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THE HONORABLE MICHAEL H. SIMON

UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

PORTLAND DIVISION

NATIONAL WILDLIFE FEDERATION, *et al.*,

Plaintiffs,

and

STATE OF OREGON,

Intervenor-Plaintiff,

v.

NATIONAL MARINE FISHERIES SERVICE, U.S. ARMY CORPS OF ENGINEERS, and U.S. BUREAU OF RECLAMATION,

Defendants,

and

No. 3:01-cv-00640-SI

DECLARATION OF FREDERICK E. OLNEY

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NORTHWEST RIVERPARTNERS, INLAND PORTS AND NAVIGATION GROUP, STATE OF IDAHO, STATE OF MONTANA, STATE OF WASHINGTON, KOOTENAI TRIBE OF IDAHO, CONFEDERATED SALISH AND KOOTENAI TRIBES, and NORTHWEST POWER AND CONSERVATION COUNCIL,

Intervenor-Defendants.

I, FREDERICK E. OLNEY, state and declare as follows:

INTRODUCTION

1. I worked as a fishery biologist for the U.S. Fish and Wildlife Service for 35 years, retiring on July 2, 2004, as Senior Scientist-Fisheries, Pacific Regional Office, Portland, Oregon. During the course of my career I have dealt extensively with the effects of Columbia River hydropower development on the Basin's salmonid resources and management of Columbia River salmon runs in general.

2. In December 1979, I was appointed Fisheries Technical Advisor and Chairman of the Fisheries Advisory Board for the U.S. District Court for the Western District of Washington. In that position I served as the Technical Advisor to Judge Walter E. Craig on fisheries conservation and management disputes under *U.S. v Washington* and *U.S. v. Oregon* until May 1982. Since 1982, my primary work has addressed Columbia River fisheries issues, including matters concerning the passage of salmon at the dams of the Federal Columbia River Power System ("FCRPS"). I have addressed such passage matters while serving as the Columbia River Coordinator for the U.S. Fish and Wildlife Service, as the Project Leader of the Columbia River Fisheries Program Office, and most recently as a Fish and Wildlife Administrator and Senior Scientist in the Pacific Regional Office. While serving as Project Leader of the Columbia River Fisheries Program Office from 1994-1999, I supervised a staff of about 20 full time biologists and directed their studies and activities, including work related to fish passage issues throughout

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the Basin. I have B.S. and M.S. degrees in Fisheries from the University of Washington.

3. I have served as the Fish and Wildlife Service's primary representative in inter-agency fish passage forums in the Columbia River Basin. These include the National Marine Fisheries Service's Regional Forum (Technical Management Team and Implementation Team), Columbia Basin Fish and Wildlife Authority (Members Management Group, Anadromous Fish Committee, Fish Passage Advisory Committee, and Fish Passage Center Operations Committee), Northwest Power and Conservation Council/CBFWA Spill Subcommittee, and various fish passage committees advisory to the U.S. Army Corps of Engineers.

4. I previously have testified by written declaration in this proceeding on behalf of the National Wildlife Federation ("NWF") plaintiffs, including declarations in support of their motions for summary judgment regarding the 2008 BiOp, as well as in support of their motion for injunctive relief regarding that BiOp. *See* Declaration of Frederick E. Olney in Support of Plaintiffs' Motion for Summary Judgment (filed Sept. 19, 2008) ("Olney 2008 SJ Dec."); Reply Declaration in Support of Plaintiffs' Motion for Summary Judgment (filed Nov. 18, 2008) ("Olney 2008 SJ Reply Dec."); Declaration of Frederick E. Olney in Support of Plaintiffs' Motion for Injunctive Relief (filed Nov. 25, 2008).

5. I have also testified by written declaration on behalf of the four lower Columbia River Treaty Tribes (the Yakama, Warm Springs, Umatilla, and Nez Perce) concerning the biological effects of summer spill and comments on the 2004 Biological Opinion. *See* Declaration of Frederick E. Olney (July 16, 2004) (summer spill injunction 2004); Declaration of Frederick E. Olney (Mar. 21, 2005) (injunction motion summer 2005); Second Declaration of Frederick E. Olney (same) (May 16, 2005); and Declaration of Frederick E. Olney in Support of Motion for Further Injunctive Relief (Dec. 7, 2005) (spring and summer 2006 operations injunction).

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6. I am currently self-employed as a consultant on fisheries issues and have been retained by the NWF plaintiffs in these proceedings. I have not been involved in any way as a government employee in the preparation of the biological opinion that is the subject of this declaration because work on it did not commence until after I retired.

7. I have reviewed the 2014 Biological Opinion on Operation of the Federal Columbia River Power System issued by NOAA Fisheries on January 17, 2014 (the "2014 BiOp"), including technical appendices and other related documents. I have also reviewed the 2008 and 2010 BiOps including the Supplemental Comprehensive Analysis and earlier Comprehensive Analysis and Biological Assessment prepared by the Corps of Engineers, Bureau of Reclamation, and Bonneville Power Administration and related documents. I am further familiar with and have reviewed previous biological opinions and related technical appendices and memoranda regarding the FCRPS and its operation following the listings of Columbia and Snake River stocks of salmon and steelhead.[1]

DISCUSSION

8. In this declaration, I start by summarizing the approach and structure of the 2014 BiOp. I then address a series of issues that I have described in my prior declarations regarding the 2008 BiOp and explain whether and how these issues are addressed in the 2014 BiOp.

I. OVERVIEW OF THE 2014 BIOP AND ITS UPDATED ANALYSIS

9. NOAA explains that the 2014 BiOp is a "supplement" to the 2008 BiOp. 2014 BiOp at 31-32 ("this reinitiated consultation analyzes the revised RPA with continued reliance on the determinations of the 2008 BiOp in the context of current information regarding the species, environmental baseline, any cumulative effects, and past and prospective

[1] The papers and reports that I refer to in this Declaration that do not appear to be in the administrative record for the 2008, 2010 or 2014 BiOps, or the action agency Records of Decision are attached as exhibits to this declaration. There are only two such documents.

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implementation of RPA actions"). The agency also explains that its supplemental opinion "was prepared to comply with the 2011 Court Remand Order." *Id*. at 33. And NOAA "concludes that the section 7(a)(2) analysis of the 2008 BiOp remains valid, as supplemented in 2010, and further by the additional project definition, analysis, and revised RPA actions contained in this [2014] Supplemental Opinion." *Id.* at 34.[2] The updated analysis for the revised RPA in the 2014 BiOp largely consists of two parts, an updated presentation of information about the status of the listed species that is set forth in chapter 2, *id.* at 43-224, and an updated discussion of RPA implementation that is set forth in chapter 3, *id.* at 225-458.

10. The 2014 BiOp does not apply a new jeopardy standard and does not alter the jeopardy analysis in the 2008 BiOp. For example, NOAA does not update its population-by-population quantitative prediction of the effects of the RPA, which it included as a central feature of the 2008 BiOp, by offering an updated base-to-current survival adjustment or an updated current-to-prospective survival adjustment for the revised RPA. *See* Olney 2008 SJ Dec. at 17-22 (describing these aspects of the 2008 BiOp jeopardy analysis). Rather NOAA's logic in the 2014 BiOp is that if its assessment of the status of the species for the Base Period in the 2008 BiOp has not changed significantly in light of its updated analysis of an extended Base Period in the 2014 BiOp, if implementation of the 2008 BiOp RPA as modified is, in NOAA's view, on track, and if, in the agency's view, there are no reasons to re-assess the effects of specific RPA actions, then its prediction of the effects of the RPA on the listed species from 2008 remains valid and continuing to implement the RPA will be sufficient to avoid jeopardy. 2014 BiOp at 34.

[2] There are seven changes to the prior RPA addressed in the 2014 BiOp. Four of the changes affect spill operations at the FCRPS dams and transportation of juvenile salmon and steelhead during their out migration. One of the changes eliminates a mitigation action in the estuary, the pile dike removal program, and two others address actions to control predation (by northern pike minnows and cormorants, respectively). 2014 BiOp at 37-38 (listing changes).

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II. THE UPDATED ANALYSIS OF THE STATUS OF THE SPECIES

11. The updated analysis of the status of the species in chapter 2 of the 2014 BiOp consists of a lengthy discussion of the "rangewide status of salmon and steelhead and designated critical habitat," 2014 BiOp at 43-182, a shorter discussion of the environmental baseline, *id.* at 183-220, and a very brief discussion of cumulative impacts, *id.* at 221. As NOAA explains, its examination of the rangewide status of salmon and steelhead "reviews new information to determine if the updated status of interior Columbia basin salmonids differs from our understanding in the 2008 BiOp. If there is a change in the species status, a second step would be to determine if that change reveals effects of the action that may affect the listed species in a manner or to an extent not previously considered." 2014 BiOp at 45.

12. The updated analysis of the species' status addresses the same extinction risk metrics, population metrics, and jeopardy thresholds (less than a 5% risk of extinction in 24 years and population growth rates of at least 1.0 for the three recovery metrics) that NOAA reported in its quantitative jeopardy analysis in the 2008 BiOp. NOAA describes how it references these metrics and new information to update its analysis on pages 48 through 69 of the 2014 BiOp. This discussion includes pages 66-69 where NOAA explains how it evaluates whether the extended Base Period estimates of its various population status metrics, using new information, have changed from the 2008 BiOp's Base Period estimates. As NOAA explains, "the primary method [it] uses to evaluate the Base Period versus the Extended Base Period indicator metric estimates is to determine whether point estimates for the various metrics have changed." 2014 BiOp at 66. The agency goes on to explain that "[w]hile the comparison of point estimates is important, it does not provide a complete picture of the current status [of a population] relative to the estimates in the 2008 BiOp. Two factors that also must be considered are uncertainty in parameter estimates [i.e., in the point estimates for each metric] and the process of density dependence . . . ." *Id.* NOAA then discusses each of these factors. I briefly

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describe NOAA's discussion of uncertainty below to provide background on this issue. I do not address the issue of density dependence.

