TODD D. TRUE (WSB #12864)
ttrue@earthjustice.org
STEPHEN D. MASHUDA (WSB #36968)
smashuda@earthjustice.org
Earthjustice
705 Second Avenue, Suite 203
Seattle, WA 98104
(206) 343-7340 | Phone
(206) 343-1526 | Fax

DANIEL J. ROHLF (OSB #99006)
rohlf@lclark.edu
Earthrise Law Center
Lewis & Clark Law School
10015 S.W. Terwilliger Boulevard, MSC 51
Portland, OR 97219
(503) 768-6707 | Phone
(503) 768-6642 | Fax

Attorneys for Plaintiffs

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

SECOND DECLARATION OF FREDERICK E. OLNEY

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 previously filed a Declaration in this matter in connection with the most recent summary judgment motion by the plaintiffs, National Wildlife Federation *et al*. In that declaration I described my background, training, and experience related to management of salmon and steelhead in the Columbia and Snake River basins as well as my prior participation in earlier iterations of this case. *See* Declaration of Frederick E. Olney at ¶¶ 1- 6 (hereinafter "Olney 2014 SJ Dec."). In my prior declaration, I also summarized the approach and structure of the 2014 BiOp, *id*. at ¶¶ 9-17, and then addressed a series of issues I had addressed earlier in declarations regarding the 2008 BiOp, *id*. at ¶¶ 18-72. In the course of discussing these issues, I explained whether and how the issues were addressed in the 2014 BiOp.

2. In this declaration I again address these same issues in order to provide relevant context for understanding points raised about these issues in declarations filed by Dr. Lynne Krasnow, Mr. Ritchie J. Graves, and Dr. Christopher Toole. *See* Declaration of Dr. Lynne Krasnow (hereinafter "Krasnow SJ Dec."); Declaration of Ritchie J. Graves at ¶¶ 47-78 (hereinafter "Graves SJ Dec."); Declaration of Christopher Toole at ¶¶ 60-68 (hereinafter "Toole SJ Dec."). I do not repeat my summary of the approach and structure of the 2014 BiOp, or the issues I discussed there.

I. ESTUARY HABITAT ACTIONS

3. In my earlier declarations addressing the 2008 BiOp, I discussed a number of

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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 2008 reply declaration, I addressed a number of statements from scientists at 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 improvements predicted in the 2008 RPA and BiOp. *Id.* at ¶¶ 48-57.

4. In my prior declaration regarding the 2014 BiOp, I again discussed aspects of NOAA's analysis of the benefits it predicted from estuary habitat actions, including its use of the "Estuary Module," addressed the estuary habitat actions that have occurred so far, and reviewed 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. *See* Olney SJ Dec. at ¶¶ 18-37. In this second declaration, I address points raised by Dr. Lynne Krasnow regarding my discussion in paragraphs 18 through 37 of my most recent declaration.

5. 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 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

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> 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 that remain relevant. Olney 2008 SJ Dec. at ¶¶ 62-74.

6. One of my observations was that the Estuary Module offered only a target level of up to a 20% survival improvement for salmon and steelhead from implementation of *all* types of restoration actions in the estuary. As I also explained, the authors of the Module stated 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. They further 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, especially when applied to evaluating specific habitat projects, were questionable. *Id.* at ¶ 64.

7. 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 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

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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.

8. While, as noted above, NOAA and the action agencies continue to rely on the 9% and 6% survival increases developed for the 2008 BiOp in the 2014 BiOp, and the analysis that produced these predictions, as discussed in my prior declaration, *see* Olney 2014 SJ Dec. at ¶¶ 18-22, they have changed somewhat the methodology they employ for survival benefit scoring for specific estuary habitat actions (essentially the method for predicting and assigning survival improvements (SBUs) to a particular estuary habitat restoration action). 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.

9. Dr. Krasnow initially discusses the work of the ERTG and other factors she says affect NOAA's use of the Estuary Module in paragraphs 10 through 18 of her declaration. In footnote 7 she identifies three aspects of this work that she explains affect NOAA's evaluation of the survival benefits from estuary habitat actions: (1) "NMFS has adjusted the potential survival benefits of implementing management action CRE-9 (Protect remaining off-channel habitat from degradation and restore degraded areas with high intrinsic potential)"; (2) "most importantly, [the ERTG has applied] a weighting factor to each type of management action [that has] had the effect of increasing the survival benefits the Action Agencies can achieve by restoring off-

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channel habitat and reconnecting diked areas to the floodplain"; and (3) "the Action Agencies have made great strides in working with landowners and land trust organizations which has reduced some of the constraints to implementation that NMFS anticipated in the Estuary Module." Krasnow SJ Dec. at ¶ 10. She concludes that, "[t]he combined effects of these changes, which are based on the best available scientific and technical information, is that the action agencies' ability to achieve survival benefits for Interior basin Chinook and steelhead is no longer limited to the percent improvements shown in Table 5-5 of the draft 2006 or final 2011 Estuary Module." *Id*. at ¶ 16 & n.7. In the paragraphs that follow, I provide information to place in context each of the three points Dr. Krasnow makes and also explain how her points relate to the points I have made about the Estuary Module and its use to predict survival benefits from estuary habitat actions.

10. Taking Dr. Krasnow's three points in reverse order, she says in her third point that the action agencies have made "great strides" in reducing the constraints to implementation of estuary habitat actions. The context of actual implementation of estuary habitat projects is relevant to putting her statement about "great strides" in context. To summarize from Dr. Krasnow's declaration, the action agencies implemented estuary projects in 2013 that achieved 3.9 SBUs for ocean-type fish and 1.4 SBUs for stream-type fish. Krasnow SJ Dec. at ¶ 34. This number of SBUs is "roughly equal" to the total number of SBUs achieved for ocean and stream-type fish during the period from 2007 through 2012. *Id*. Dr. Krasnow goes on to say that the action agencies achieved a similar number of SBUs during 2014 and that "their performance during 2015 is likely to be equal to or better than in 2013 and 2014." *Id*. Dr. Krasnow then says that this actual performance through 2014, and her estimate of performance through 2015, "is clear evidence of a ramp-up as shown [in a figure from the Action Agencies] 2014-2018 Comprehensive Evaluation," a figure she reproduces on page 23 of her declaration. *Id*.

11. There is a discrepancy between the action agencies' projection of the number of SBU's they will achieve for ocean and stream-type fish in the graph Dr. Krasnow reproduces,

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and the actual achievement of SBU's she reports (but does not graph). The graph indicates that the Action Agencies will have achieved about 23 SBUs for ocean-type fish and 9 SBUs for stream-type fish through 2014. Krasnow SJ Dec. at ¶ 34 (Figure 2). Using the actual numbers of SBUs accomplished that Dr. Krasnow reports for the periods 2007-2012 and 2013, and assuming her statement that the action agencies achieved a "similar number" of SBUs in 2014 as they did in 2013 means they again achieved about 3.9 SBU's for ocean-type fish and 1.4 SBUs for stream-type fish, the actual numbers Dr. Krasnow reports add up to a cumulative total of 12.2 SBUs for ocean-type fish and 4.9 SBUs for stream-type fish through 2014. This is just over half the amount shown for each type of fish through 2014 in the action agencies' graph (Figure 2 of Dr. Krasnow's declaration).

12. Dr. Krasnow's statement that the action agencies expect to achieve SBUs for ocean- and stream-type fish in 2015 that are "equal to or greater than" those they achieved in 2013 and 2014 would indicate total SBUs from estuary habitat actions through 2015 of 16.1 for ocean-type fish and 6.3 for stream-type fish, if 2015 accomplishment is at least equal to that in 2013 and 2014 (Dr. Krasnow does not explain what the phrase "or greater than" might actually mean). These numbers are less than half the total SBUs the action agencies project through 2015 in their graph for estuary habitat actions in Dr. Krasnow's Figure 2. *See* Krasnow SJ Dec. at ¶ 34 & Figure 2 (projecting approximately 39 SBUs for ocean-type fish and 14 SBUs for stream-type fish through 2015).

13. To put the number of SBUs from estuary habitat actions that Dr. Krasnow reports have been accomplished through 2014 (and projects for 2015) in perspective, in order to meet the 2008 and 2014 BiOps' RPA requirement of a 9% survival increase for ocean-type fish (a total of 45 SBUs) and a 6% survival increase for stream-type fish (a total of 30 SBUs), the action agencies would need to increase the rate of implementing estuary habitat actions *each year* between 2016 and 2018 by 2.5 times for ocean-type fish and by 5.6 times for stream-type fish over the levels actually achieved annually in 2013 and 2014 in order to achieve the total number of SBUs the RPA requires. In other words, they would need to achieve 9.6 SBUs for ocean-type

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fish *each year* rather than the 3.9 SBUs they actually achieved in 2013 and 2014. Similarly, they would need to achieve 7.8 SBUs *each year* for stream-type fish rather then the 1.4 SBUs they actually achieved in 2013 and 2014. To achieve the 80-plus SBUs the action agencies are projecting for ocean-type fish by 2018 in Dr. Krasnow's Figure 2, which is inconsistent with the Estuary Module for reasons explained below, they would need to increase their annual level of accomplishment by about 5.8 times (from 3.9 SBUs each year to more than 22 SBUs each year). This would be about 30% more SBUs *each year* from 2016 through 2018 than the total number of SBUs the action agencies have achieved, or are projected to achieve, by Dr. Krasnow for these fish for the entire period from 2007 through 2015.

