he was preparing to leave in 1895.

Response: NMFS agrees with this clarifying comment and has added this information and reference to Evermann's 1895 observations to Section 6.3.1.6: "Investigate and Evaluate the Potential for Restoring Natural Production of Anadromous Sockeye Salmon from Returning Kokanee Outmigrants from Alturas Lake."

Hydropower System

59. Comment: The recovery plan should not defer to the FCRPS BiOp for hydropower system actions when detailing regional limiting factors (Section 6.3.2.1 and others). An effective recovery plan should specify what the action agencies (with NOAA oversight) need to achieve in the FCRPS BiOp, if recovery is to be successful. Deference to the BiOp has not been adequate for Sockeye Salmon recovery to date, and is not likely to be adequate with the 2014 Supplemental BiOp.

Response: Substantial changes to the configuration and operation of the mainstem federal hydropower system have occurred over the past decade. NMFS, along with the FCRPS Federal Action Agencies and regional co-managers, are assessing the efficacy of these actions (on both juveniles – annually, and returning adults – as the full returns become available) and the status metrics of Snake River Sockeye Salmon. NMFS will reassess the efficacy of the actions and determine, through discussion with regional co-managers, what additional actions may be needed with respect to the FCRPS projects.

I. Key Information Needs

60. Comment: The recovery plan must carefully consider reactivating kokanee control strategies which should only be done after very careful consideration and targeting. The goal is to avoid depleting or extirpating future native genetic options, as would appear to have been the outcome in the initial efforts.

Response: NMFS agrees with this comment, and it will be helpful to remember this point regarding future research to better understand each lakes' carrying capacity, nutrients, and ecology. This recommendation is similar to Comment No. 7, where NMFS also agrees with the need to conserve native residual and resident forms of *O. nerka*. Information has been added to several sections of the plan clarifying that while the focus of this plan is on the recovery of ESA-listed anadromous Snake River Sockeye Salmon, residual Sockeye Salmon and kokanee represent important life history and spatial diversity attributes which may contribute to recovery of anadromous Sockeye Salmon. The recovery plan identifies key information needs regarding potential competition between Sockeye Salmon juveniles and kokanee in the lakes. These questions can help to guide future research needs. These questions are meant to provide guidance and are flexible enough to be revised as new information becomes available.

J. Comments on Recovery Actions

a. Habitat

61. Comment: The recovery plan should include public education and interpretive objectives as part of the recovery strategy. Quality interpretation (including facilities and/or services) should be anticipated commensurate with the integration of the recovery element with the visitor services or activities currently occurring. For example, should the Redfish Lake Creek weir be reconstructed, in the heart of the Redfish Lake recreation complex, interpretive elements should be considered as core design objectives.

Response: NMFS agrees with this comment. Public education and interpretation are important strategies and actions for effective Snake River Sockeye Salmon recovery. In particular, there are important opportunities to educate the public as they visit the Sawtooth National Recreation Area. Regarding the future reconstruction of the Redfish Lake Creek weir, the Idaho Department of Fish and Game is already working with Sawtooth National Recreation Area staff to identify how to incorporate public education and interpretation into the rebuild design. There are many other examples of public education opportunities, and the recovery plan supports including quality interpretive objectives wherever recovery actions are implemented. Public education and interpretation has been added to the recovery strategies and actions in the recovery plan Section 6.3.2.9, Implement the Snake River Sockeye Salmon Recovery Plan through Effective Communication, Education, Coordination and Governance; and corresponding recovery actions, Section 7.3.9.

62. Comment: The recovery plan should include actions to eradicate lake trout in Stanley Lake. The US Forest Service understands eradication is currently technically feasible within this single small lake. With the catastrophic potential impacts to native fish populations, when combined with the “high” potential for their eventual occurrence, the commenter believes there is no appropriate rationale for retention of this exotic and invasive species within the Upper Salmon River watershed.