13. With respect to uncertainty, NOAA notes that "the point estimates calculated for the 2008 BiOp Base Period indicator metrics tended to have fairly wide statistical confidence intervals, reflecting . . . uncertainty, as do the new extended Base Period estimates." *Id.* NOAA then explains that, "[i]f confidence intervals [for two point estimates of the same metric for the same population] overlap, particularly if the second point estimate falls within the confidence interval of the first estimate, [a statistical test] would not indicate that the metric has changed." *Id.* at 67 (emphasis added). NOAA further states that while the approach of determining whether a new point estimate falls within the confidence intervals for a prior point estimate "is a useful way of describing if a statistically significant change in a BiOp indicator metric *has* occurred, it may be of limited utility in determining that a change has *not* occurred." *Id.* (emphasis in original). NOAA does not describe or discuss in the 2014 BiOp other aspects or implications of the wide confidence intervals for its calculation of the Base Period (or the Extended Base Period) point estimates of the various population indicator metrics. Other relevant implications of these wide confidence intervals have been described and explained in the Declarations of Ed Bowles filed in support of Oregon's challenge to the 2008 BiOp and in the Declarations of Dr. Steven Orzack filed in support of NWF's challenge to the same BiOp. *See* Declaration of Edward Bowles in Support of State of Oregon's Motion for Summary Judgment at ¶¶ 51-64 ("Bowles 2008 SJ Dec."); Declaration of Steven Orzack, Ph.D., in Support of NWF's Motion for Summary Judgment at ¶¶ 8-16 ("Orzack 2008 SJ Dec.").

14. NOAA concludes that because of the uncertainty indicated by these wide confidence intervals, it does not "rely solely on results based on the relation of new mean (i.e. point estimates) to the confidence intervals of the previous estimates. . . . but rel[ies] on a

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combination of all of the information described in this section in [its] determination." 2014 BiOp at 67. NOAA summarizes the information it combines from section 2.1 on pages 129 to 134 for the interior Columbia basin salmon and steelhead populations. First, it notes that its updated analysis of metrics "provide[s] support for NOAA Fisheries' continued reliance on the 2008 BiOp's description of the rangewide status of these species and the Base Period metrics." 2014 BiOp at 129. In other words, where NOAA's calculation of Base Period metrics in 2008 produced point estimates for a metric that showed populations that were not replacing themselves, i.e., populations that were declining, the updated or Extended Base Period metrics cannot be statistically distinguished from a continuation of that trend.

15. Next NOAA summarizes the results of several reports it has made and a separate five-year status review of the listed species. As NOAA explains, these reports generally conclude that the status of the listed species has not changed: "the status of species and their constituent populations relative to those recovery goals is nearly identical to the recovery status in the 2008 BiOp as updated by the 2010 Supplemental BiOp." *Id.* at 130 (for example, according to the five-year status review, "[o]verall risk ratings continued to be 'high' for all populations of [upper Columbia Chinook, upper Columbia steelhead, and Snake River spring/summer Chinook]"). NOAA then summarizes again the results of its Extended Base Period analysis of the 2008 BiOp population metrics as set out in the 2014 BiOp. 2014 BiOp at 131-32. It notes, as it had previously, that "[v]irtually all of the new extended Base Period estimates fall within the statistical confidence limits of the 2008 BiOp Base Period metric estimates" but it goes on to summarize, discuss, and draw conclusions about the populations based on a comparison of the updated Extended Base Period point estimates for these metrics to the original Base Period point estimates. *Id.* at 131-133.

16. The main conclusion it draws from this discussion of the new point estimates is

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that they provide '"strong support for the hypothesis that density-dependent recruitment is occurring in these populations' and 'strong support for the hypothesis that productivity has not decreased for these populations when comparing base to recent time periods . . . ." *Id.* at 132. Finally, NOAA summarizes the results of "[m]ore recent aggregate dam counts and predictions from factors influencing earlier ages of some cohorts . . . ." *Id.* at 133. NOAA does not draw any specific conclusions from these aggregate dam counts. *Id.* Earlier in the 2014 BiOp, NOAA also states that "[n]o changes resulting from RPA implementation are expected to be reflected in available BiOp indicator metrics." *Id.* at 68.

III. THE UPDATED ANALYSIS OF THE EFFECTS OF THE RPA

17. As noted above, NOAA sets out in Chapter 3 of the 2014 BiOp its updated analysis of RPA implementation and its effects. It summarizes the conclusion of this review as follows:

> As described in sections 3.1 through 3.9 and summarized above, the effects of the RPA action are anticipated to be within expectations of the 2008 BiOp. In reaching this determination, NOAA Fisheries considered apparent reductions in juvenile system survival and adult survival through the hydropower system, but determined that these factors remain within the BiOp's expectations for the reasons described above. Additionally, survival is expected to improve to match 2008 BiOp expectations for all interior Columbia species and populations as a result of the modification to RPA action 46, which requires a reduction in the number of cormorants on East Sand Island, and survival is expected to be above expectations for specific species and populations as a result of tributary habitat improvement actions, hatchery improvements, and tern management in the upper Columbia area.

2014 BiOp at 455. In my prior declarations filed in support of NWF's summary judgment motion against the 2008 BiOp, I addressed specific aspects of NOAA's evaluation of the effects of the original 2008 BiOp RPA. These included the predicted effects of estuary habitat restoration actions, *see* Olney 2008 SJ Dec. at ¶¶ 61-74, measures to address avian predation (both terns and cormorants), *see id.* at ¶¶ 75-80, and the proposed kelt reconditioning program

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for some steelhead populations, *id.* at ¶¶ 86-92. I will explain below whether and how the 2014 BiOp addresses each of these issues.

A. Estuary Habitat Actions

18. In my two prior declarations addressing the 2008 BiOp, I discussed a number of aspects of NOAA's assessment of the survival benefits it predicted would occur from habitat actions in the Columbia River estuary that are part of the 2008 RPA. Olney 2008 SJ Dec. at ¶¶ 61-74; Olney 2008 SJ Reply Dec. at ¶¶ 37-57. In these paragraphs, I described the survival benefits NOAA said estuary habitat actions would provide, a 6% increase for Snake River steelhead and Snake River spring/summer Chinook (called "stream-type" fish), and a 9% increase for Snake River fall Chinook (called "ocean-type fish"), with comparable increases for other ocean- and stream-type species in the Columbia basin. I also discussed aspects of the tools NOAA relied on to make these predictions. In my reply declaration, I addressed a number of statements from NOAA that appeared to misapprehend my statements and further explained the points I had raised. Olney 2008 SJ Reply at ¶¶ 38-57. Finally, I described some features of the estuary habitat projects that were relevant to the ability of the projects to provide the survival increases predicted in the RPA and the 2008 BiOp. *Id.* at ¶¶ 48-57. In the paragraphs that follow, I focus primarily on the estuary habitat actions that have occurred so far and NOAA's discussion in the 2014 BiOp of the factors it considered in evaluating whether estuary habitat actions in the revised 2014 RPA would provide the survival benefits predicted for them in the 2008 BiOp.

19. NOAA discusses the RPA's estuary habitat actions, RPA actions 36 through 38, on pages 319 through 344 of the 2014 BiOp. In this discussion, NOAA confirms that:

> The particular 9% and 6% relative survival improvement performance standards [] for this program were set in the 2008 BiOp based on estimates of survival increases reasonably achievable through implementation of the Columbia River estuary management actions described in the Columbia River Estuary ESA

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> Recovery Plan Module for Salmon and Steelhead (NMFS 2011h, hereinafter Estuary Module). These figures, 9% relative survival increase for ocean-type fish and 6% for stream-type fish, were factored into the [2008] BiOp's quantitative analysis [Snake River and Upper Columbia River salmon and steelhead] as well as into the qualitative analysis for other affected listed salmonids, demonstrating how implementation of the RPA . . . would likely avoid[] jeopardy . . . and adverse[] modification of critical habitat.

2014 BiOp at 319-320 (footnote omitted). In my 2008 summary judgment declaration, I offered a number of observations about the action agencies' and NOAA's employment of the Estuary Module to predict survival improvements from estuary actions. Olney 2008 SJ Dec. at ¶¶ 62-74. Since NOAA continues to rely on the specific prediction of survival benefits from estuary actions developed in the 2008 BiOp, my observations about the role of the Estuary Module in developing these predictions remain relevant.

20. My observations included noting that the Module offered only a target level of survival improvement for salmon and steelhead from all types of action in the estuary of up to 20 percent. The authors of the Module state that this 20 percent total figure was for "planning purposes only," and not an actual prediction of the level of survival improvement that could be achieved from estuary actions, hence they described it as a "target." They also noted that their 20% target level of the total potential survival improvement that could be achieved in the estuary was based on a number of other critical assumptions, including the assumption that all 23 elements of the Module, in addition to estuary habitat restoration which covers only a subset of the 23 elements, were implemented to a reasonable degree. Olney 2008 SJ Dec. at ¶¶ 62-63. I also described an Independent Scientific Advisory Board ("ISAB") review of the Estuary Module that noted the Module was of limited scientific value and that its assumptions about survival improvements in the estuary were questionable. *Id.* at ¶ 64.

21. I then explained how a consultant for the action agencies developed the specific 9% and 6% survival improvement predictions for the estuary habitat restoration program

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described in RPA actions 36-38 using the Estuary Module, *id.* at ¶ 65, and how the consultant's approach to developing these predictions omitted and/or did not address a number of factors that would be relevant to assessing the use of the Estuary Module to make specific survival predictions, *id.* at ¶¶ 66, 67-69 (e.g., relying on actions that protect existing estuary habitat to provide a portion of the predicted survival improvement when protecting existing habitat may prevent degradation but does not increase available habitat), 70 (not accounting for all of the Module assumptions in the survival predictions), and 71-74 (not actually following the methods described in the consultant's report or addressing the gap between the Module's assumptions about funding needs and the action agencies' planned funding at that time). I subsequently addressed and further explained these and similar points in my summary judgment reply declaration regarding the 2008 BiOp. Olney 2008 SJ Reply at ¶¶ 37-57.

22. While, as noted above, NOAA and the action agencies continue to rely on the 9% and 6% survival increases developed for the 2008 BiOp and the analysis that produced these predictions, they have changed the methodology they employ for survival benefit scoring for specific estuary habitat actions (essentially the method for predicting the amount of survival improvement a particular estuary habitat restoration action is expected to provide). NOAA describes this new approach in the 2014 BiOp. *See* 2014 BiOp at 325–328. The new approach, developed by a new group called the Expert Regional Technical Group ("ERTG"), consists of a process for calculating the number of "survival benefit units" or SBUs a particular estuary habitat restoration action is predicted to provide. As NOAA explains, as part of the ERTG scoring process, each percentage point of the 9% and 6% survival improvement requirement under the RPA was converted into 5 SBUs so that the total SBUs needed to implement the estuary RPAs for ocean-type salmonids is 45 and for stream-type is 30. 2014 BiOp at 326. As I explain in more detail in the following paragraph, even for completed projects in the estuary, the

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survival benefits the ERTG process calculates remain predictions because the action agencies and NOAA cannot determine whether a specific estuary habitat action that has been completed actually has produced a survival improvement.