14. Dr. Krasnow does not address the difference between the number of SBUs she says the action agencies have achieved through 2014 by implementing estuary habitat actions, and those she projects for 2015 (on the one hand), and the SBUs for estuary habitat actions projected by the action agencies in the graph from their Comprehensive Evaluation on which she relies (on the other hand).

15. Dr. Krasnow's anecdotal description of an estuary habitat project where she indicates the action agencies apparently have ramped up their efforts and overcome "social, political and technical constraints," Krasnow SJ Dec. at ¶ 13; *see also id*. at ¶ 14 (describing example), does not change the above numbers. The specific project Dr. Krasnow mentions, the second phase of the Columbia River Stock Ranch project, will add 4.4 SBUs for ocean-type fish and 1.4 SBUs for stream-type fish, beyond the initial small SBU credits already taken, *id*. at ¶ 14. While this may well be a useful estuary habitat project once it is completed, its SBU benefits are relatively small in comparison to the SBUs that still must be achieved by 2018 to meet the estuary habitat survival improvements of the 2014 BiOp RPA. In addition, the other project Dr. Krasnow mentions, the "Large Dike-Breach Reach E," which she characterizes as a "potential project" that the action agencies "were developing . . . in their 2014-2018 Implementation Plan," Krasnow SJ Dec. at ¶¶ 14-15, is among the projects in the feasibility stage of development that I discussed in paragraph 27 of my prior declaration and also more

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generally in paragraphs 25 through 29 of that declaration. *See* Olney 2014 SJ Dec. at ¶ 27; *see also id*. at ¶¶ 25-29. The observations I made in those paragraphs still apply to this and other projects in the feasibility stage.

16. Turning to Dr. Krasnow's second point, and according to her, her most important point, the ERTG has developed weighting factors for each type of management action in the Estuary Module. She says these weighting factors have had the effect of increasing the survival benefits the action agencies can achieve by restoring off-channel habitat and reconnecting diked areas to the floodplain. Krasnow SJ Dec. at ¶ 10. I addressed the ERTG weighting factors in my prior declaration at paragraphs 32 and 33. Olney 2014 SJ Dec. at ¶¶ 32-33. As I explained there, the ERTG weighting factors using the fish density estimates "only affect[] how the potential SBUs *within* an Estuary Module action are allocated among projects and do[] not change the number of SBUs possible for that action element . . . ." *Id*. at ¶ 32 (emphasis in original). As support for this point, I cited and quoted statements from both the ERTG and the ISAB's review of the ERTG's scoring methods. *Id*. at ¶¶ 32-33. Dr. Krasnow's statement in paragraph 11 of her declaration, that the ERTG weighting factors "had the effect of lowering scores for projects that restore riparian function (CRE-1) compared to those for projects that reconnect and improve off-channel habitat in the historical floodplain (CRE-9) or breach or lower a dike or levee (CRE-10)," is consistent with my point and the statements of the ERTG and ISAB. Her earlier statement that the weighting factors have the effect of increasing the survival benefits the action agencies can achieve by restoring off-channel habitat and reconnecting diked areas to the floodplain is also consistent with my point and the statements of the ERTG and ISAB *but only with the addition of the qualifier: as compared to projects that restore riparian function*. In other words, the ERTG weighting factors make some projects more "valuable" in terms of providing SBUs as compared to other projects, but the weighting factors do not increase the overall number of SBUs that can be achieved from the various Estuary Module action elements.

17. Dr. Krasnow's further statement—that "[a]nother outcome of the ERTG's use of optimal fish density to assign weighting factors is that the Action Agencies will obtain more than

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the 45 SBUs required to achieve a 9% survival improvement for ocean-type fish," Krasnow SJ Dec. at ¶ 11—is not consistent with the above discussion or the statements by the ERTG or the ISAB that I quoted in my prior declaration. As the ISAB said:

> 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.

2014 Corps AR 6310 at 194881 ("ISAB 2014-1") (discussing the Estuary Module). The action agencies chose five action elements from the 22 estuary habitat restoration actions in the Estuary Module that they thought they could implement (CRE-1, CRE-8, CRE-9, CRE-10 and CRE-15). These five action elements together add up to the 9% (45 SBUs) and 6% (30 SBUs) survival improvements for ocean- and stream-type fish for estuary actions identified in the 2008 and 2014 BiOps' RPA. As the ISAB cautioned, NOAA "cannot assign more SBU's for a restoration action than the Module delineates," a point with which the ERTG agrees. *See* Olney 2014 SJ Dec. at ¶ 32 (quoting similar statement from the ERTG).

18. It also is relevant to note that these weighting factors do not apply to stream-type juveniles like Snake River steelhead and spring/summer Chinook in any event. As the 2014 BiOp states, "The weighting factor standardized the potential survival benefits among the various types of habitat improvement actions by calculating the expected density of juvenile salmon per square meter based on each target goal (acres or miles*) and the ocean-type survival units (increased numbers of ocean-type fish expected when the target was achieved*." 2014 BiOp at 327 (emphasis added). Stream-type fish generally quickly migrate through the estuary and are not feeding to much of an extent in the shallow water habitats, so there is no weighting of rearing densities for them.

19. Finally, Dr. Krasnow's first point was that NOAA has adjusted the number of potential survival benefits of implementing management action CRE-9. She says "[t]he fact that the Action Agencies were able to overcome the social and political constraints on acquiring and

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restoring large parcels of the historical floodplain . . . increases the SBUs that they can achieve through management actions CRE-9 and CRE-10 beyond those shown in Table 5-5 of NMFS's Estuary Module." Krasnow SJ Dec. at ¶ 15. Dr. Krasnow is correct that the Estuary Module was updated in 2011 and NOAA did make some adjustments to CRE-9 and other action elements. Dr. Krasnow explains the precise changes to CRE-9 in footnote 5 of her declaration. *Id*. at ¶ 13 & n.5. These changes increased the survival improvement targets for CRE-9 from 14% to 16% for ocean-type juveniles and from 6% to 9% for stream-type juveniles. To put these numbers in perspective, this amounts to an increase for Estuary Module action element CRE-9 of 2 SBUs for ocean-type fish and 3 SBUs for stream-type fish. Because other actions were also adjusted, the total SBUs for the subset of Estuary Module action elements that the action agencies selected to implement as part of the RPA (CRE-1, CRE-8, CRE-9, CRE-10 and CRE-15) still add up to the 9% and 6% survival improvement requirements (or about 45 SBUs for stream-type fish and about 30 SBUs for ocean-type fish) from estuary habitat actions. This is consistent with the statements about SBUs by the ERTG and the ISAB discussed in the preceding paragraphs. These relatively small adjustments *within* the Estuary Module process are about one-twentieth the size of the increase—some 40 additional SBUs (from 45 SBUs to nearly 85 SBUs) that the action agencies and NOAA are now predicting from estuary habitat actions for ocean-type fish. Based on the prediction they will achieve these additional SBUs, the corresponding overall survival increase for these fish that the agencies are now projecting increases from 9% to 17%. These large increases are quite different from the small adjustments within the Estuary Module process that have occurred.

20. In my earlier declaration, I explained that NOAA and the action agencies have now removed action 38—the Piling and Piling Dike Removal Program—from the RPA. Olney SJ Dec. at ¶ 31 (citing 2014 BiOp). I also explained the nature and extent of the survival improvements in the estuary that had been assigned to this RPA action, survival improvements that NOAA agrees will need to be replaced. *Id*. I then pointed out that NOAA did not explain how the survival improvements it has removed from the RPA can be made up consistent with the

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framework of the Estuary Module, the ERTG scoring process, and the ISAB reviews. *Id*. at ¶¶ 32-34 (describing in some detail this issue which is similar to the issue of increasing overall survival benefits for the Estuary Module action elements discussed above).

21. Dr. Krasnow addresses this issue in her declaration at paragraphs 23 and 37. She says it is reasonable to expect the action agencies to meet the 2014 BiOp's overall survival improvement requirements for estuary habitat without implementing RPA 38 because, as NOAA recognized in the Estuary Module, "if a certain action were implemented partially or not at all, the potential 20 percent gain in the number of wild, ESA listed juveniles leaving the estuary and plume could not be achieved *unless other actions were implemented to a greater extent than envisioned in the module*, to compensate." *Id*. (emphasis in Dr. Krasnow's declaration).

22. The following discussion is intended to put the language from the Estuary Module that Dr. Krasnow emphasizes in context.

23. In order to achieve the 9% and 6% survival improvements for ocean- and stream-type fish that the RPA requires from estuary habitat actions, as I have described above, the action agencies chose five action elements from the Estuary Module (CRE-1, CRE-8, CRE-9, CRE-10, and CRE-15). These were among the 22 action elements to improve juvenile fish survival, and one adult fish measure that together produced the overall 20% survival improvement target in the Estuary Module. According to the Module, the five action elements the action agencies chose to implement add up to the 9% and 6% survival improvements projected for ocean and stream-type fish.