Response: The recovery plan identifies lake trout as a limiting factor in the section on the introduction of non-native fish species in Section 5.1.1.4, Land Use and Other Human Activities. There are corresponding recovery strategies, actions, and research questions described in the plan. The Idaho Department of Fish and Game is currently investigating the issue of lake trout in order to identify future management options to support recovery of Sockeye Salmon in Stanley Lake. NMFS believes this topic is adequately covered in the recovery plan and will work cooperatively with all partners to address this issue.

63. Comment: The Sawtooth National Recreation Area recommended additional habitat recovery actions for consideration to be implemented within the Sawtooth National Recreation Area.

Response: NMFS agrees with many of these new additional recommended habitat site specific recovery actions proposed by the Sawtooth National Recreation Area. These additional actions specifically related to Sockeye Salmon recovery have been added to Table 7-1 in Section 7.

b. **Hydropower System**

64. Comment: To achieve recovery, the Sockeye Recovery Plan must address the suite of threats to persistence *and* recovery. In this context the proposed plan must not only incorporate the suite of Reasonable and Prudent Alternative actions (RPAs) in the FCRPS BiOp; it must also include additional actions needed to achieve a recovery standard. While the RPAs are positive in terms of their effects on survival, the evidence shows that they are not altering the continued flat or downward population abundance trajectories of listed populations of salmon and steelhead.

Response: NMFS agrees that the recovery plan should go beyond what is described in the FCRPS RPAs and we believe that plan does this with its comprehensive review of limiting factors and detailed recovery actions. NMFS respectfully disagrees that population trends are flat or downward. There is substantial evidence indicating that FCRPS actions are substantially improving the survival and fitness of Snake River Sockeye Salmon migrating past the mainstem hydropower system projects. It is equally clear that their status has vastly improved compared to status indicators at the time of their listing under the ESA in 1991.

65. Comment: The recovery plan should include actions that modify the current mainstem FCRPS operations to advance recovery of ESA-listed salmon and steelhead. The commenter agrees that salmon and steelhead populations throughout the Columbia River basin, including Snake River Sockeye Salmon, will benefit from efforts to protect and restore freshwater tributary and estuary habitat. However, the weight of scientific evidence clearly indicates that the benefits produced by habitat improvements are being limited and constrained by the significant mortality resulting from the configuration and operation of the FCRPS. This is evident in the low rates of survival to adulthood for juvenile salmon and steelhead. The Sockeye Recovery Plan notes, on page 138, that for "*the 2004 through 2006 brood years, the natural-origin and full-term hatchery-raised smolts produced the highest SARs. These ranged from a low of 0.06% for brood year 2004 hatchery-raised pre-smolts to a high of 2.48% for brood year 2006 smolts that hatched in and emigrated from Redfish Lake*" (page 138). These SARs (Smolt to Adult Return

survivals) fall below the Northwest Power and Conservation Council's goal of 2 to 6 percent for salmon and steelhead (averaging 4 percent), and the commenter believes they are inadequate to achieve recovery.

The evidence also shows that SARs resulting from changes in current hydropower system operations could not only improve population abundance trajectories, but could significantly reduce mortality to levels necessary for survival and recovery. The commenter continues to advocate for increased spill levels over those in the FCRPS BiOp and improved spill management as essential actions to increase SARs.

Response: For brood years 2004-2006, average smolt-to-adult return rates for Sockeye Salmon produced from juveniles released as smolts were over three-fold greater than average rates for adults produced from Redfish Lake pre-smolt releases (i.e., 0.60% vs 0.17%). Average smolt-to-adult return rates for Sockeye Salmon produced from natural spawning events in Redfish Lake were over three-fold higher than results from smolt releases (i.e., 1.84% vs 0.60%) and over ten-fold higher than rates for adults produced from pre-smolt releases. For these three brood years, over 83% of returning adults originated from smolt releases, while the pre-smolt release option accounted for only about 3% of all returning adults. Importantly, the relatively small number of smolts produced from in-lake spawning events accounted for over 13% of the adult returns during this period. Observed smolt-to-adult return rates for natural-origin fish have exceeded the minimum 2% rate Kline and Flagg estimate is required for population self-sustainability (Kline and Flagg 2014).