23. The ISAB has reviewed this new ERTG scoring process for estuary habitat actions. Their conclusions confirm many of the points I describe below. The ISAB's major conclusions are:

> *1. Are the ERTG Scoring Criteria used to assign survival benefits for habitat restoration based on sound science?*
>
> **The ERTG Scoring Criteria are partially based on sound science**. The Scoring Criteria were developed by the highly qualified ERTG team, which has considerable experience with estuarine and salmonid ecology. . . . The results and conclusions based on the ERTG Scoring Criteria are only partially supported by available scientific information. The Criteria have not been applied to comprehensive management elsewhere and are based largely on professional opinion. Thus, the ERTG's findings should be viewed as informed hypotheses that require research, monitoring, and evaluation to verify results and conclusions.
>
> *2. Do the ERTG Scoring Criteria have the ability to differentiate and/or prioritize those projects that will succeed in increasing the survival of salmonids through their residence and migration in the Columbia River estuary?*
>
> **The ERTG Scoring Criteria are being used by Action Agencies (BPA/Corps) to differentiate and/or prioritize habitat restoration projects in the Columbia River estuary. However, the ability of projects to actually succeed in increasing the survival of salmon through their residence and migration in the Columbia River estuary cannot be determined from the Scoring Criteria.** The ERTG Scoring Criteria can differentiate and/or prioritize the potential effectiveness of a project to increase survival of salmonids, assuming the accuracy of the score is reasonable. The statistical accuracy and precision of scoring of restoration projects are not estimated and are probably low in terms of the actual survival benefit expected from a specific project, but the accuracy and precision are likely greater for comparing the relative benefits of one project ranked against another. . . . [T]heir ability to differentiate and/or prioritize is only as good as the science behind SBUs in the primary planning document (Estuary Module). The main disadvantage of the scoring process is its subjectivity and variability of assigned scores, especially if there is a change in ERTG personnel. Whether or not the selected projects will actually succeed in increasing the estuarine survival of salmonids will remain uncertain until quantitative estimates of improvements in estuarine survival of salmonids become available.

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3. *Do the processes identified in the ERTG Scoring Criteria reflect a landscape approach to restoring estuarine habitat through landscape ecology, resilience, and adaptive capacity?*

The processes identified in the ERTG Scoring Criteria reflect a landscape approach to restoring estuarine habitat through landscape ecology, resilience, and adaptive capacity, but only in a limited way. Ecological processes acting at the landscape scale, such as connectivity of habitats along salmonid migratory pathways, are recognized by the ERTG when subjectively scoring individual projects rather than by explicit criteria that guide scoring. Feedback processes due to connections among habitats are particularly important to resilience, but they are not explicitly quantified by the ERTG Scoring Criteria. Major socioeconomic processes such as salmon harvest, hatchery salmon production, hydrosystem operation, and urbanization also affect the diversity of salmon populations and habitats, and hence resilience, but do not seem to be considered in the scoring process. At present, the ERTG is operating under a high level of scientific uncertainty to qualitatively evaluate the identified processes. Quantitative estimates of processes are needed to develop adaptive capacity. Indeed, the limited purpose and scope of the ERTG Scoring Criteria and Terms of Reference for the ERTG do not promote a comprehensive landscape approach.

4. *Are there systematic and repeatable methods for quantitatively assessing the net changes in the Columbia estuary ecosystem that would produce data and analysis to validate the ERTG's survival benefit estimates?*

The review materials provided to the ISAB did not include systematic and repeatable methods for quantitatively assessing the net changes in the Columbia estuary ecosystem that would produce data and analysis to validate the ERTG's Survival Benefit estimates. Previous ISAB advice from the CEERP review . . . is still relevant: "A highly focused RME approach that estimates stock-specific survival rates in all major habitat types in the estuary and identifies habitats/locations where there are survival bottlenecks for species and stocks that migrate through Federal Columbia River Power System (FCRPS) is needed. Once these estuary bottlenecks are identified, it will be much easier to determine the most cost-effective approaches to habitat restoration that will be of benefit to Columbia River fish and wildlife."

5. *Are there other data available to complement the ERTG's approach or additional analysis that would make better use of available information to prioritize habitat restoration?*

The information from ERTG reports, meetings, and Action Agency documents specific to the ISAB's review suggests that other data are available to complement the ERTG's approach and additional analyses could make better use of available information to prioritize habitat restoration. . . .

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Habitat Restoration at 2-3 (Feb. 12, 2014) (hereinafter "ISAB 2014-1") (2014 Corps AR at 3671).[3]

24. The 2014 BiOp reports that the ERTG scoring process the ISAB addressed in its review quoted above was used to score all of the estuary projects completed, or expected to be completed, from 2007 through 2013, although it appears from the record that more than one third of these projects were actually scored by the action agencies or were scored (possibly using a different method) in the original action agency biological assessment. *See* 2014 NOAA AR at 271375 (estuary action spreadsheet dated May 21, 2013) ("May Spreadsheet"). Based on the reported scores for these projects, all of the projects completed from 2007 through 2012 provided less than 4 of the required 45 SBUs for ocean-type fish and less than 2 of the required 30 SBUs for stream-type fish. 2014 BiOp at 332-333 (Table 3.2-2). By adding projects the action agencies expected to complete through 2013, *id.* at 330, this total increased to 8.2 SBUs and 3.4 SBUs for ocean and stream-type fish, respectively, *id.* at 333 (Table 3.2-2). This is less than one-fifth of the survival improvement the RPA requires for ocean-type fish and just over one-tenth of the improvement for stream-type fish. As NOAA acknowledges, "this means that the program still must achieve the bulk of the SBUs . . . needed to satisfy the estuary performance standard." *Id.* at 331.

25. The estuary habitat work in the RPA has consistently been behind in implementation and so in the survival improvements it is predicted to provide. At each step since the 2008 BiOp, the action agencies have said that the estuary habitat program is "maturing," or becoming better organized, or ramping up, and will soon catch up with level of survival improvements it is required to provide. *See, e.g.*, 2009 Annual ESA Project Report:

[3] Citations to the administrative records for the 2014 BiOp are in the form "2014 [agency] AR at [document or page number]" where the AR number is the document or page number in the AR index. If necessary for clarity, the citation includes the specific Bates stamp page number as well.

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Section 2, Summary Table: Actions and Accomplishments for 2009 at 40 (2014 Corps AR 27 at 4551) ("Some projects scheduled for completion in 2007-2009 were delayed or proved infeasible. The Action Agencies are constructing projects in the 2010-2013 implementation period to replace the survival benefits those projects would have provided"); FCRPS 2010-2013 Implementation Plan at 6 (June 2010) (2014 Corps AR 29 at 5133) ("Estuary actions are behind schedule, but a catch-up plan has been formulated, with many new estuary projects under development for completion in 2010-2013"); 2014-2018 Implementation Plan at 61-62 (2014 Corps AR 9 at 1347) ("During 2007-2009 implementation period, some projects scheduled for completion were delayed and carried forward to the 2010-2018 period. The benefits associated with those projects are included in the 2010-2013 [Comprehensive Analysis, section 3, 2014 Corps AR 12 at 2466-2480], and the 2014-2018 [Implementation Plan at Appendix A, 2014 Corps AR 9 at 1468-1510] implementation cycles. During the 2007-2009 period some projects also proved infeasible. The Action Agencies are implementing additional projects through 2018 to provide survival benefits equivalent to those of the infeasible projects. These additional projects are being selected and implemented in accordance with RPA Action 37"). As with these prior statements, the 2014 BiOp also says that the estuary habitat program has become better organized and more effective and will soon catch up and provide the predicted survival improvements. 2014 BiOp at 331 (discussion and NOAA conclusion that the action agencies "are likely to make up this sizable difference").

26. As the 2014 BiOp explains, the action agencies expect to make up the large shortfall in predicted SBUs from estuary habitat actions by relying on a few very large habitat projects. 2014 BiOp at 334-35 (Table 3.2-3) (listing many individual projects but estimating only SBU totals for projects initiated in 2012 that are to be completed by 2018 and separate totals for projects to be initiated in 2013 and beyond and completed by 2018). The 2014-2018

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Implementation Plan (Jan. 10, 2014), (2014 Corps AR at 9), Appendix A lists the individual projects for 2014 and beyond with the SBU estimates and identifies whether they were given preliminary scores by the action agencies, preliminary scores by the ERTG, or final scores by the ERTG. The ERTG provided preliminary scores for four large dike breach projects. The ERTG provided a final score for only one small project: Oaks Bottom Tidal Reconnection (0.16 and 0.08 SBU's for ocean and stream-type fish, respectively). One other large dike breach project and the remainder of the projects were given preliminary scores by the action agencies. NOAA says these groups of projects combined are expected to provide 74.6 SBUs for ocean-type fish and 26.6 SBUs for stream-type fish. *Id.* The SBUs for these future projects, when added to the much smaller number of SBUs predicted to be produced by all estuary habitat actions that have been implemented or are expected to be implemented from 2007 through 2013 (8.2 SBUs for ocean-type fish and 3.4 SBUs for stream-type fish), produce the total number of SBUs on which NOAA relies. 2014 BiOp at 336 (last paragraph).

27. In the 2014 draft BiOp, NOAA discusses estuary habitat projects it expects will be implemented between 2014 and 2018. *See* 2014 Draft BiOp at 317-318. There it explains that some of these projects are still in the feasibility phase and none are in construction-ready status hence they were given only preliminary scores by the ERTG. By summing the scores from Appendix A of the action agencies 2014-2018 Implementation Plan, it appears that the ERTG preliminary scores, based on project concepts, for the four large projects would provide 41.82 ocean SBUs and 14.8 stream-type SBUs. One of these large projects, Large Dike Breach-Reach E alone has a preliminary ERTG score of 31.0 ocean-type SBUs and 11.08 stream-type SBUs. These large projects all involve levee breaching, 2014 BiOp at 337-338, which requires significant investment. The 2014 BiOp does not discuss in any detail the feasibility of these projects or any potential funding issues but the 2014 BiOp does say that if any of these projects

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prove infeasible, the action agencies "will implement others that collectively contribute an equivalent number of SBUs." *Id.* at 336. NOAA does not actually describe any potential substitute projects or explain where they would occur or its basis for concluding that they are available and can be implemented.