24. If CRE-8, which is RPA action 38, is implemented, it was predicted to provide 6 SBUs for ocean- and 6 SBUs for stream-type juvenile fish. To put these numbers in perspective, for stream-type fish (e.g., Snake River spring/summer Chinook and steelhead) this number of SBUs is about equal to all of the SBU's for completed or expected estuary habitat actions from 2007-2015 using Dr. Krasnow's numbers for SBU achievement discussed above. For ocean-type fish the 6 SBUs that were to have come from RPA 38 represent about 37% of the SBUs completed or expected from 2007-2015 according to Dr. Krasnow's numbers. As the 2014 BiOp

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and Dr. Krasnow state, other actions now need to be implemented to a greater extent than the level of implementation predicted and evaluated in the Estuary Module. *See* 2014 BiOp at 341; Krasnow SJ Dec. at ¶ 37.

25. The suite of action elements from the Estuary Module that the action agencies chose to implement and that are reflected in the RPA now include only CRE-1, CRE-9, CRE-10, and CRE-15 since CRE-8, RPA action 38, has been dropped. The Estuary Module goals are expressed quantitatively for these action elements. For example, for CRE-1.3 the Module goal is purchase of 3,600 acres and for CRE-1.4 the Module goal is restoration of 28 miles of riparian area; for CRE-9.3 the goal is purchase of 5,150 acres of off-channel habitat and for CRE-9.4 the goal is restoration of 6,500 acres of off-channel habitats; for CRE-10.1 the goal is breaching or lowering the elevation of dikes or levees for 5,000 acres; for CRE-10.2 the goal is removing tide gates for 2,000 acres and for CRE-10.3 the goal is upgrading tide gates to 1,000 acres, and for CRE-15.3 the goal is to remove invasive plants from 10,000 acres. The total for the action elements is 28 miles and 33,250 acres. The ERTG's SBU calculator includes as one of its key multipliers the proportion of these Module goals that an individual project is expected to achieve.

26. In order to implement the remaining RPA estuary habitat actions from the Estuary Module to a greater extent than envisioned in the Module in order to compensate for the loss of CRE-8, the Module's quantitative goals for each of these actions would need to be increased significantly *above* the level expected in the Module (e.g., in the case of stream-type fish by about 20%). Neither the 2014 BiOp (nor Dr. Krasnow) discuss or describe the *additional* actions within some or all of the action elements that will be taken—or that they believe could be taken—to accomplish this *increased* level of estuary habitat restoration *beyond* the level anticipated in the Module and incorporated into the RPA estuary survival improvement requirements. The 2014 BiOp says, "[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. This statement would appear to address both

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replacing the survival improvements from deleted RPA 38 as well as any shortfall in survival improvements where actions to implement the remaining estuary habitat RPAs prove infeasible. It is relevant to consider the statement about replacement actions in the context of the level of SBUs that have been achieved from 2007 through 2014 through estuary habitat restoration projects, and the elimination of RPA 38, based on Dr. Krasnow's actual numbers for estuary habitat improvements which I discuss above in paragraphs 10-14.

27. Dr. Krasnow discusses the reasons why RPA 38 is no longer being implemented, i.e., only a small number of the pile dikes are under the Corps' discretionary control and could be removed without endangering or having a negative effect on currently functioning shallow water habitat, and secondly, cormorants could roost in many areas other than the pile dikes near the main migration channel, preying on salmon even if the pile fields were removed. *See* Krasnow SJ Dec. at ¶ 23. For these reasons, NOAA and the action agencies decided that there was not enough evidence that removal of pile structures would improve the survival of juvenile salmon and steelhead through the estuary. Dr. Krasnow refers to this as an "investigation of one of the ERTG's uncertainties." *Id.* This uncertainty was actually initially identified in the 2006 Estuary Module. There the Module authors noted that implementation constraints for the piling and pile dike removal element of the Module were significant and said that perch habitats were plentiful enough in the estuary that removal of pile dikes and other structures may not be an effective tool. *See* 2006 Estuary Module at 5-23. This constraint and the related uncertainty and risk was thus known to the Corps and NOAA before they added RPA 38 to the 2008 BiOp RPA—and even before the ERTG was formed.

28. As I explained in my earlier declaration, the ISAB has reviewed the new ERTG scoring process for estuary habitat restoration actions. Their conclusions track many of the points I made in my earlier declaration and address again here. *See* Olney SJ Dec. at ¶ 23 (quoting the ISAB summary of its conclusions). Dr. Krasnow addresses the ISAB review of the ERTG scoring process in her declaration in paragraphs 19 through 31. Krasnow SJ Dec. at ¶¶ 19-31. She correctly points out that the ERTG had published its own list of uncertainties

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about its scoring process prior to the ISAB review. *Id.* at ¶ 21. She also says that NOAA and the action agencies have had similar concerns about the scoring process over the last several years and have been conducting research and developing technical products to address these issues. *Id.* at ¶¶ 22-31 (describing various projects and research that are planned or underway to address issues in the scoring process). Dr. Krasnow does not discuss when this research will be completed or when the issues and uncertainties identified by the ISAB and others will be resolved. *See*, *e.g*., *id.* at ¶ 22 (describing plans for an estuary project that will "provide opportunities for research to improve the scientific basis for decisions on future projects"); ¶ 30 (describing plans for the publication of a paper). The ISAB's findings, which I previously quoted, remain accurate. *See* Olney SJ Dec. at ¶ 23.

29. In my prior declaration, I explained that the Estuary 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. *See* Olney SJ Dec. at ¶ 34. 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 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. Dr. Krasnow says in her declaration that the extent to which these other factors affecting Estuary Module actions have been implemented is addressed in the discussion of cumulative effects and the environmental baseline in the 2014 BiOp. Krasnow SJ Dec. at ¶¶ 38-40. My point was about whether the 2014

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BiOp discusses or evaluates whether the other 18 action elements of the Estuary Module, outside the five (now four) that were originally included in the RPA, have been implemented to a reasonable degree and, if not, whether that affects the survival improvements that can be achieved through the estuary actions in the RPA, given the assumptions built into the Module about the level of implementation of all of the action elements.

30. NOAA 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. As I explained in my prior declaration, 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 included in the RPA. 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 (2014 Corps AR 39 at 5628-5631). These 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.

31. In her declaration, Dr. Krasnow characterizes my point (summarized again above)

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as stating that "the ERTG does not consider how FCRPS flow management can limit the survival benefits of each habitat improvement project." Krasnow SJ Dec. at ¶ 41. This statement shifts my point from one about whether NOAA has considered the extent to which the 18 Estuary Module action elements outside the RPA are being implemented, whether or not they are being implemented to a reasonable degree, and if they are not, how that affects the predicted survival increases for the Module elements that are in the RPA (on the one hand) to a question about whether and how the effects of flow are considered in scoring individual estuary habitat projects (on the other hand). With respect to this much narrower question, Dr. Krasnow says that ERTG scoring criteria for individual projects calculates the potential wetted area of a project from either the two-year flood elevation or extreme high water and that it calculates the likely frequency of inundation (presumably under current flow conditions). Krasnow SJ Dec. at ¶¶ 41-42. As the ISAB pointed out, "the ERTG scoring criteria do not include key processes such as operations of spill and water releases at dams, precipitation and timing of volume of flows that likely affect estaurine conditions." ISAB 2014-1 at 14. The fact that the ERTG scoring criteria calculate a potential wetted area does not address the ISAB's point about flow effects or my broader point about whether all of the elements of the Estuary Module are being implemented to a reasonable extent as the Module assumed in developing its survival improvement targets.

32. In my prior declaration, I noted that the Estuary 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. Olney SJ Dec. at ¶ 20. As discussed above, they also noted that their 20% target level for 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 now covers only four of the 23 elements, were implemented to a reasonable degree. *Id*. In NOAA's January 13, 2011 response to public comments regarding the Estuary Module

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(Dr. Krasnow's Exhibit 2 to her declaration) NOAA states on page 21 in response to a comment on the 20 percent target, "the improvement target is hypothetical, not based on quantitative information. We have been explicit that the document rests more on the allocation of the 20 percent survival improvement target among the 23 management actions than it does on the 20 percent number itself." On page 22 in response to a related comment that the survival improvement targets should be viewed as planning tools only, NOAA stated, "We agree and have noted so explicitly in several places in the module . . . ." NOAA has now "allocated" from one third (6% for stream-type fish) to more than three-quarters (17% for ocean-type fish) of the total 20% survival improvement possible from implementation of all 23 elements in the Estuary Module to just 4 of the 23 elements. The rationale for this disproportionate allocation is not described in the 2014 BiOp and is not addressed in Dr. Krasnow's comments.

II. AVIAN PREDATION

33. In my most recent declaration and in my 2008 summary judgment declarations, I described a number of issues related to avian predation because the RPA in the 2008 and 2014 BiOps 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. *See* Olney 2014 SJ Dec. at ¶¶ 39-43 (addressing Caspian tern predation), 44-47 (addressing cormorant predation), & 48-50 (addressing compensatory mortality); *see also* Olney 2008 SJ Dec. at ¶¶ 75-80; Olney 2008 SJ Reply Dec. at ¶¶ 16-28. I address below a response to my discussion of these issues by Mr. Ritchie J. Graves of NOAA in his most recent declaration, *see* Declaration of Ritchie J. Graves at ¶¶ 47-61 (hereinafter "Graves SJ Dec."), in an effort to clarify an apparent misunderstanding by Mr. Graves of my discussion of compensatory mortality and then to place his discussion of tern and cormorant predation in the context of my prior declarations and the 2014 BiOp.