NMFS has addressed the other part of this comment regarding recommended changes to operation of the hydropower system. NMFS believes there is substantial evidence indicating that FCRPS actions are substantially improving the survival and fitness of Snake River Sockeye Salmon migrating past the mainstem hydropower projects. It is equally clear that their status has vastly improved compared to status indicators at the time of their listing under the ESA in 1991.

c. Hatcheries

66. Comment: The recovery plan advances a dangerous overdependence on Sockeye Salmon hatcheries and the captive broodstock program. When the captive broodstock program was initiated in the early 1990s, it was intended to be a 1or 2-generation project to jumpstart the species, while mainstem survival issues were being addressed. Due to the many risks of extended hatchery operations, the current situation with a 20-year program already behind us, and projecting at least 20 years more, is unwise, wasteful, and unsound. Long-term, Sockeye Salmon recovery depends not on a captive broodstock program, but on natural processes in natal and migratory habitats.

Response: The captive broodstock hatchery program project managers developed a tiered or phased approach that includes increasing the number of adult Redfish Lake Sockeye Salmon returns, incorporating more natural-origin returns in hatchery spawning designs and on spawning grounds, and moving towards the development of an integrated conservation program that takes advantage of local adaptation as described in the IDFG Springfield hatchery master plan (IDFG 2010). The recovery plan takes a full life-cycle approach to describing limiting factors and threats, and the recovery strategies and actions needed to improve survival of the natural-origin populations at each life stage. The plan's goal is to restore natural Sockeye Salmon populations in Sawtooth Valley lakes. Recovery Strategy 6.3.1.1, Conserve Population Genetic and Life History Diversity and Spatial Structure, describes the phased approach for transitioning the existing captive broodstock program to a recolonization phase which will reduce reliance on captive broodstock for population maintenance. In the long term, hatchery supplementation programs will be adapted to transition to an appropriate longer-term role emphasizing natural adaptation consistent with maintaining genetic variability. The plan identifies key information needs regarding this topic, and Section 11, Research, Monitoring and Evaluation for Adaptive Management, outlines actions to address the uncertainties.

K. Comments on Time and Cost

67. Comment: The recovery plan includes a large number of new and/or expanded projects (including research, monitoring and evaluation projects) outlined in Appendix A and the estimated costs presented in Section 9. It seems worthwhile to identify prioritization criteria for implementation. The prioritization exercise itself would likely be carried out by the Snake River Sockeye Salmon Implementation and Science Team and the Stanley Basin Sockeye Technical Oversight Committee (SBSTOC). However, identifying the criteria for setting priorities would be relevant and seems necessary to include in the recovery plan.

Response: NMFS agrees that implementation of recovery plan actions should be carried out after an action prioritization exercise based on proposed prioritization criteria identified in the recovery plan. NMFS will add the following new action task to Section 6.3, Recovery Strategy, "develop and implement a recovery action prioritization process element to proposed prioritization criteria" which will be carried out through the proposed recovery plan implementation process. Section 10, Implementation, will be updated to add this prioritization exercise. Section 10 does identify action prioritization as a task of the Snake River Sockeye Salmon Implementation and Science Team, yet NMFS has added more text in several places in the plan to more consistently include this important issue.

L. Comments on Implementation

68. Comment: The recovery plan's proposed Snake River Sockeye Salmon Implementation and Science Team should include a representative from the Bonneville Power Administration.

Response: NMFS agrees that the Bonneville Power Administration will continue to be an important partner to implement many aspects of this recovery plan. The recovery plan already identifies the Bonneville Power Administration as a member of the future Snake River Sockeye Salmon Implementation and Science Team in Section 10.1, Implementation Framework.

M. Comments on Research, Monitoring and Evaluation for Adaptive Management

69. Comment: The recovery plan's Research Monitoring and Evaluation (RM&E) Plan would benefit from a review of existing relevant RME in the basin. In particular, status and trend monitoring is already in place for other Snake Basin listed salmon and steelhead. There should also be a mention of potential efficiencies where data collected on other species could be generalized or help inform adaptive management questions as they relate to Snake River Sockeye Salmon. Additionally, a large amount of the objectives associated with 'maintain the genetic resources of the Redfish Lake Sockeye Salmon' have been previously assessed or are ongoing.