28. As NOAA explained more clearly in the draft BiOp, because the estuary projects given preliminary scores by the ERTG did not provide the SBUs for stream-type fish required by the RPA, the action agencies also relied on additional projects to provide another 24.4 SBUs for ocean- and 8.06 SBUs for stream-type fish. These projects had not yet been initiated and were not scored even preliminarily by the ERTG. 2014 Draft BiOp at 316-317. These projects, with slightly different SBU numbers, apparently are listed in the final 2014 BiOp on page 335 but the feasibility and individual scores for these projects are not described or listed. The 2014-2018 Implementation Plan does not make a separate designation for these projects.

29. NOAA and the action agencies expect to achieve totals of 74.6 ocean- and 24.6 stream-type SBUs from the two groups of estuary habitat actions discussed above between 2014-2018. When added to the much smaller number of SBUs estimated for estuary projects from 2007-2013, NOAA expects to achieve 82.7 and 30.0 SBUs in total for ocean- and stream-type fish, respectively, which exceeds the 45 SBUs (9% relative survival improvement for ocean-type fish) and just meets the 30 SBUs (6% relative survival improvement for stream-type fish). The projects whose final feasibility have not been assessed by the ERTG make up about 95% of the total ocean- and total stream-type SBU's for the entire RPA from 2007 through 2018. Preliminary ERTG scores given for the four large dike breach projects make up about 51% of the total ocean and 49% of the total stream-type SBUs.

30. Although not discussed in the 2014 BiOp, apparently the original 2008 BiOp requirements of a 9% and 6% survival improvement assumed that estuary habitat projects would

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deliver 0.66 stream SBUs for every ocean SBU. The 2014-2018 Implementation Plan at pages 61-62, however, states that, "[t]he original targets based on the [2008] BiOp's relative percent survival improvement targets (9% for ocean and 6% for stream type) assume that habitat projects will deliver roughly 0.66 stream SBUs for every ocean SBU (30/45). The actual results from the ERTG scores to date correspond to 0.33 stream SBUs for every ocean SBU, roughly half the ratio found in the BiOp targets." It is more difficult to achieve benefits for stream-type fish from estuary habitat projects because they spend so little time in the estuary in their migration to the ocean. In order to meet the survival improvement of 6% or 30 SBUs for stream-type fish, the action agencies must achieve about 90 SBUs for ocean-type fish rather than the 45 SBUs required by the 2008 RPA. This change in the ratio of SBUs between ocean- and stream-type fish accounts for the sharp increase in predicted SBUs and survival improvements for ocean-type fish in the 2014 BiOp. Thus NOAA now says that estuary habitat actions will increase the survival of ocean-type fish by nearly 17% rather than 9%, while just meeting the required 6% survival improvement for stream-type fish.

31. NOAA and the action agencies have now eliminated from the RPA action 38—the Piling and Piling Dike Removal Program. 2014 BiOp at 341. This action was depicted in the 2008 BiOp as a key component of the estuary work. The project was intended to help increase connectivity and reduce avian predation by removing perches for double-crested cormorants. According to the 2008 BiOp, Comprehensive Analysis, Appendix D, the piling and piling dike removal program would provide about 1.2% of the 9% survival benefit target for ocean-type and 1.2% of the 6% target for stream-type fish, or 15% and 20% of the overall survival benefit from estuary work, respectively. These numbers can also be derived from NOAA's Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead at 5-39 (Table 5-5) (Jan. 2011) (2014 NOAA AR B296 at 31691). Removing this program creates a need to make up for these

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predicted estuary survival benefits and NOAA says as much: "[a]ll SBUs attributed to this program in [the analysis supporting the 2008 BiOp] will now be acquired by implementing other projects under RPA action 37 [estuary habitat projects]." 2014 BiOp at 341.

32. NOAA does not explain how this can be accomplished consistent with the framework of the Estuary Model, the ERTG scoring process, and the ISAB reviews. As these documents explain, the action agencies cannot create or take credit for more SBUs for an Estuary Module component action than the Module's structure allows. They cannot, for example, take assumed potential SBUs from the Module's flow management element/action and shift them to estuary habitat work because it is inconsistent with the assumptions of the Module. The same is true for the Piling and Piling Dike Removal action which is a separate Module action from habitat restoration. NOAA's response to comments on this issue that accompany the 2014 BiOp does not address this point when it discusses the issue of ERTG "weighting." *See* Response to Comments ("RTC") at 44 (comment/response D-8) (2014 NOAA AR 288216 at 288259). The weighting using the fish density estimates discussed in this response to comments only affects how the potential SBU's *within* an Estuary Module action are allocated among projects and does not change the number of SBUs possible for that action element as noted by the ERTG. For example, in the ERTG's 2011 Feedback on Inputs to the Calculator to Assign Survival Benefit Units, the ERTG states with respect to the SBU calculator, "[w]eighting does not change the number of SBU possible. It only reallocates SBU among subactions." ERTG 2011-01 at 4 (2014 NOAA AR B108 at 9152). They state the same in their Meeting Notes 2011, 2012, and 2013. ERTG 2013-03 at 6 (2014 Corps AR 42 at 5705).

33. The ISAB makes this same point in their review of the ERTG SBU scoring methods: the process cannot assign more SBUs for a restoration action than the Module estimates:

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> The 2011 Estuary Module developed by NOAA constrains the quantity of SBU's that the ERTG can assign to restoration projects. The Module lists 22 habitat restoration actions and associated subbasin goals, and provides each restoration action with a set number of SBU's. The ERTG cannot assign more SBU's for a restoration action than the Module delineates.

ISAB 2014-1 at 1 (discussing the Estuary Module). As in other aspects of the 2014 BiOp, NOAA states that "[i]f any of [the estuary habitat restoration actions] prove infeasible, the Action Agencies will ensure that the total sum of projects implemented, including any replacement projects, will collectively reach the BiOp's estuary habitat survival benefits performance standards . . . ." 2014 BiOp at 338.

34. NOAA's statement about replacing the survival benefits from the piling and piling dike removal program also does not address the Estuary Module's assumption of a total 20% overall survival improvement target for the estuary if each of the 23 management actions in the Module are implemented to "a reasonable degree" (22 actions to improve juvenile survival and one to improve adult survival). The piling and piling dike removal program was one such action and was a different element from the habitat restoration elements. Not addressing factors that limit survival in some areas could reduce or negate survival benefits from improvements in estuary habitat in other areas. As NOAA explained in the 2008 BiOp, the 9% and 6% survival improvement requirements for the RPA from estuary habitat actions were derived from the Estuary Module and its underlying assumptions. The Module assumed a total potential survival improvement of 20% as a target for salmonids passing through the estuary if all 22 of the actions for juvenile salmonids and the one action for adult salmonids were implemented to a reasonable extent. In addition to the estuary habitat improvement actions, these actions include improvements in flow regulation, reducing entrapment of sediments in reservoirs, reducing impacts from dredging, fertilizer and pesticides upstream, limiting industrial, commercial and public sources of pollution, reducing the effects of ship wakes and reservoir related water

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temperature changes, and removing piling and pile dike structures. NOAA does not address whether these actions have been implemented to a reasonable extent or whether there are negative effects such as adverse flow effects, increased ship traffic, or increased agricultural runoff as a result of some of the elements not being implemented at all or to a reasonable degree, or whether such shortcomings (if any) could affect the survival improvements from estuary habitat actions, although NOAA has concluded that the piling and piling dike removal program will not be implemented at all.

35. NOAA also says in the 2014 BiOp that it "continues to assume that these habitat improvement projects are mitigating for the negative effects of RPA flow management operations on estuarine habitat used by these species for rearing and recovery." 2014 BiOp at 475. In making this assumption (that estuary habitat improvement projects can mitigate for negative effects of RPA flow management), NOAA does not address several relevant factors. First, as discussed above, the Estuary Module assumed that all 22 actions, including flow improvements, would be implemented to a reasonable extent in order to achieve the 20% potential survival improvement target for the estuary, which includes the potential SBUs from the subset of estuary habitat actions. Second, the ISAB states, "the ERTG scoring criteria do not include key processes such as operations of spill and water releases at the dams, precipitation and timing of volume of flows that likely affect estuarine conditions." ISAB 2014-1 at 14. Finally, the ERTG also has identified several key uncertainties including whether historical functions of floodplains can be restored because of modern flow regulation and invasion by non-native warm water fishes, uncertainty about juvenile salmon use of riparian habitats depending on water level and vegetation type, uncertainty about how rearing capacity varies seasonally with changes in temperature and flow, and uncertainty about how the "peaking" cycle at the dams influences rearing opportunities and capacities at upper estuary restoration sites. ERTG 2012-02 at 4-7

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(2014 Corps AR 39 at 5628-5631). These latter points indicate that allowing the negative effects of RPA flow operations to continue could reduce the potential survival benefits from estuary habitat actions and that these negative effects of flow are not mitigated by habitat actions.

36. In my summary judgment reply declaration regarding the 2008 BiOp, I explained that one assumption of the Estuary Module was that restoration actions would be balanced and distributed throughout all segments of the lower river in order to ensure their connectivity, rather than concentrated in one or a few segments. Olney 2008 SJ Reply Dec. at ¶ 51 (summarizing a memorandum from a NOAA scientist). In their May Spreadsheet and 2014-2018 Implementation Plan, the action agencies list the completed and proposed estuary habitat projects located in the eight reaches of the estuary from A to H. Only a few small projects have been completed and none are proposed for reaches D and H for implementation in 2014-2018. Three of the four large projects that NOAA discusses in the 2014 BiOp, and relies on to produce the SBUs still needed to improve estuary survival, are located in the upper three of the six reaches that do have proposed estuary projects. These three projects alone contribute nearly half of the total ocean- and stream-type SBUs for all of the 2007-2018 estuary habitat improvement projects. One of these projects, Large Dike Breach E, contributes about one-third of the total expected benefits. NOAA says the estuary habitat projects, including these, are adequately distributed in the estuary, 2014 BiOp at 338, but it does not provide any supporting analysis. The completed and predicted SBUs for estuary habitat actions, according to the action agency's May Spreadsheet and the 2014-2018 Implementation Plan, are substantially concentrated in a few projects in three reaches from the mid- to upper estuary. About 66% of all of the SBUs listed in the May Spreadsheet and 2014-2018 Implementation Plan are concentrated in 3 of the 8 reaches in the mid- to upper estuary, less than 0.5% of the SBUs are located in 2 of the 8 reaches, and the remaining 34% are located in the three lower reaches of the estuary. Of course, this

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analysis assumes all of the projects listed in the 2014-2018 Implementation Plan, most of which are only conceptual, are actually implemented. It also assumes that final SBU scores by the ERTG do not change the scores developed by the action agencies for a number of projects that only the action agencies have scored.