A. <u>Compensatory Mortality</u>

34. In my 2008 summary judgment declarations, I described an ecological process

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called "compensatory mortality" which NOAA also identifies and discusses in the 2008 BiOp at pages 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." *See* Olney 2014 SJ Dec. at ¶ 48 (quoting 2008 BiOp). In my 2014 summary judgment declaration I again addressed this issue and offered the following observation about the relevance of this ecological process to predation by Caspian terns and by cormorants:

> NOAA's second comment regarding compensatory mortality [in its Response to Comments on the 2014 BiOp] explains that its analysis of cormorant predation compares two time periods during which compensatory mortality for cormorants was presumably the same. This may well be the case for comparing two periods of *cormorant* mortality, but it does not address the . . . effects of compensatory mortality on the survival improvements predicted from reduced *Caspian tern* predation.

Id. at ¶ 50 (citation omitted) (emphasis added). I made this statement because the action agencies are attempting to accomplish two different goals, one in addressing cormorant predation and another in addressing tern predation and these different goals affect the relevance of considering compensatory mortality.

35. For cormorants, the agencies are seeking to reduce cormorant predation to a level consistent with their assumptions about Base Period cormorant predation because predation by this species increased significantly *after* the Base Period, but this increase was not taken into account in the assumptions used in the 2008 BiOp's analysis (which instead assumed that cormorant predation in the future would be at approximately the same level as in the Base Period). Under these circumstances, where the focus is on reducing a single source of predation—cormorants—to the level assumed *for that source* in the original analysis, it is reasonable to treat the level of compensatory mortality associated with that predation as being the same in the earlier time period (i.e., in the Base Period) as in a later time period (after the Base Period). And it does not matter to the analysis whether the assumed level of compensatory mortality is 50% or 100%. *See* Graves SJ Dec. at ¶ 60 (providing an illustration of why this is

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the case).

36. For tern predation, on the other hand, the action agencies are pursuing a different goal: they are seeking to reduce the *overall* level of mortality salmon and steelhead experience from *all* sources by reducing the mortality from a specific source, Caspian terns. Under these circumstances, the level of compensatory mortality that affects tern predation is quite relevant because the issue is how many *additional* salmon and steelhead will survive *overall* if tern predation is reduced by some amount. Because of the nature of compensatory mortality, an assumption of 0% compensatory mortality for tern predation will produce an overall survival increase from reducing tern predation that is twice as large as an assumption of 50% compensatory mortality from tern predation (and an assumption of 100% compensatory mortality would eliminate the overall survival benefit of reducing tern predation altogether because at 100% compensatory mortality, any fish not eaten by a tern will die from some other source of mortality anyway). Mr. Graves does not address the relevance of compensatory mortality to evaluating the survival improvements from reducing *tern* mortality. *See* Graves SJ Dec. at ¶¶ 58-60 (discussing either avian predation generally or cormorant predation).

37. Because of the difference in what the action agencies are seeking to accomplish by reducing cormorant predation (on the one hand) and tern predation (on the other hand), there is no inconsistency in explaining why compensatory mortality is a relevant consideration in addressing tern predation while at the same time not urging application of a compensatory mortality factor to cormorant predation where it is not a relevant consideration.

38. In the case of Caspian tern predation, where the effects of compensatory mortality are relevant, NOAA concluded that RPA action 45 to reduce tern predation in the estuary would provide, for example for listed steelhead, a +3.4% overall survival improvement, assuming 0% compensatory mortality. This projected survival improvement from the current period as a result of implementing the prospective action to reduce tern predation was then used as a multiplier (1.034) for increased survival in the 2008 BiOp jeopardy analysis. *See*, *e.g.*, 2008 BiOp at 8.5-56 (Table 8.5.5-1) (providing survival multipliers for prospective actions and explaining how

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they work) (multiplier for "Bird Predation" for all Snake River steelhead populations listed as "1.03"); *see also* Olney 2014 SJ Dec. at ¶ 39 (listing survival multipliers for other salmon and steelhead populations). If NOAA had employed an assumption of 50% compensatory mortality, as it said it would in the 2008 BiOp and Supplemental Comprehensive Analysis (SCA), *see id*. at ¶ 48 (quoting 2008 BiOp at 8.3-26), the survival improvement for reducing tern predation for steelhead would have been 1.7% or half the 3.4% improvement they actually used.

39. To put the difference between applying a survival multiplier for a 3.4% survival improvement and for a 1.7% improvement for tern predation in perspective, the difference between the larger survival improvement of 3.4% from assuming no compensatory mortality for steelhead, as compared to the smaller 1.7% improvement assuming 50% compensatory mortality, is 1.7% and equivalent to achieving about 3.4 survival benefit units (SBUs) for steelhead through estuary habitat restoration work. This number of SBUs is only slightly less than the *total* number of SBUs (3.52) achieved for stream-type fish (which include steelhead) between 2007 and 2013. *See supra* at ¶¶ 10-14 (discussing estuary habitat restoration and the level of SBUs that have been achieved).

40. As I have previously explained, NOAA decided not to apply a 50% adjustment for compensatory mortality for tern predation in the jeopardy analysis in the 2008 BiOp even though it said it would, apparently because it concluded this adjustment—which would have halved the survival improvements from reducing tern predation—was not "significant." *See* Olney 2014 SJ Dec. at ¶ 48 (providing history of this issue and citing prior declarations). In the 2008 Supplemental Comprehensive Analysis on page 7-48 NOAA discusses the issue of compensatory mortality and, consistent with the language of the 2008 BiOp but not NOAA's actual calculations, say:

> Any estimated benefit of reduced tern predation is sensitive to assumptions about the additive or compensatory nature of mortality from tern predation. The projected benefits identified in the CA (Appendix F) assume complete additivity (no compensatory mortality), i.e., every salmonid not consumed by terns survives all other sources of mortality. However, if some portion of the tern's predation consists of salmonids predestined to die as a result of illness, poor condition, or

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> other predation, the survival improvements modeled above would need to be reduced accordingly to estimate the actual survival improvements from tern relocation. Since current literature and empirical data do not identify more specific estimates or ranges, NOAA Fisheries assumes that tern predation likely falls between being completely additive or completely compensatory (Roby et al. 2003). Consequently, in estimating the effect of reducing tern predation NOAA Fisheries assumed a hypothetical compensatory mortality of 50% (Roby et al. 2003).

2008 SCA at 7-48. NOAA still has not explained what it considers a "significant" survival adjustment, either positive or negative, in the context of its treatment of tern predation or elsewhere, 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. *See* Olney 2008 SJ Reply Dec. at ¶¶ 17-21.

41. As I noted in my prior declaration regarding compensatory mortality, *see* Olney 2014 SJ Dec. at ¶ 49, in its Response to Comments on the draft 2014 BiOp, NOAA acknowledges comments by both the State of Idaho and NWF regarding NOAA's assumption 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 was that the cited studies did not "offer a specific compensation level for predation by the estuary tern population," *id*. 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 the actual, specific level of compensatory mortality for avian predation in the estuary does not make the issue of compensatory mortality irrelevant. It also stands in contrast to NOAA's statements in the 2008 BiOp and the Supplemental Comprehensive Analysis quoted above.

42. Mr. Graves addresses these comments indirectly in paragraph 59 of his

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declaration stating that "what Mr. Olney (and those commenting on the draft 2014 Supplemental BiOp) fail to grasp is that compensatory mortality, at whatever level it may be occurring, must be applied equally to both 1) the assessment of the impact of predation and 2) the effectiveness of the actions taken to address it." Graves SJ Dec. at ¶ 59. As I have explained above, Mr. Graves' comment would be relevant to the analysis of cormorant predation in the 2014 BiOp, but it is not relevant to the analysis of the role of tern predation and the survival improvements it is predicted to provide in the RPA. His comment also is not a relevant reason to assume compensatory mortality for tern predation is zero.

43. To illustrate in another way a situation where compensatory mortality is not relevant, when I prepared my summary judgment declarations in 2008, NOAA had not developed predation rate estimates for the cormorant impacts comparable to the predation rate estimates they had developed for terns in order to derive the survival gap multipliers for tern predation. NOAA has since developed differential predation rate estimates for the cormorant impact (e.g., -3.6 percent for steelhead) after the 2008 BiOp and after I had pointed out the relevance of the issue of increasing cormorant predation to their 2008 analysis, and after NOAA had further consulted with researchers. The only cormorant data available when I prepared my 2008 declarations to make comparisons between cormorants and terns were estimates of how many salmonids cormorants consumed compared to terns, not predation rates because none were available for cormorants. In my 2008 summary judgment declaration, I said, "[i]n fact, in 2006, cormorants consumed 10.3 million salmonids compared to 5.4 million by terns—*or almost twice as many juvenile salmonids as terns* (Roby et al. 2008)." Olney 2008 SJ Dec. at ¶ 76 (emphasis added). If I had assumed 50% compensatory mortality for the numbers of salmonids consumed for both terns and cormorants, the relative difference I stated in my declaration would still be the same, i.e., twice as many salmonids consumed by cormorants as terns (50% of 10.3 million is 5.15 million salmonids consumed by cormorants and 50% of 5.4 million is 2.7 million salmonids consumed by terns that would not have died anyway). It would not have been valid to compare numbers of salmonids consumed by cormorants to tern predation *rates*. The data available at the

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time supported my point about cormorant predation numbers compared to tern predation numbers with or without an assumption about compensatory mortality.