Response: NMFS agrees that it is important to identify existing relevant RM&E and the recovery plan does include this information for each objective under the heading "Status." This describes what is being done to address each objective and who is carrying out the actions. NMFS will identify the current level of monitoring and, where necessary, we describe what additional monitoring is needed to fully address each objective. These are the monitoring programs that will inform adaptive management. NMFS agrees that it is important to identify some of this monitoring work early in the RM&E section. To this end, we have rewritten an introduction paragraph in Section 11.1.2, Monitoring Framework, to provide a general overview and context of existing monitoring activities.

Other Comments

Comments on Estuary Module

70. Comment: The recovery plan's Estuary Module is consistent with the Estuary Module referenced in the FCRPS 2008 Biological Opinion, which provides some estuary mitigation as "off site" mitigation for the dams. However, as with tributary habitat, please note that estuary impacts not associated with the FCRPS are substantial, due to diking, dredging, and other land use and fishery activities. Additionally, information relative to the development and refinement of the Expert Regional Technical Group (ERTG) process would better validate objectives of the Module.

Response: NMFS agrees with the comment and this is a good clarification that many recovery actions in the Columbia River estuary are outside the scope of the FCRPS Biological Opinion. As with other recovery actions in the recovery plan, there are many partners, governments, entities and jurisdictions that will need to work in partnership to recover this species.

Comments on Harvest Module

71. Comment: The recovery plan's Harvest Module's Section 2.1.4 *Snake River Mainstem and Tributary Fisheries* would benefit from some additional discussion, or at a minimum, an example of an annual Fishery Implementation Plan (FIP) in action.

Response: NMFS agrees with this comment and has added new language to the recovery plan and Harvest Module. State fishery management agencies and tribes submit to NMFS a Fishery Implementation Plan (FIP) each year as part of ESA compliance. FIPs are used pre-season by NMFS to determine if year-specific fishery plans are consistent with ESA Fishery Management and Evaluation Plans (FMEPs) and Tribal Resource Management Plans (TRMPs) that have ESA authorization, and to confirm ESA compliance in the long term for the duration of the respective biological opinion. FIPs describe year-specific pre-season details for fisheries in the Snake River that affect ESA-listed species, such as harvest numbers and ESA take that is expected in a given year, and that may have occurred in prior years under a given biological opinion.

Idaho Department of Fish and Game's (IDFG's) annual Snake River spring/summer Chinook fishery FIP is a good example of this process. IDFG submits an FIP to NMFS each year describing its year-specific projected fishing season goals based on pre-season run size estimates. Post season, IDFG reports to NMFS harvest and ESA take based on creel surveys and

this includes any projected incidental take of Sockeye Salmon. This Chinook fishery is carefully managed to avoid any potential take of Sockeye Salmon and no incidental take has been reported thus far.

NMFS agrees that additional information and discussion about fishery harvest reporting requirements is helpful to understand any potential impacts to Sockeye Salmon. Information has been added to Section 5.4.2, Salmon River and Snake River Fisheries, and to the Harvest Module, Section 2.1.4, Snake River Mainstem and Tributary Fisheries, to describe these reporting processes.

72. General comment: The recovery plan's Harvest Module on Fisheries in Section 5, focuses primarily on direct take and it would benefit from a description and further discussion (beyond ESA section 7) of likely current and potential incidental take of listed fish, particularly Sockeye Salmon.

Response: Fishery harvest is covered in the recovery plan, and it takes the fisheries incidental take uncertainty into account. For example, Section 6.3.1.8, includes a bulleted list of Recovery Strategy Questions regarding harvest and incidental harvest rates. The second, third, fourth, and fifth bullets address uncertainties related to incidental take. The Harvest Module will be edited to include these questions which can help to inform future fishery harvest.

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