37. NOAA also does not address the relationship between the Estuary Module's constraint of a total survival improvement of 20% in the estuary—as a target, not a prediction—assuming all 22 action categories from the Module are implemented to a reasonable degree (on the one hand), and its conclusion in the 2014 BiOp that the action agencies can achieve almost a 17% increase in survival for ocean-type Chinook just from estuary habitat projects implemented between 2007-2018 which is nearly double the 9% potential survival improvement identified in the 2008 BiOp and over 80% of the total survival improvement assumed to be possible under the Estuary Recovery Module (on the other hand). Likewise, NOAA does not discuss the relationship between the Estuary Module assumptions and its conclusion that almost half the required stream-type survival improvements can be achieved from three habitat projects in the mid- to upper estuary.

B. Avian Predation

38. In my 2008 summary judgment declarations, I described a number of issues related to avian predation because the RPA in the 2008 BiOp included several measures to increase salmon survival (and thereby help avoid jeopardy) by reducing avian predation of juvenile salmon during their migration to the ocean. Olney 2008 SJ Dec. at ¶¶ 75-80; Olney 2008 SJ Reply Dec. at ¶¶ 16-28. These issues included the RPA actions to address predation by Caspian terns, the treatment of predation by double-crested cormorants in NOAA's assessment of the effects of the RPA, and NOAA's treatment of the issue of compensatory mortality. I again address these issues below as they have evolved since the 2008 BiOp and as they are addressed

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in the 2014 BiOp.

1. Caspian terns

39. In the 2008 BiOp, NOAA concluded that RPA action 45 to reduce predation on juvenile salmon by Caspian terns in the estuary would provide a 3.4% survival increase for all listed steelhead populations, a 2% survival increase for all listed spring/summer Chinook populations, and a .8% survival increase for listed fall Chinook. *See, e.g.*, 2008 BiOp at 8.3-54 (Table 8.3.5-1) (indicating a 2% survival improvement for all Snake River spring/summer Chinook populations from measures to address "bird predation"). RPA action 45 called for reducing Caspian tern nesting habitat on East Sand Island in the Columbia River estuary to less than one-third of its pre-2008 BiOp size and simultaneously creating alternative nesting sites away from the River in order to reduce the number of nesting pairs of terns by more than half (from about 9,000 pairs before implementing RPA 45 to 3,500 to 4,000 pairs following implementation). 2014 BiOp at 411. The 2008 BiOp assumed that reducing the area of the East Sand Island colony would reduce the number of nesting pairs of terns, which would then reduce predation by terns and provide the survival improvements noted above and attributed to this RPA action.

40. Since 2008, the action agencies have reduced the area of the East Sand Island tern colony from about 6 acres in 2008 to 1.5 acres in 2012, 2014 BiOp at 411, which is at least the amount of reduction the 2008 BiOp assumed would be required to shrink the number of nesting pairs to the desired level. 2013 Comprehensive Evaluation at 83 (2014 Corps AR 12 at 1786). The agencies also have created 8.3 acres of alternative nesting habitat at nine locations elsewhere but "no coastal sites have been developed [and] [p]redation [on terns at alternative sites], lack of sufficient water, and limited food resources have plagued tern nesting success at several of these interior sites to the degree that a significant portion of the alternative nesting habitat has not been

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available for nesting terns in any single year." 2014 BiOp at 411.

41. Even though the area of the East Sand Island tern colony has been reduced to the extent planned by the action agencies, as the 2014 BiOp also reports, the number of nesting pairs of terns has not been reduced to the 3,500 to 4,000 pair level but remains at 6,000 to 6,500 pairs, at best half the total reduction in tern pairs that NOAA thought would be necessary to achieve the predicted survival improvements for juvenile salmon. Apparently the density of tern nesting has increased to offset the loss of total nesting habitat. NOAA also notes that action agency efforts to establish tern colonies elsewhere have been considerably less successful than anticipated. *Id.* NOAA does not indicate whether or the extent to which it believes the terns now nesting at other sites are from the East Sand Island colony or represent an expansion of the tern population. NOAA also acknowledges that it will be difficult to reduce the area of the East Sand Island nesting site further. *Id.* at 411-412. For example, the Corps is pursuing construction of an additional island in San Francisco Bay. That island, if construction becomes possible, will allow a further reduction on East Sand Island to 1.0 acres, the minimum area considered in the management plan. 2013 Comprehensive Evaluation at 83 (2014 Corps AR 12 at 1786).

42. NOAA says in the 2014 BiOp the reduction in tern numbers by 2,500 to 3,000 pairs at East Sand Island that has been achieved so far through reducing nesting habitat there, "has not translated to a similar reduction in salmonid smolt consumption [by Caspian terns] which remains similar to pre-implementation levels." 2014 BiOp at 411. In other words, even though nesting habitat has been reduced as planned, and even though the number of nesting pairs of terns has declined to some extent, tern predation on juvenile salmon has not declined and so the salmon and steelhead survival improvements predicted for this RPA action have not actually accrued.

43. With respect to the survival improvements anticipated from reducing tern

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predation in the estuary, NOAA concludes, "[i]t remains likely that suitable [alternative nesting] habitat will be found, allowing for full implementation of the management plan to occur, and for the reduction of Caspian terns (and associated losses of steelhead and Chinook smolts) to levels anticipated in the 2008 BiOp." 2014 BiOp at 413. In this regard, NOAA notes that "additional suitable habitat is being sought," that "only about one acre of suitable habitat is needed," and that there are "currently likely candidate locations." *Id.* NOAA does not explain why it expects the acquisition of one additional acre of alternative nesting habitat somewhere in the West, and the corresponding small additional reduction in the area of nesting habitat at East Sand Island it may then undertake, to produce the remainder of the reduction in terns at East Sand Island that has not yet occurred—as well as, more importantly, the corresponding reduction in smolt predation from 2008 BiOp levels that also has not yet begun to occur.

2. Cormorants

44. In my 2008 summary judgment declarations I explained that the analysis in the 2008 BiOp did not address the rapid growth of cormorant colonies in the estuary and the large increase in predation on juvenile salmonids by these birds. Olney 2008 SJ Dec. at ¶¶ 76-80; Olney 2008 SJ Reply Dec. at ¶¶ 22-28. In Appendix E to the 2014 BiOp (the "Cormorant Appendix"), NOAA states:

> The primary goal for addressing double-crested cormorant (DCCO) smolt consumption in the 2013 [sic] BiOp is to determine the smolt survival "gap" that has resulted from the dramatic increase in cormorant population and smolt consumption between the base [1981 to 2000] and current [2001-2006] years that was not captured in the 2008 BiOp analysis.

2014 BiOp, App. E at E-3. In the Cormorant Appendix, NOAA calculates that this survival gap is 3.6% for steelhead populations, 1.1% for yearling Chinook, and less than 1% for sockeye. *Id.* at E-5 to E-6. In other words, steelhead survival during the current period was 3.6% lower and spring/summer Chinook survival was 1.1% lower, as compared to the Base Period, than the

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analysis in the 2008 BiOp assumed. In order to address this survival "gap," NOAA proposes to reduce cormorant predation from today's level by an amount sufficient to return cormorant predation levels to those of the Base Period, thereby bringing current period survival for salmon and steelhead in line with the assumptions in the 2008 BiOp analysis. The cormorant action in the RPA is thus not designed to increase salmon survival as compared to the Base Period but to address an overlooked source of increased mortality that arose after the Base Period and thereby restore cormorant-caused mortality to the Base Period level.

45. NOAA's proposal for addressing the survival gap described in the Cormorant Appendix is the removal of more than 50% of the breeding pairs of cormorants from the largest colony in the estuary (and the largest colony in the western United States), also on East Sand Island. 2014 BiOp at 410 ("[t]he FCRPS action agencies will develop a cormorant management plan . . . and implement warranted actions to reduce cormorant predation in the estuary to Base period levels"). This would require the elimination of between 6,500 and 7,000 pairs of cormorants. In fact, since the colony size continued to increase to almost 15,000 pairs in 2013, a higher number of cormorants presumably would need to be eliminated. Multiplying the number of pairs that need to be eliminated by two to produce the number of individual birds that would need to be removed is likely to under-estimate the magnitude of the removal effort because of re-pairing, juvenile maturation and other factors.

46. NOAA explains that "[t]he Corps is the lead agency on a draft EIS that will use NOAA Fisheries' survival gap and colony per capita analysis to develop objectives for double-crested cormorant management on East Sand Island. . . . The range of alternatives will cover lethal methods (shooting of individual birds, egg collection/nest destruction, etc.) and non-lethal methods (hazing, habitat modification, etc.) to reduce double-crested cormorant predation impacts to juvenile salmonids in the estuary." 2014 BiOp at 410. NOAA goes on to say that

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"[m]anaging natural resource damage by cormorants and associated conflicts on a local scale has been successfully implemented in the U.S. . . . . A recent example of a successful cormorant-damage management action includes a 2005 implementation at Leech Lake, Minnesota . . . [that] was considered a success in helping to curb declining populations of walleye and contribute to record 2008-2009 walleye harvest rates." *Id.* at 411 (citing Schultz 2011 and 2012 which report on a program that involved pass-shooting of cormorants with shotguns as they returned to the nest island in order to remove 3,000 birds per year from a colony of about 2,500 pairs). Although NOAA acknowledges "that any similar management actions in the Columbia River basin will require that the Action Agencies first obtain the appropriate permits," *id.*, it concludes that "[s]imilar double-crested cormorant management actions in other parts of the U.S. have recently been implemented in a timely manner and have proven successful," *id.* at 412, apparently referring to the Leech Lake program.