B. Caspian terns

44. As I described in my prior declaration, RPA action 45 calls 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 Columbia River in order to reduce the number of nesting pairs of terns by more than half. The 2008 BiOp assumed that reducing the area of the East Sand Island colony in this fashion would reduce the number of nesting pairs of terns, which would then reduce predation by terns, and provide the 3.4% survival improvement discussed above and attributed to this RPA action. *See* Olney 2014 SJ Dec. at ¶ 39.

45. As I also explained, 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 tern 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 available for nesting terns in any single year." 2014 BiOp at 411.

46. 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 level sought and, 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 also says in the 2014 BiOp the reduction in tern numbers by 2,500 to 3,000 pairs at East

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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. In his declaration, Mr. Graves agrees with the above summary of what has occurred so far in the action agencies' efforts to implement RPA 45 and achieve the survival improvements it was predicted to provide. *See* Graves SJ Dec. at ¶¶ 47-48, 49 (first three lines).

47. I also pointed out in my paragraph 43 that, with respect to the survival improvements anticipated from reducing tern 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.*

48. I then stated "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*." Olney 2014 SJ Dec. at ¶ 49 (emphasis added). Mr. Graves states that he "disagree[s] with [my] assessment." Graves SJ Dec. at ¶ 50. He then summarizes his reasons which include: (1) "It is pre-mature to draw conclusions about the overall efficacy of RPA action 45 at this time"; (2) "lower numbers of terns nesting on East Sand Island . . . indicates that reducing nesting habitat may be working , but that terns are tolerating

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higher nesting densities and slower to abandon habitat (especially when no other high quality habitat is available nearby) than expected by consulting seabird experts"; (3) "[o]nce fully implemented, the efficacy of the actions to reduce predation by Caspian terns at East Sand Island will take several years to determine"; and, (4) "ongoing monitoring, used to track progress to date, is sufficient to this task." *Id*. at ¶ 51. Mr. Graves concludes by stating his view that RPA 45 will be successful in reducing tern predation on juvenile salmon and steelhead as predicted. *Id*.

49. All of Mr. Graves' reasons focus either on why the efforts to reduce tern predation have not worked, e.g., "terns are tolerating higher nesting densities," or on when he hopes to have additional evidence to evaluate whether the action has achieved a reduction in tern predation, e.g., "[i]t is premature to draw conclusions . . . at this time," "the efficacy of the actions . . . will take several years to determine," and "on-going monitoring is sufficient." None of these reasons are actually relevant to whether the action will reduce the number of terns as predicted, let alone whether the anticipated survival benefits to salmon and steelhead from a reduction in the number of terns will accrue. And it does not appear that Mr. Graves expects to be able to evaluate whether this action has had its predicted effect until some unstated time after the expiration of the current biological opinion and RPA in 2018.

C. Cormorants

50. I discussed the growth of cormorant predation in the estuary and the response to it in the 2014 BiOp in paragraphs 44-47 of my prior declaration. *See* Olney 2014 SJ Dec. at ¶¶ 44-47. I explained there 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. In the Cormorant Appendix to the 2014 BiOp, NOAA calculates that the effect of this increased predation is to create a survival gap between the assumptions about cormorant predation in the 2008 BiOp and what has actually occurred since then of 3.6% for steelhead populations, 1.1% for yearling Chinook, and less than 1% for sockeye. 2014 BiOp, App. E. at E-5 to E-6. In other

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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 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 cormorant predation on salmon and steelhead in line with the assumptions in the 2008 BiOp analysis. As I have discussed above, *see supra* at ¶¶ 34-37, the cormorant action in the RPA is not designed to increase overall salmon survival as compared to the Base Period (unlike the action to address tern predation), but to address an overlooked source of increased mortality from a single source that arose after the Base Period. It is not intended to achieve a net gain in salmon and steelhead survival, but to restore survival to levels NOAA (incorrectly) assumed in 2008.

51. I then described and discussed NOAA and the action agencies' proposal for reducing cormorant predation to Base Period levels which involves reducing by more than 50% the number of 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. *See* Olney 2014 SJ Dec. at ¶¶ 45-46. As part of that discussion, I noted that the 2014 BiOp says "[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 ¶ 46 (quoting 2014 BiOp at 411). I also noted that 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." *Id.* at ¶ 47 (quoting Schultz *et al*. 2013). The 2013 Schultz study also recognizes evidence that "suggests cormorant management has positively affected the

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[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 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.

52. I noted that NOAA did not describe or discuss any of these findings from the Schultz 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. In his declaration, Mr. Graves says:

> The Schultz 2013 paper is an article on cormorant populations and fish consumption modeling that used Leach [sic] Lake as an example. This may have been why it was not included in our literature search. However, after reviewing it, NMFS came to the same conclusion regarding the value of the Leach [sic] Lake example. There are no statements in this paper that would refute the statements made in the 2010 or 2013 references.

Graves SJ Dec. at ¶ 56. It is not clear from Mr. Graves' statement when NOAA reviewed the Schultz et al. (2013) paper. The only Schultz paper listed in the 2014 BiOp Literature Cited is Schultz (2010), which was not published in a peer reviewed scientific journal. Moreover, the Schultz 2013 paper was published in a peer-reviewed scientific journal. Often this level of review leads authors to address relevant factors that earlier work, which was not rigorously peer reviewed and published in a scientific journal, may not address.

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D. Kelt Reconditioning

53. In my prior declaration, I addressed RPA action 33, the steelhead kelt reconditioning program and explained that 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 2014 SJ Dec. at ¶ 51; *see also* Olney 2008 SJ Dec. at ¶¶ 86-92 (discussing factors relevant to this analysis that NOAA had not addressed); Olney 2008 SJ Reply Dec. at ¶¶ 29-36 (again addressing these issues as well as comments by Mr. Graves of NOAA). I also summarized 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* Olney 2014 SJ Dec. at ¶¶ 52-57, 60-61 (quoting ISRP and other analyses). I also noted that NOAA did not address these reviews in the 2014 BiOp. *Id*. at ¶ 60.

54. One of the points I noted that the ISRP had made about kelt reconditioning was that the kelt reconditioning efforts so far had failed to include any means of assessing of whether reconditioned kelts can successfully spawn, produce viable offspring, and yield an increase in Natural Origin Spawners (NOR) in the following generation. Olney 2014 SJ Dec. at ¶¶ 53, 56. Mr. Graves agrees that the ISRP identified this as an issue in evaluating the efficacy of kelt reconditioning and says, "NMFS agrees that the goal of any [kelt reconditioning program] should be to increase the number of viable spawners on the spawning grounds." Graves SJ Dec. at ¶ 64. In his 2008 summary judgment declaration, Mr. Graves said that NOAA's 6% survival improvement estimate for kelt reconditioning was based on a range of effectiveness of reconditioned kelts spawning in the wild of 50% to 100%, and that the "assumed success rate of long-term reconditioned kelts might be 50%." Graves 2008 SJ Reply Dec. at ¶¶ 59-60. Mr. Graves then says in his current declaration, "[p]reliminary results indicate reconditioned spawners are equivalent or better than first time spawners (i.e., fecundity, fertilization rates, fry growth rates)," and he cites "Hatch (2014)" to support this statement. *Id*.

55. The Hatch (2014) study is not actually cited in the 2014 BiOp. An earlier 2013

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Snake River Kelt Management Plan (BPA and USACE 2013B), which was referred to in the 2014 BiOp, reviews the same general results from the Parkdale hatchery that Mr. Graves discusses in his declaration where he relies on Hatch (2014). That Plan does not address the relevant differences between the Parkdale hatchery study reported on in Hatch (2014) and the conditions that will affect survival improvements from reconditioned Snake River steelhead kelts that I describe below.

56. There are a number of relevant differences between the reconditioned fish that were the subject of the Hatch (2014) study and Snake River steelhead kelts. Mr. Graves does not address these differences or explain why, in light of them, the Hatch study shows that the current kelt reconditioning program in the Snake River will "increase the number of viable spawners on the spawning grounds," *id*., to the degree necessary to increase overall Snake River B-run steelhead survival by 6%. The first relevant difference between the fish in the Hatch study and the fish that are the subject of the 2014 BiOp's kelt reconditioning program is that the experiment reported by Hatch (2014) did not use Snake River steelhead or wild kelts collected during their migration after spawning in the wild—as will be the case with any reconditioned Snake River steelhead kelt. The fish used in the Hatch study were un-spawned summer run fish from the Hood River carefully air-spawned at the Parkdale Hatchery Facility and then reconditioned in the hatchery (Hatch 2014).

57. In addition, the steelhead in the Hatch study only migrate over one dam, compared to eight dams for Snake River B-run steelhead, and, because they were first-time spawners taken into the hatchery for air spawning, they did not go through the rigors of spawning naturally in the wild and then, post-spawning, migrate downstream to a collection point, as any Snake River kelts that will be collected for reconditioning must do. In a similar vein, reconditioned kelts that are released into the Snake River in the fall have to live off body reserves and face a number of other challenges like successfully migrating to spawning areas before spawning in the spring. All of these factors, which affect the condition of the Snake River kelts and the viability of their eggs at spawning, as well as fry growth and viability, are missing

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in the Parkdale experiment reported in Hatch (2014).