47. NOAA did not refer to the Schulz et al. (2013) studies of the Leech Lake cormorant control program which reported that, "increases in walleye harvest reflected increasing walleye abundance . . . concurrent with cormorant control and Walleye fry stocking, indicating that the effects of cormorant management on the Walleye population and its fishery are thoroughly confounded with other management actions." Schultz et al. 2013 at 1296 (copy attached as Exhibit A). While the 2013 Schultz study recognizes evidence that "suggests cormorant management has positively affected the [Walleye] fishery," data for two other fish species "were not explained by cormorant predation pressure," leading the study authors to state that while "[c]hanges in all Walleye population metrics were associated with changes in cormorant feeding pressure, . . . we suspect that Walleye fry stocking has confounded interpretation of Walleye abundance, recruitment and fishery statistics." *Id.* Varying stocking densities of Walleye fry during 2005-2011, as well as the implementation of a 454-660 mm

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protected slot limit and a bag limit reduction from six to four Walleye, also confounded interpretation of the Walleye population and fishery response to the concurrent efforts at cormorant control according to this 2013 study. *Id.* The authors note further that during the period of cormorant removal at Leech Lake, "it is no surprise that new colonies have established and expanded in northern Minnesota, some of which are less than 100 kilometers from the [Leech Lake] study site. It has been hypothesized that some of these new colonies may be the direct result of control efforts on Leech Lake, and public pressure is mounting for cormorant management to begin at these locations." *Id.* at 1298. NOAA does not describe or discuss any of these findings from the Schultz et al. 2013 studies of the Leech Lake cormorant control program or address the differences in scale between the program at Leech Lake and the program that would be required at East Sand Island to reduce the cormorant colony there by 6,500 to 7,000 pairs or more.

3. Compensatory Mortality

48. In my 2008 summary judgment declarations, I described an ecological process called "compensatory mortality" and explained how it would affect the evaluation of the benefits to salmon and steelhead survival from reductions in avian predation by terns or cormorants. Olney 2008 SJ Dec. at ¶¶ 77-78; Olney 2008 SJ Reply Dec. at ¶¶ 16-21. NOAA identifies and discusses the concept of compensatory mortality in the 2008 BiOp at page 7-48, explaining that "[t]he projected benefits identified [for reducing Caspian tern predation] assume complete additivity (no compensatory mortality), i.e., every salmonid not consumed by terns survives all other sources of mortality." NOAA then indicates it will apply "a hypothetical compensatory mortality of 50%" to its estimates of the survival improvements from reducing tern predation. This 50% factor would reduce by half the survival improvement from reduced tern predation for each of the listed species. Olney 2008 SJ Reply Dec. at ¶ 17 (citing calculation from the 2008

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BiOp at page 8.3-26). As it turns out, NOAA did not apply this adjustment for compensatory mortality to its prediction of survival benefits from reducing tern predation because it concluded it was not "significant." *Id.* at ¶ 16 (discussing response of Mr. Graves). As I explained in my reply declaration, NOAA has not explained what it considers a "significant" survival adjustment, either positive or negative, but it has included in its jeopardy analysis *positive* survival adjustments much smaller than the *negative* adjustment that would occur from using a 50% compensatory mortality assumption for the effects of reducing tern predation. *Id.* at ¶¶ 17-21.

49. In the 2014 BiOp and its Response to Comments on the draft 2014 BiOp, NOAA makes two observations about compensatory mortality, one related to terns and one related to cormorants. First, both the State of Idaho and NWF commented on the assumption in NOAA's analysis that tern predation is not affected by compensatory mortality. RTC at 60 (2014 NOAA AR 288216) (comment and response G-4) (Idaho comment that "[a]ssuming there is no compensatory mortality . . . is contrary to the ecological principal [sic] of minimizing energy expenditures to capture prey" and referring to a study of compensatory mortality in avian predation in the Columbia basin); *id.* at 63 (comment by NWF and NOAA's response G-11). NOAA's response to both comments was either that the cited studies did not "offer a specific compensation level for predation by the estuary tern population," RTC at 63 (2014 NOAA AR 288216), or that the studies were "in the mid-Columbia and Snake Rivers, not in the estuary," *id.* at 60. The absence of a study identifying a specific level of compensatory mortality for avian predation in the estuary does not make the issue of compensatory mortality irrelevant. Not addressing the effects of a recognized ecological principle where NOAA has previously described information that would allow it to do so, and has said it would do so, just because no study provides a specific compensation level for predation by the estuary tern population, is actually a failure to consider a relevant factor where information is available to do so. For

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example, in the 2008 BiOp at 7-48 NOAA says, "[s]ince current literature and empirical data do not identify more specific estimates or ranges, NOAA Fisheries assumes tern predation likely falls between being completely additive or completely compensatory. Consequently, in estimating the effect of reducing tern predation NOAA Fisheries assumed a hypothetical compensatory mortality of 50%." As noted above, however, NOAA did not apply that adjustment in the 2008 BiOp, apparently because it did not find it "significant." It also did not apply this adjustment in the 2014 BiOp and did not explain further its decision to omit this factor.

50. NOAA's second comment regarding compensatory mortality explains that its analysis of cormorant predation compares two time periods during which compensatory mortality for cormorants was presumably the same. RTC at 60, 63 (2014 NOAA AR 288216). This may well be the case for comparing two periods of cormorant mortality, but it does not address the points discussed above regarding the effects of compensatory mortality on the survival improvements predicted from reduced Caspian tern predation.

C. Kelt Reconditioning

51. In my first summary judgment declaration regarding the 2008 BiOp, I addressed RPA action 33, the steelhead kelt reconditioning program. As I explained there, the jeopardy analysis in the 2008 BiOp relies on this action to increase the survival of each Snake River B-run steelhead population by 6%. Olney 2008 SJ Dec. at ¶¶ 86-92. I pointed out a number of factors relevant to this analysis that NOAA had not addressed. *Id.* In my summary judgment reply declaration I again addressed this issue and responded to comments by Mr. Graves of NOAA. Olney 2008 SJ Reply Dec. at ¶¶ 29-36. Except as noted in my reply declaration, my observations about NOAA's analysis of the effects of the proposed kelt reconditioning program have not changed.

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52. I summarize below a series of Independent Scientific Review Panel (ISRP) reviews of kelt reconditioning projects in the Columbia River basin. These reviews have consistently expressed skepticism about whether kelt reconditioning is a viable steelhead survival improvement and recovery strategy. *See*, *e.g.*, ISRP 2009-39 at 2 (Sept. 28, 2009) (reviewing the Yakama Nation's Upper Columbia River Kelt Reconditioning Program - 2008-458-00) (*available at* https://www.nwcouncil.org/fw/isrp/isrp2009-39/). I also address a number of statements about kelt reconditioning from the 2014 BiOp.

53. The 2009 ISRP review of project 2008-458-00 cited in the preceding paragraph states that evidence kelt reconditioning is effective at improving the survival of steelhead populations remains to be demonstrated and the results of the Yakama Nation work to date are discouraging. ISRP 2009-39 at 2. The ISRP also indicated that, "Simply putting more adult steelhead on the spawning grounds does not ensure enhanced natural recruitment and, in fact, may do the opposite. Artificial reconditioning may alter maturity and spawning dates (as seen when smolts, parr, or sub-adults have been used for supplementation) thus adding little, or negatively, to recruitment." ISRP 2009-39 at 3.

54. Likewise, the ISRP's Retrospective Report 2011 from December of 2011 looked at all of the kelt work in the Columbia River basin to date. *See* ISRP 2011-25 (*available at* https://www.nwcouncil.org/fw/isrp/isrp2011-25/). In their conclusions and recommendations in this Report the ISRP states: "Kelt reconditioning (either transportation, short-term, or long-term) as a recovery tool as envisioned by the agencies is in an early stage of development. It remains to be seen whether reconditioning can contribute meaningfully as a recovery strategy. Efforts from transportation and short-term reconditioning have not yielded substantial gains compared to in-river migration. Long-term reconditioning has demonstrated some promise. An adequate comparison of reproductive performance between natural and reconditioned kelts has not been

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accomplished. It remains uncertain whether nutrition and gametogenesis in reconditioned kelts is sufficient. In any case, it should be recognized that successful reconditioning—survival and subsequent reproduction—is a necessary, but not sufficient condition for kelt reconditioning to provide benefits for recovery." ISRP 2011-25 at 28.[4]

55. The Northwest Power and Conservation Council (NPCC) has approved funding of the kelt reconditioning proposals the ISRP has reviewed as part of implementing the Columbia Basin Fish Accords, despite the concerns the ISRP has expressed. In reaching the recommendation to fund one of these projects (2008-458-00), the NPCC explained, in a January 13, 2010 letter from Tony Grover to William Maslen, Bonneville Power Administration, why it recommended proceeding with the project despite an ISRP recommendation that the proposal did not meet scientific review criteria, *see* ISRP 2009-39 at 2 (*available at* https://www.nwcouncil.org/fw/isrp/isrp2009-39/). The NPCC recommended that the project proceed conditioned on the understanding that the project would have a performance check in 2014. In its 2014 review (ISRP 2014-9) of project 2008-458-00 the ISRP gave it a rating of Meets Scientific Review (Qualified). They said the project has the potential to make important contributions to kelt reconditioning research if it can be modified to address several qualifications. To address these, they encouraged the project proponents to expand its future work objectives, "[o]therwise, there is a real risk that essential questions will remain unanswered

[4] In their findings on page 27-28 of the Retrospective Report, the ISRP refers to long-term reconditioning survival for steelhead kelts ranging from 5% in the Deschutes River subbasin to 38% for fish from the Yakima River subbasin. This is presumably the basis for their statement that long-term reconditioning shows "some promise." But as the ISRP quote above makes clear, survival rates for reconditioned kelt are only the first step towards increased reproduction from these kelt and increased steelhead population survival. As the ISRP explains, any subsequent increase in steelhead populations is contingent on much more than kelt survival because increased survival of reconditioned kelts must also lead to increased reproductive success from these kelts which must, in turn, lead to increased juvenile production, their survival, and increased adult returns. ISRP 2011-25 (*available at* https://www.nwcouncil.org/fw/isrp/isrp2011-25/).

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and that the project will make a minimal contribution to answering the questions surrounding kelt reconditioning." As they had noted in prior reports, the ISRP also stated a continuing concern, "Ultimately the efficacy of reconditioning and releasing kelts to spawn in nature will depend on the demographic and genetic effects the strategy has on targeted populations, MPG's and ESU's. At present it remains to be seen if reconditioning is a viable recovery strategy." ISRP 2014-9 at 3 (*available at* https://www.nwcouncil.org/fw/isrp/isrp2014-9/).

56. The original Yakima River kelt reconditioning project became project 2007-401-00 in July 2007. Project 2007-401-00 includes kelt reconditioning studies in the Columbia and Snake Rivers, not including the upper Columbia River. The kelt studies in the upper Columbia River are included in project 2008-458-00 mentioned above. In the ISRP's final assessment of this project (2007-401-00), *see* 2007-401-00-ISRP-20101015 (*available at* www.cbfish.org) (Columbia Basin Fish and Wildlife Program Projects and Priorities), the ISRP concluded that it did not meet scientific review criteria and recommended, "Before proceeding with additional kelt reconditioning feasibility and physiology research the Basin co-managers need to establish a well-defined kelt management master plan." The ISRP stated in their first round review of this project that, "Kelt reconditioning is mushrooming into a very large effort with little quantitative justification for anticipated benefits to steelhead status. The potential research seems endless. It seems that some numerical and life history benefit and cost analysis should have been done by now." Despite the ISRP's concerns, this project was also approved by the NPCC conditioned on a performance check in 2014 (which I have not been able to locate).

57. In the 2014 BiOp, NOAA identified a number of problems the action agencies face in implementing a kelt reconditioning program and achieving the 6% steelhead survival improvement from the program. *See* 2014 BiOp at 383-387. For example, NOAA says reconditioning success rates by holding kelts for extended periods continue to be inconsistent,

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ranging from 20% to 62% with a 10-year mean of 38% for kelts from the Yakima Basin. *Id.* at 385. One problem I identified in my 2008 declarations was that NOAA's estimate of the number of kelts potentially collected for reconditioning failed to address a number of relevant factors or explain why they did not need to be addressed. *See* Olney 2008 SJ Reply Dec. at ¶ 35. NOAA has now noted in the 2014 BiOp that only 5.6% of the kelts passing Lower Granite Dam entered the juvenile bypass system. 2014 BiOp at 385. This is substantially lower than the 33% assumed in the 2008 BiOp in the analysis of the number of kelts that could be collected for reconditioning and which was used to estimate the potential survival improvements that could be achieved from a reconditioning program. *Id.* NOAA describes a number of steps it expects to take over the next several years to increase collection of kelts, *id.* at 386, but again offers no estimates of the likely number of kelts collected through any of these measures, or any analyses to explain why these measures would allow the kelt reconditioning program to achieve the goal of increasing steelhead survival by 6%. These collection measures also only address the initial capture and reconditioning of kelts, not their subsequent spawning success or contribution to increased population productivity.

58. In my 2008 BiOp summary judgment reply declaration, I noted that Mr. Graves in his declaration indicated NOAA's assignment of benefits for kelt survival from in-river kelt migrants, which he placed at less than .1%, was not an important consideration in the overall analysis of survival benefits from kelt reconditioning. Olney 2008 SJ Reply Dec. at ¶ 32 (quoting Graves declaration). NOAA's 2008 BiOp analysis also suggests that a substantial number of female kelts would need to be reconditioned (not left to migrate in-river) in order to achieve the 6% benefit. 2008 BiOp at 3.5 30 to 8.5-31. The 2014 BiOp, however, says, "[i]ncreasing the survival of inriver migrating kelts . . . appears to have longterm potential for increasing the productivity of B-run SR steelhead populations . . . ." 2014 BiOp at 383. NOAA

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then describes a number of projects to improve in-river survival for these fish. *Id.* at 383-384. The average return rate for kelts migrating in-river back to Lower Granite Dam is only 0.68%. Transport of kelts from Lower Granite Dam to below Bonneville Dam provided a relatively small benefit in comparison (1.17%). 2014 BiOp at 384. Even if the action agencies collected and transported all of the kelts downstream, the increase would amount to a very small number of fish. For example, if they collected and transported 1,000 fish, they would gain only 5 more fish from the transported group than the 7 fish that would have returned if all of the fish were left to migrate in-river. Because of these low return rates for both in-river and transported kelts, NOAA also says: "the Action Agencies proposed to prioritize strategies which yield a higher rate of reconditioned kelts, such as long-term reconditioning." 2014 BiOp at 384. NOAA does not explain its basis for concluding that prioritizing these other strategies will consistently produce the kelt numbers, spawning success and other steps that must occur to achieve the 6% survival improvement for steelhead.

59. NOAA also states on page 387 of the 2014 BiOp that installation of surface passage routes and kelt-specific operations at The Dalles Dam have likely increased the survival of in-river migrating kelts (and adult steelhead falling back at the dams), but the limited number of reach survival estimates are not definitive. In 2012, nine (9) natural origin B-run steelhead kelts that had been successfully reconditioned were released into the Snake River and the action agencies claimed a 0.5% survival improvement toward achieving the 6% survival improvement goal from kelt reconditioning. *See* 2012 Kelt Management Plan at 9-10 (July 9, 2013) (2014 NOAA AR B39 at 2658-2659). The action agencies also say in the 2012 Kelt Management Plan that the goal of the Plan is to increase B-run female *spawners* by 6% or 180 females above the 3000 female base. The release of nine fish, even if they all spawn, equals 5% of the 180 kelt goal and even these fish will contribute to reaching the 6% steelhead population survival increase

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of the RPA only if all of the questions and uncertainty the ISRP identifies turn out to be immaterial, e.g., if it turns out, for example, that kelt released back to the river are 100% as effective in spawning and reproducing as a wild female and in increasing adult returns. It also is not clear how the action agencies arrived at the 0.5% credit for the release of these 9 fish. Even if 9 fish are 5% of an overall 180 fish goal, 5% is only 0.3% of the 6% survival improvement the RPA requires.

60. NOAA does not discuss the ISRP's concerns from their reviews of kelt reconditioning projects underway in the Columbia River basin and from the ISRP's 2011 Retrospective Report. It also appears that there is currently no final Snake River Kelt Master Plan that the ISRP or others could review and evaluate. NOAA also describes several other areas of uncertainty in the 2014 BiOp, including several that I had identified earlier and some of those discussed above (e.g., the numbers of potential kelts collected has fallen well below the assumption used in the 2008 BiOp calculations, 2014 BiOp at 385). *See also* Olney 2008 SJ Dec. at ¶¶ 87-92; Olney 2008 SJ Reply Dec. at ¶¶ 30-36.

61. NOAA concludes its discussion of the "potential for long-term [kelt] reconditioning as a tool to increase the number of viable females" by noting:

> One of the uncertainties surrounding the survival benefits of long-term reconditioning is the actual spawning success of reconditioned kelts. There are also questions relating to the nutrition and proper maturation of kelts being held in the long-term reconditioning program. Research is currently underway to assess these issues.

2014 BiOp at 386. These are also issues I raised in my summary judgment declarations. Olney 2008 SJ Dec. at ¶¶ 89-92. NOAA does not explain how these particular factors affect its analysis of the ability of RPA 33 to achieve a 6% survival increase for Snake River steelhead populations although it does conclude that this RPA will achieve the predicted survival increase. 2014 BiOp at 387.

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D. NOAA's Base Period and Extended Base Period Analysis

62. Since the 2008 BiOp, three additional points relevant to NOAA's updated analysis for Snake River steelhead—and, for two of these points, other species as well—have become apparent. First, in the 2008 BiOp, NOAA used aggregate dam count estimates for Snake River steelhead to derive its Base Period values for the extinction risk metric and the three recovery metrics for the individual steelhead populations. *See, e.g.*, 2008 BiOp at 8.5-32 (discussing A-run population estimates), 8.5-50 (Table 8.5.2-1). I offered a number of observations about the uncertainty inherent in this approach for calculating individual steelhead population level metrics and individual population responses to RPA actions. *See* Olney 2008 SJ Dec. at ¶ 26 (explaining that using aggregate data in this fashion "introduces an element of uncertainty about the individual B-run population performance because the status of a few strong populations can mask the status of weak populations"). NOAA responded, through the Declaration of Dr. Christopher Toole, that it had acknowledged this uncertainty. *See* Declaration of Christopher L. Toole at ¶¶ 60-62 (dated Oct. 24, 2008).

63. As NOAA now recognizes, in light of subsequent research, its use of aggregate dam count data for this species is not valid because of recent studies that indicate a more complex structure for Snake River steelhead populations than is indicated by the previous A- and B-run classifications. *See* 2014 BiOp at 74-75 (noting this problem in the 2008 jeopardy analysis and stating that an alternative method to the use of aggregate dam counts will not be reliably available for two or three more years). Because NOAA recognizes that its aggregate method is now outdated, it does not attempt to calculate extended Base Period metric estimates for individual Snake River steelhead populations using the average A-run and average B-run data, so there are no extended Base Period estimates for the various jeopardy metrics for these populations. *See, e.g.*, *id.* at 92 (Table 2.1-10) (no updated information for Snake River steelhead populations for the R/S metric) (yet stating that "all new estimates are within the 2008

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BiOp's 95% confidence limits").

64. The analysis in the 2008 BiOp also used the average A-run and B-run estimates to calculate the prospective effects of population-specific tributary habitat RPA actions for the individual Snake River steelhead populations. *See* 2014 BiOp at 73-75 (identifying this issue). In light of the research discussed in the preceding paragraph, this is an approach that NOAA acknowledges is no longer valid. *Id*. The 2014 BiOp does not discuss how this limitation affects projected survival benefits assigned to individual Snake River steelhead populations from tributary habitat actions. *Id*. NOAA continues to assign the same habitat quality improvements from tributary habitat actions to the individual steelhead populations that it developed in the 2008 BiOp based on what is now recognized as an invalid method, 2014 BiOp at 73 (Table 3.1-1), and continues to report the extent to which these individual populations have met these habitat quality improvement standards (*e.g.* Lolo Creek, South Fork Clearwater, Lochsa, Secesh, etc.), *id; see also id*. at 278-279.