58. Hatch (2014) acknowledged that reproductive success of reconditioned fish is difficult to assess under natural conditions and also noted that, "[s]teelhead, in particular, are problematic as migration and spawn timing are associated with high flow events in late winter and spring. This limits the operation of weirs and traps and makes direct observation of spawning difficult. In addition to the problems associated with sampling migratory anadromous adults, resident *O. mykiss* can represent a substantial portion [of the?] spawning population (Araki et al. 2007), and are often unsampled." Hatch (2014). Mr. Graves and the 2013 Snake River Kelt Management Plan do not mention these issues, although the 2014 BiOp itself says, "[o]ne of the uncertainties surrounding the survival benefit of long-term reconditioning is the actual spawning success of reconditioned kelts. . . . Research is currently underway to assess this issue," 2014 BiOp at 386 (possibly referring to the anticipated Hatch study, although this is not clear). So far as I am aware, there are no studies with reconditioned Snake River kelts that show they can consistently "successfully spawn and produce viable offspring and yield an increase in NOR steelhead in the following generation." ISRP 2009-39 at 2 (cited and quoted in Olney 2014 SJ Dec. at ¶ 53). As the ISRP concluded, there is currently no evidence that kelt reconditioning actually is effective at improving the survival of wild steelhead populations and the results of the Yakima Nation work on kelt reconditioning has been discouraging. *Id*. In fact, as the ISRP observed with respect to the Yakima program it was reviewing, "[s]imply 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.

59. In the context of the above discussion of information about the effectiveness of the kelt reconditioning program in the 2014 BiOp, it is important to bear in mind that in order to achieve the 6% survival increase NOAA predicts for kelt reconditioning, as Mr. Graves explains, it will be necessary to add 180 viable female steelhead spawners through the kelt reconditioning

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program to the approximately 3,000 female wild Snake River steelhead spawners that exist across all the B-run wild Snake River steelhead populations. *See* Graves SJ Dec. at ¶ 66 (making this calculation). The 2014 BiOp, however, refers to "the 180 reconditioned kelts required." 2014 BiOp at 385. This is a very different goal than the one stated by Mr. Graves and in RPA 33 of the 2014 BiOp which refers to "long-term reconditioning as a tool to *increase the number of viable females on the spawning grounds*." (emphasis added). A program to generate 180 reconditioned kelts that just survive *reconditioning* is much different from reconditioning enough kelts to produce 180 viable spawners reaching the spawning grounds and being 100% effective. Logically, only the latter could increase overall survival by 6% (i.e., 180 is 6% of the current estimate of 3,000 female wild steelhead spawners).

60. As I have noted, the 180 number itself is based on the assumption that the reconditioned kelts that reach the spawning grounds following reconditioning and release will be 100% as effective as wild fish at spawning and producing natural origin spawners that then return to spawn effectively in the next generation. If the 180 additional spawners the RPA requires are not 100% as effective as wild spawners, the 6% survival increase will not occur. As I pointed out earlier, in 2008 Mr. Graves indicated that NOAA assumed a range of 50% to 100% effectiveness, and he said then that it "might be 50%." It is for this reason that the current lack of evidence that reconditioned Snake River kelts can perform at least as well as wild spawners is relevant. As the ISRP said in 2011, in their conclusions and recommendations: "An adequate comparison of reproductive performance between natural and reconditioned kelts has not been 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.

61. Separately, as I have noted in past declarations, NOAA's estimate of the number of kelts potentially collected for reconditioning does not address a number of relevant factors or explain why they do not need to be addressed, especially in light of the above discussion. *See*,

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e.g., Olney 2008 SJ Reply Dec. at ¶ 35. Mr. Graves says that "[t]he 2014 Supplemental BiOp assessed current and planned activities that could affect the number of fish that could be produced . . . ." and that "NMFS believes that these actions are sufficient to collect enough fish to produce the requisite viable 180 females." *See* Graves SJ Dec. at ¶ 66 (citing 2014 BiOp at 383, 387 & 453). The information on the pages Mr Graves cites does not address the factors relevant to fish collection I have previously raised. Thus, for example, although Mr. Graves says, "[t]he 2014 Supplemental BiOp assessed current and planned activities that could affect the number of fish that could be produced," neither the 2014 BiOp nor the 2013 Snake River Kelt Management Plan provide information, or an assessment that identifies numbers, or even a range of numbers, for kelts potentially collected. This was missing but relevant information in the 2008 BiOp too.

62. One of the three strategies to improve steelhead productivity identified in the 2013 Snake River Kelt Management Plan was, "In years when large numbers of kelts that are in good condition can be collected, kelt reconditioning could likely meet the BiOp goal of increasing B-run steelhead abundance by 6%." 2013 Snake River Kelt Management Plan at 5. No estimates were provided for the number of kelts that are expected to be in good condition at Lower Granite Dam in such years when "large numbers" are collected, or for any other years. The Plan does say an additional 50 fish should be collected at the Fish Creek weir but does not say whether these fish are females in good condition or explain how they derived this estimate. The Plan also says that 100 good condition kelts are *observed* annually at Little Goose Dam but it doesn't say whether these are males and females or just females. The 2014 BiOp also says that in 2013 additional B-run kelts were collected directly from the Clearwater River, but the numbers were "small." 2014 BiOp at 386. Fish Creek (and the Fish Creek weir) is in the Clearwater River so the fish collected there and mentioned above may be part of the "small" number collected from the Clearwater.

63. Notwithstanding the limited information described above, there are additional data available in Hatch (2014) to assess the likelihood of collecting adequate numbers of fish to

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reach a 6% survival improvement for steelhead. Mr. Graves cites this report in his declaration for a different point (*see* above discussing this report) but does not discuss information about fish collection efforts (i.e., numbers collected) at Lower Granite Dam in 2013 or the relevance of this information to the action agencies' ability to collect enough kelts for reconditioning and subsequent release and spawning. Nor are these numbers mentioned in the 2013 Snake River Kelt Management Plan. As I stated in my prior declaration in paragraph 57, NOAA does note 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's 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*. While the number of kelts collected in 2013 represent only one year of information, they help illustrate the magnitude of the problem of collecting adequate numbers of kelts for reconditioning and subsequent spawning. Hatch (2014) indicates that the Lower Granite Dam facility in 2013 was operated 24 hours a day throughout the kelt migration period (April-June) to collect kelts—so it afforded the maximum collection effort possible. With this maximum effort, a total of 210 female B-run steelhead kelts were collected and 104 were in good condition. One-hundred-ten wild B-run kelts collected at Lower Granite were transported to Dworshak National Fish Hatchery (NFH) for long-term reconditioning. Only 57 of these survived to release (51.8%). These fish were released 3.5 kilometers below Lower Granite Dam in October 2013. They would not spawn until the following spring, or perhaps even a year later if they "skipped spawned." As of November 30, 2013, Hatch (2014) reported they had detected 10 of these 57 fish, 8 migrating upstream over Lower Granite Dam and 2 migrating downstream over Little Goose Dam and are the best numbers available to that date. These numbers for 2013 indicate that collecting enough kelts to achieve 180 viable reconditioned B-run steelhead kelts *on the spawning grounds* following reconditioning and release, would require collection of many hundreds more fish than were collected in 2013 at Lower Granite Dam with the maximum possible effort.

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64. In addition, the 51.8% survival of kelts being reconditioned in 2013 at Dworshak NFH to the point of release (not return to the spawning grounds) is near the high end of success at all of the kelt facilities. Hatch (2014) reported that survival of the long-term reconditioned kelt groups was 46.7% for Prosser on the Yakima River and only 8.16% for Omak in 2013. The 10-year mean of kelts surviving reconditioning in the Yakima basin was 38%. 2014 BiOp at 385.

65. To be clear, Lower Granite Dam is not the only facility available for collecting steelhead females to be reconditioned. Mr. Graves indicates that additional kelts can be collected at two weirs (South Fork Clearwater and Fish Creek) to make up the difference for any shortfall in collection at Lower Granite Dam. Graves SJ Dec. at ¶ 66. Mr. Graves does not provide data on kelt collection at these weirs but 50 fish (of unknown sex and condition) were mentioned as "should be collected" in the 2013 Snake River Kelt Management Plan from the Fish Creek weir (*see* above). The 2013 Snake River Kelt Management Plan also refers to 100 good condition B-run kelts observed annually at Little Goose Dam but they do not indicate whether this number includes males, or whether this number includes years of kelt collection before the installation of the temporary spillway weirs in 2009 which would reduce the number of kelts collected through the juvenile bypass system (a major reason why the high expectation of the percent collected of the migration of kelts at Lower Granite Dam had to be revised downward in the 2014 BiOp). Hatch (2014) at page 91states that steelhead migration and spawn timing are associated with high flow events in the late winter and spring. This limits the operation of weirs and traps. In many years, weirs cannot be operated for extended periods due to high flows and debris. Mr. Graves does not address how these factors may affect collection efforts at the weirs he mentions.

66. To illustrate the problem of collecting enough kelts to meet the survival improvements of the RPA, even with two significant favorable assumptions for which evidence is lacking—(1) a consistent 50% survival to release after long-term reconditioning, which is close to the level achieved at Dworshak NFH in 2013; and, (2) that all fish that are reconditioned and released return to the spawning grounds and produce viable offspring that also return to

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spawn at the same rate as offspring of wild fish (i.e., are 100% as effective as wild spawners)—the kelt program would need to collect at least 360 female B-run kelts that could be sent for reconditioning each year. It is relevant to note that the 51.8% number reported for Dworshak NFH in Hatch (2014) is for only one year. After several years of operation and refinement, the Prosser facility on the Yakima River has not achieved an average survival of 50% just for long-term reconditioning (10-year mean of 38%). Of course, catastrophic losses of reconditioned kelts have occurred at hatcheries because of unexpected malfunctions or natural disasters, like the case in 2011 when only 2 of 70 B-run fish transferred from Lower Granite Dam to Dworshak NFH survived reconditioning because of problems with chlorinated water contamination (Hatch 2011) (2014 NOAA AR CO23154, pp. 199327-199604).