65. NOAA Fisheries does not address the implications of continuing to rely on the 2008 BiOp's use of aggregate dam count data for the individual Snake River steelhead populations in the 2014 BiOp, or describe any risks that may be associated with continued use of this data, or consider any alternative approaches, other than to note that it "continue[s] to rely on the . . . average A- and B- run method, for lack of an alternative method . . . ." 2014 BiOp at 75. The risks of continuing to rely on the aggregate dam count data as the basis for predicting the effects of the RPA on individual Snake River steelhead populations would include, for example, difficulty in determining the individual population response to tributary habitat measures and other RPA actions affecting steelhead. To the extent NOAA expects to rely on monitoring to make adjustments to the tributary habitat program for steelhead populations if actions are not as effective as assumed, the lack of any valid population data will make assessing the effectiveness

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of habitat actions much more difficult and less reliable. Of course, NOAA also says elsewhere that it is unrealistic to expect empirical validation of habitat quality or survival improvements by 2018 or even much later. *See* RTC at 30-31 (Comment and Response C-11) (2014 NOAA AR 288216 at 288245-246).

66. The second new issue relevant to NOAA's 2008 BiOp analysis for Snake River steelhead—and for other ESUs/populations—is the acknowledgement in the 2014 BiOp that the currently available data indicate adult survival through the FCRPS has been lower during the recent period than during the approximately 20-year Base Period for Snake River spring/summer Chinook, Snake River sockeye, and Snake River steelhead. 2014 BiOp at 351-355 (discussing this issue and providing details on these lower survival rates). The 2008 BiOp assumed that these adult survival rates would be the same for both the Base Period and the time since then. I explain below how this issue is relevant to NOAA's 2014 BiOp's updated analysis.

67. NOAA based adult survival assumptions in the 2008 BiOp on new, stock-specific detection methods using Passive Integrated Transponders or "PIT" tags to identify the origin of adults passing Bonneville, McNary and Lower Granite dams (for 2002 and 2006-2007). Because they had no PIT tag data for the Base Period before 2002, the 2008 BiOp's assumption was that Base Period survival was the same as that estimated from PIT tags in 2002 and 2006-2007. In the 2008 BiOp, NOAA also used PIT tag detections from upper Columbia River sockeye stocks as surrogates to establish assumed survival rates in the lower Columbia River reach and extrapolated these to assess likely survival rates for the entire Bonneville to Lower Granite Dam migration corridor. *See* 2014 BiOp at 351-355 (discussing this issue). Based on this approach, NOAA reported in the 2008 BiOp that it would use an adult survival rate for Snake River sockeye of 81.1%, although it considered this estimate too uncertain to use as an actual adult survival performance standard for this species. *Id.* at 353-354. NOAA now has 2010-2012 PIT

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tag-based data for adult survival, a direct measure of this survival rate, rather than an extrapolation. This direct estimate of adult survival is 70.9% for Snake River sockeye which is more than 10% lower than the 2008 BiOp assumption. *Id.* at 354.

68. Based on similar recent data for other ESU's and DPS's, adult survivals are also lower than assumed in the 2008 BiOp for Snake River spring/summer Chinook and Snake River steelhead, and it is unclear if they have declined or not for mid-Columbia River steelhead.[5] They were higher for Snake River fall Chinook, and upper Columbia River spring Chinook and steelhead. 2014 BiOp at 352 (Table 3.3-1). For these and other species, NOAA used its 2008 adult survival assumptions as adult performance standards. *Id.* at 351 (citing 2008 BiOp RPA actions 52 through 54). NOAA does not discuss why these recent survival rates, based on actual data rather than extrapolations, are lower (or higher) than the assumptions it used in the 2008 BiOp. *Id.* at 351-355. It also does not describe or discuss the implications of these new survival rates for its analysis of the effects of the RPA. *Id.* Regardless of the factor or factors causing the lower estimates of adult survival, and regardless of whether they eventually prove to be accurate, the implication of the lower survival rates through the hydrosystem is that positive expectations of future population improvements for most of the Snake River populations are at least more uncertain than anticipated, and may also prove to be too optimistic.

69. NOAA does explain that it is not certain whether the new estimates represent a true difference from the Base Period adult survival rates it assumed in the 2008 BiOp. Consequently it says it does not yet consider this new information as indicative of an RPA

[5] Adult passage was blocked at Lower Granite Dam on two separate occasions in 2013 which resulted in adult losses (substantial for sockeye (about 30%) and significant for summer Chinook (about 15%) and less for Snake River fall Chinook (about 7%) and steelhead (about 12%)), based on PIT tag based conversion rate estimates. NOAA has required the action agencies to implement operational changes and physical structures to address the blockage that occurred at Lower Granite Dam in 2013. This problem, however, illustrates that serious adult passage problems can still occur.

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implementation problem because it cannot identify the factor that is responsible for the lower than expected survival rates. 2014 BiOp at 354. NOAA also says in its response to comments on the draft 2014 BiOp that, "[t]he validity of the PIT tag method of estimating adult upstream survival has been generally confirmed [but it is pursuing] further analyses to identify potential sources of bias . . . ." RTC at 51 (comment/response E-12) (2014 NOAA AR 288216 at 288266). In other words, even with generally confirmed empirical methods for estimating adult upstream survival, and the updated empirically based adult survival estimates that are lower than those on which the 2008 BiOp relies, NOAA says it will not discuss or include in its analysis any potential negative implications of the new data until it has identified potential sources of bias. *See* 2014 BiOp at 355 (describing additional studies).

70. The third issue relevant to the analysis in the 2014 BiOp is not actually new but the actions in the RPA have changed and the change affects this issue. In my 2008 declarations I addressed how transportation may impair homing ability and increase straying and mortality of adult salmon and steelhead. Olney 2008 SJ Dec. at ¶¶ 125-129. In the 2008 BiOp NOAA presented adult conversion rate data for adult fish that had been collected and transported as juveniles and for fish migrating as juveniles in the river. In Table 14.1 of the 2008 BiOp's Incidental Take Statement, the reduction in adult escapement due to transportation was 6.1% for Snake River fall Chinook, 6.9% for Snake River spring/summer Chinook, and 6.8% for Snake River steelhead. 2008 BiOp at 14-21 to 14-23 (Table 14.1). It was listed as unknown for Snake River sockeye. *Id.* In the 2010 Supplemental BiOp, NOAA acknowledged that transported Snake River spring/summer Chinook salmon and steelhead stray at higher rates than fish that migrated in the river as juveniles. 2010 BiOp at 70. NOAA explained that "[c]ompared to assumptions in the 2008 BiOp, recent spill operations at the Snake River collector projects have resulted in substantially lowered transportation rates (compared to either the Base or Current

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conditions). This should substantially reduce the number of Snake River steelhead adults straying into affected MCR steelhead populations (primarily those in the Deschutes and John Day rivers) as a result of juvenile transportation operations, and thus reduce negative genetic impacts to these MCR populations." *Id.* at 78 (emphasis added).

71. NOAA did not include adult conversion rate estimates for transported fish in the 2014 BiOp. They also did not discuss the effects of the proposed increase in transportation under the revised RPA on homing impairment and straying in updating their analysis. *See* 2014 BiOp at 367-376 (discussing RPA transportation actions); 375 ("modifications to RPA action 30 should result in somewhat higher transportation rates, compared to recent operations for both SR spring/summer Chinook salmon and steelhead smolts"). They only generally state that "previously described effects of recent operations on SR spring-summer Chinook salmon, sockeye salmon, and steelhead are generally expected to continue through the remainder of the BiOp." *Id.* at 376. While NOAA concluded in the 2010 BiOp that the reduced transportation rates under recent spill operations would "substantially" reduce straying, and consequently improve adult conversion rates, it did not address in the 2014 BiOp the negative effects that increased transportation under the revised RPA could have on straying. For example, achieving a goal of transporting 50% of juvenile steelhead is a significant change from the 28-49% of juvenile steelhead that were transported between 2007 and 2013. The Fish Passage Center addressed this issue in their comments on the draft 2014 BiOp and noted that NOAA has not updated its analysis of the effects of increased transportation on straying or adult conversion rates. Fish Passage Center, Review Comments: 2013 Draft FCRPS Supplemental Biological Opinion at 16-18 (Oct. 7, 2013) (Exhibit B). The impact of transportation on straying has been shown to be significant and the effect of increased transportation would be expected to increase straying and reduce adult conversion rates to some extent. NOAA's response is that "overall

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transport rates will remain substantially lower than those expected in the 2008 FCRPS BiOp for all spring-migrating species (though somewhat higher than observed recently) and the previously described effects of recent operations . . . are generally expected to continue through the remainder of this BiOp." 2014 BiOp at 375-376. NOAA does not explain how a revised RPA that will limit an action which for the last eight years NOAA says has "substantially" reduced straying will allow the "effects of recent operations . . . to continue through the remainder of the BiOp."

72. In addition, when a higher percentage of juvenile fish are left to migrate in-river it reduces predation rates because the total number of fish available to predators increases which has a swamping effect on predation. *See* Olney 2008 SJ Dec. at ¶¶ 116-121 (discussing this issue). The 2014 BiOp acknowledges that uncertainty about the degree to which removing juveniles from the river for transportation would have affected predation rates on the juvenile fish remaining in the river is a complicating factor (along with configuration changes) in how the 2008 BiOp transport operations would have performed relative to the actual operation under the Court Order. 2014 BiOp at 369. While the degree of predation rate change from transporting more fish under the 2014 BiOp compared to the recent operations may be uncertain, the direction of that change is not uncertain: it would significantly reduce the population migrating in-river which would reduce the effects of swamping and consequently increase predation rates on juvenile fish migrating in-river. The ISAB in their 2008-5 review of spill and transport on pages 23-24 also addressed this issue and reached a similar conclusion. NOAA does not explain how the effect of predator swamping under the current operations . . . "are generally expected to continue through the remainder of this BiOp". . . when a much higher percentage of the fish will be removed from the river for transport under the 2014 BiOp's proposed transport operations. Indeed, it appears that with recent (2010-2012) levels of in-river migration for steelhead, any

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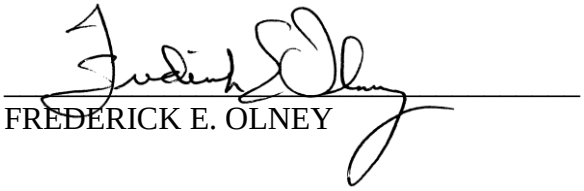
benefits from transportation have all but disappeared, suggesting that any benefits of removing more fish from the river for transportation, as the revised RPA proposes, may not be supported by the available data.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge. Executed this 4th day of December, 2014, at Nittenau, Germany.



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