67. As noted above, the number of kelts collected overall would need to be increased even higher if kelts released in October experience *any* mortality before spawning greater than wild first-time spawners, or if spawning kelts are *any* less than 100% as viable as wild first-time spawners. If as Mr. Graves stated, the effectiveness of reconditioned kelts on the spawning grounds "might be 50%", rather than 100%, the number of kelts that need to be initially collected for reconditioning would double to 720 (i.e., 360 that survive reconditioning assuming 50% survival of which 180 would become viable spawners at 50% viability).

68. Based on 2013 collections at Lower Granite Dam, the weirs Mr. Graves mentions (and even the possibility of collecting kelts at Little Goose Dam), these facilities together would have to yield a minimum of 250 more kelts in good condition, to add to the kelts collected in good condition at Lower Granite, to achieve the minimum 360 kelts needed. This number increases to 610 more kelts needed assuming 50% effectiveness on the spawning grounds, for a range of 250-610 more kelts that would need to be collected at locations other than Lower Granite. As I describe above, collections at Lower Granite Dam in 2013 that produced 110 kelts for reconditioning represented a maximum effort. The 2013 Snake River Kelt Management Plan also mentions improvements at Lower Granite Dam that may improve the condition of kelts collected, but does not translate that into an expected number of fish collected in better

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condition. The 2013 Kelt Management Plan mentions a *possible* total of 150 more kelts (50 of unknown condition from weirs and 100 with an unstated proportion that are females from Little Goose) that could be collected at other locations. Neither the aggregate numbers of 250 to 610 more kelts (which reflects the range of underlying kelt effectiveness assumptions in the 6% survival estimate plus 2013 information on kelt collection and reconditioning success), nor their implications, are discussed in the 2014 BiOp.

69. In my summary judgment declaration, I explained that as far as I could determine, six years after the 2008 BiOp's RPA required preparation of a Snake River Kelt Master Plan, no plan had been adopted. Olney 2014 SJ Dec. at ¶ 60. I first noted the requirement for such a plan in my 2008 summary judgment declaration. At that time, Mr. Graves stated that, "Mr. Olney correctly notes that a plan must be developed, that several challenges will need to be overcome, and that there is considerable scientific uncertainty . . . . However, none of these concerns, which NMFS fully acknowledged . . . suggests that these issues cannot be resolved . . . ." Graves 2008 SJ Dec. at ¶ 43. There is now a 2013 Snake River Kelt Management Plan but it is primarily a status report which describes "the current status of actions carried out to improve the survival of steelhead kelts, in order to meet goals of increased spawner abundance defined in the 2008 FCRPS Biological Opinion." Snake River Kelt Management Plan at 3. This Plan still (1) does not provide a target number or range of the number of kelts needed or expected to be collected at all dams and weirs, (2) does not say whether the rearing facilities are being sized for 180, 360, or more fish, only that, "[f]acility space is currently considered less limiting than the number of kelts that can be collected for the program," and, "[i]n 2013, the reconditioning facility for Snake River B-run kelts at Dworshak NFH became equipped for full program operation . . . ;" and (3) does not define full program operation. *Id*. at 3. In his current declaration in 2014, Mr. Graves states, "[a]s I stated earlier, the kelt reconditioning program has been in an experimental phase. Only after the production facilities have demonstrated that they can produce viable female spawners (generally as reproductively fit as first-time spawners or discounted to the extent they are not equally as fit) would NMFS agree to a value for

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additional . . . kelt rehabilitative actions contributing towards the target 6% survival improvement goal. If the production facilities do not provide this level of benefit, the action agencies will be required under the BiOp to implement other actions to meet the targeted 6% production increase." Graves SJ Dec. at ¶ 68. This statement indicates that at this time (except for a small 0.9% survival increase discussed below), the action agencies have not achieved *any* of the 6% survival increase for Snake River steelhead from kelt reconditioning that the RPA requires. Relevant context for this fact is the discussion above noting the ISRP's views about the ability of a kelt reconditioning program to actually increase steelhead survival, the information from Hatch (2014) about the limited number of kelts collected in 2013 at Lower Granite Dam and their survival through reconditioning to release, and the discussion about the overall potential for collection of kelts. Neither Mr. Graves nor the 2014 BiOp describes the alternative actions that the action agencies can take in a timely way if they are "required under the BiOp to implement other actions to meet the targeted 6% production increase" as Mr. Graves indicates. *Id*.

70. According to Mr. Graves, the only survival improvement credit related for the steelhead kelt reconditioning program NOAA has recognized so far is for a 0.9% survival increase from modified operation of The Dalles sluiceway. Graves SJ Dec. at ¶ 68. Mr. Graves explains that the primary benefit of modified operation of the ice and trash sluiceway at The Dalles Dam was "not to increase the survival of downstream migrating kelts. Rather, the primary benefit was to increase the survival of relatively large numbers of adult Snake River B-run steelhead (first time spawners) that were otherwise falling back through the projects' turbines units . . . . NMFS has accepted that this action will contribute 0.9% to the targeted 6% survival improvement goal [for kelt reconditioning] (the equivalent of about 27 additional B-run females on the spawning grounds." Graves SJ Dec. at ¶ 69. It is not clear why this small improvement was credited to the kelt reconditioning program when it appears to be part of the RPA's Hydropower Strategy 2 - Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival.

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71. Nonetheless, to put this 0.9% credit for a survival improvement from kelt reconditioning in context, it is relevant to note that NOAA used the Snake River Steelhead Kelt Appendix in the Supplemental Comprehensive Analysis (Appendix J) to develop the 6% survival improvement multiplier for kelt reconditioning. This Appendix is an April 21, 2008, memorandum to Bruce Suzomoto of NOAA from Blane Bellerud, Ritchie Graves, and Gary Fredericks. They estimate the expected benefits from the menu of actions that could be applied to steelhead kelts that are collected, including transportation, improved in-river passage, and short- and long-term kelt reconditioning, *see* 2014 NOAA AR B282 at 28715-28722 Supplemental Comprehensive Analysis ("SCA"), Appendix J. The improved in-river passage section of this Appendix only refers to improving *downstream* kelt survival, i.e., kelts reaching the ocean more quickly, in slightly better condition, and returning at higher rates. There is no mention in Appendix J of including potential actions for improving the upstream survival of first time spawners in developing the 6% survival improvement for the kelt program. In addition, Mr. Graves says in his 2008 declaration that NOAA assessed the benefits for in-river migrating kelts as being less than 0.1% and so it was not an important consideration in the overall analysis. *See* Graves 2008 SJ Dec. at ¶ 40. The 2013 Snake River Kelt Management Plan at page 5 indicates, "Enhanced in-river migration strategies have resulted in marginal increases in repeat spawners that are annually consistent."

72. Of further relevance, recognizing a survival credit for adult fish migrating upstream would logically require NOAA to have assessed all of the FCRPS actions that affect upstream adult passage survival both positively and negatively to ensure that the overall effect of these actions allowed the survival credit for operation at The Dalles ice and trash sluiceway. For example, NOAA refers to mortalities from adult passage blockages at the fishway at Lower Granite Dam in 2013. 2014 BiOp at 356. There were substantial losses for Snake River sockeye and significant losses for summer Chinook. The losses to Snake River steelhead are characterized as "appear[ing] to be relatively small" and "some additional mortalities observed in recent years are likely." Still, NOAA does not appear to have taken this and additional sources

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of mortality into consideration when it awarded the survival credit for operating The Dalles ice and trash sluiceway to improve upstream steelhead survival (the "27 additional B-run females" Mr. Graves identifies as a result of the 0.9% survival credit to kelt reconditioning. Graves SJ Dec. at ¶ 69).[1] As I also noted in my earlier declaration, NOAA has found that adult survivals for Snake River steelhead are lower than assumed in the 2008 BiOp, although it has not included in its analysis any potential negative implications of the new data at this time. Olney SJ Dec. at ¶ 68. I discuss this survival data further below.

73. As I explained in my prior declaration, NOAA has acknowledged 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. *See* Olney 2014 SJ Dec. at ¶¶ 66-72. The 2008 BiOp assumed that adult survival rates would be the same for both the Base Period and the time since then. I also explained how NOAA treats these data and how this issue is relevant to the 2014 BiOp's updated analysis. *Id*. In addition, I discussed how increasing transportation may impair adult salmon and steelhead homing ability and increase straying and mortality of adults. *Id*. And I explained the implications of the uncertainty about the degree to which removing juveniles from the river for transportation would affect predation rates on the juvenile fish remaining in the river. *Id*. Mr. Graves also addresses these issues in his declaration to a limited extent as I describe below. *See* Graves SJ Dec. at ¶¶ 71-78. As in other sections of this declaration, I provide relevant information below to place Mr. Graves' comments on these subjects in the context of all of the available information.

74. As I have explained, 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

[1] In footnote 5 of my prior declaration I said this problem illustrates that serious adult passage problems can still occur.

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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 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. 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. They were higher for Snake River fall Chinook, and upper Columbia River spring Chinook and steelhead. 2014 BiOp at 352 (Table 3.3-1).

75. As I further explained previously, 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 and it does not describe or discuss the implications of these new survival rates for its analysis of the effects of the RPA. *See* Olney 2014 SJ Dec. at ¶ 68. 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. *Id*. at ¶ 69. Regardless of the factor or factors causing the lower estimates of adult survival, and regardless of whether they eventually prove to be entirely accurate, the implication of the lower survival rates through the hydrosystem based on the most recent data available 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.

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76. Mr. Graves in his declaration reviews what NOAA said in the 2014 BiOp with respect to how the Base Period survival was estimated and the reasons why the new PIT tag data is uncertain. Graves SJ Dec. at ¶ 72. He then quotes the language from the 2014 BiOp where NOAA explains its decision not to use this new information. *Id*. at ¶ 73. It is relevant to note that NOAA does use the positive results of the new PIT tag data, i.e., the fact that some species are surviving at higher rates than it initially estimated, to support their conclusion that fishway operations are not likely to be a causative factor in the declines for other species. *See id*. at ¶ 72 (citing 2010 BiOp). This is despite significant, unanticipated adult mortalities related to fishway operations in 2013 at Lower Granite Dam which resulted after high water temperatures in the fishway temporarily blocked or hindered migration. *See* Olney 2014 SJ Dec. at ¶ 68 & n.5 (describing this issue). NOAA has indicated that both short-term and long-term actions are underway to address this issue, 2014 BiOp at 356.

77. In my earlier declaration, I explained how transportation may impair homing ability and increase straying and mortality of adult salmon and steelhead. Olney 2014 SJ Dec. at ¶ 70. As I noted there, NOAA said in the 2010 BiOp that recent *increases* in the fraction of fish that migrate in-river as a result of increased spill "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.* (quoting 2010 BiOp) (emphasis added). Note that NOAA did not refer only to the fraction of wild fish transported in making this statement. As I also noted, NOAA did not discuss the effects of the most recent proposed *increase* in transportation under the revised 2014 RPA on homing impairment and straying in updating their analysis for the 2014 BiOp. *Id*. at ¶ 71.

78. Mr. Graves presents the conversion rate data for transported and in-river migrants from the 2008 BiOp and states that these would be unlikely to vary substantially. Graves SJ Dec. at ¶ 77. Mr. Graves does not provide an explanation for this statement or mention the discussion from the 2010 BiOp quoted above. Mr. Graves does imply that I inappropriately

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assumed all, or most of these fish, ultimately spawn within the Mid-Columbia steelhead population. *Id*. What I actually said was that NOAA concluded in the 2010 BiOp that reduced transportation rates under recent spill operations would "substantially" reduce straying, and consequently improve adult conversion rates, and that NOAA did not address in the 2014 BiOp the negative effects that increased transportation under the revised 2014 RPA would have on straying. Olney 2014 SJ Dec. at ¶ 71.

79. Mr. Graves concludes that compared to the 2008 BiOp's assessment, the effect of straying into mid-Columbia steelhead populations (because of increased transportation under the 2014 RPA) will be reduced. His point apparently is that because the ratio of transported fish to in-river migrants is closer to equal under the 2014 BiOp RPA, as compared to the 2008 BiOp assessment, this would cause a reduction in straying as compared to the 2008 BiOp, which assumed a much higher proportion transported, and so is a positive factor for the ultimate success of the RPA, even though as compared to the current (recent) ratio of transported fish to in-river migrants, the effect of the increase in transportation under the 2014 BiOp RPA would be to increase straying and thus increase related adverse effects. *See* 2010 BiOp at 78 (indicating that increased in-river migration under current operations would provide a substantial benefit as compared to 2008 assumptions); *see also* Olney 2014 SJ Dec. at ¶ 71 (discussing additional relevant comments from the Fish Passage Center on this issue).

80. Finally, as I have discussed, when a higher percentage of juvenile fish are left to migrate in-river (and consequently fewer fish are transported) it reduces predation *rates* on the in-river migrants because the total number of fish available to predators increases which has a swamping effect on predation. *See* Olney 2014 SJ Dec. at ¶ 72; *see also* 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) and an important variable in how the 2008 BiOp transport operations would have performed relative to the actual operation under the Court's Orders. 2014 BiOp at

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369. While the exact 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 predator swamping and consequently likely increase predation rates on juvenile fish migrating in the 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. ISAB, "Snake River spill-transport review" (Sep. 16, 2008) (included in 2010 NOAA AR at RIOG04) (hereinafter "ISAB 2008-5"). As I said before, NOAA does not explain how the effect of predator swamping under current, Court-ordered spill 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, leaving fewer fish in the river and reducing to some degree the benefits of predator swamping.

81. I did explain in my prior declaration that transporting 50% of the juvenile steelhead, as proposed under the 2014 BiOp, is a substantial change from the 28-49% of juvenile steelhead that were transported between 2007-2013. Olney 2014 SJ Dec. at ¶ 72. At the time I prepared my declaration, I referred to these data from NOAA not realizing the implication of the fact that they were only presenting the *wild* steelhead proportions transported, an omission by NOAA that I discuss in more detail below. Mr. Graves says that returning to a 50% transportation operation would be only a modest 5-10% change from 2007 to 2013 operations and he later refers to this difference as a "slight increase in transportation." Graves SJ Dec. at ¶¶ 76, 77. He explains that the average wild steelhead transport rates were about 40% between 2008-2013. He does not describe how he arrived at his range of a 5-10% increase however. *Id*. at ¶ 76. The actual transport rates for juvenile *wild* steelhead between 2008-2013 that NOAA reports in Table 3.3.4 on page 371 of the 2014 BiOp differed from 50% by a range of -0.5 to 21.6%.

82. In addition, the major passage changes that occurred between 2008 and 2013 are relevant to any discussion about transport percentages. These included the addition of spillway

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weirs which can affect the number of fish collected in the juvenile bypass systems and transported. The most recent time period of 2009-2013 is actually more representative of the full implementation of recent operations (increased court-Ordered spill) *and* configurations changes at the collector dams, including the more recent installation of temporary spillway weirs at Little Goose Dam in 2009. The mean rate for *wild* steelhead transport during this time period, using NOAA's Table 3.3.4 data, was 35.3% (about 15% below the 50% target). The range of the increase in transportation to achieve the 50% target of the 2014 RPA is thus about 4 % to 22%, not 5% to 10%, using NOAA's wild steelhead transport rates.

83. Mr. Graves' and NOAA's evaluation of how the transport operation changes proposed in the 2014 BiOp would affect juvenile steelhead by only reviewing the impacts on wild steelhead transport percentages, leaves a relevant gap in their analysis. The goal of RPA Actions 30 and 31, as described in Table 3.3-6 is "transporting about 50% of juvenile steelhead," not 50% of wild steelhead. My declaration refers to substantial increases in the number of juvenile steelhead transported, and not just to wild steelhead. This is relevant because, as data available from the Fish Passage Center (FPC) website shows, 83% to 90% of the juvenile steelhead arriving at Lower Granite Dam are marked hatchery fish and only 10% to 17% are unmarked juvenile steelhead which include an unknown number of unmarked hatchery fish. (FPC data for 2008-2014 queried from the FPC website). In addition, I requested data from the FPC on the proportion of wild and hatchery fish destined for transportation in the forebay of Lower Granite Dam in 2014. While their data are somewhat different from NOAA's because of different assumptions and analytical methods, the FPC data do illustrate that the proportion of hatchery steelhead transported in some years is substantially different than the proportion for wild steelhead (e.g., 2011—48% wild, 36% hatchery; 2013—48% wild and 32% hatchery, 2014—46% wild, 31% hatchery). The average proportion transported for the FPC estimates from 2009-2014 was 43.3% (2-22%) for wild steelhead and 34.7% (4-26%) for hatchery

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steelhead.[2]

84. Since the goal of the RPA is to transport about 50% of all juvenile steelhead, the very high proportion of hatchery steelhead in the migration will have a significant influence on straying, other adverse impacts from transportation, and predation rates. NOAA did not present estimates of the proportion of hatchery versus wild steelhead in Table 3.3.4; nor did Mr. Graves address the implications of the very large number of hatchery steelhead in his assessment of the impacts on straying and predation. Increasing the transportation of hatchery fish also increases hatchery strays and putting more hatchery fish in barges will reduce the swamping effect and increase predation mortality of wild steelhead migrating in-river. The Fish Passage Center reviewed the estimated change in proportion of fish transported with the April 21 transport start date under the 2014 RPA, *see* Declaration of Anthony Nigro at ¶ 58 (describing this issue). The FPC also provided estimates of the proportion of fish destined for transport for 2008-2012 for hatchery and wild juvenile salmonids, including steelhead, and concluded that shifting the start date of transportation to April 21under the 2014 BiOp RPA would subject a much larger proportion of the migrant yearling Chinook and steelhead populations to transportation operations. *See* FPC, Memorandum from Jerry McCann to Tom Lorz (July 10, 2013).

85. Significantly decreasing the number of fish migrating in-river would also cause a corresponding increase in predation rates on juvenile fish migrating in-river. Olney SJ Dec. at ¶ 72. The ISAB 2008-5 reached a similar conclusion where avian or fish predators are taking a fixed number in a certain time period (type 1 predation), ". . . the more fish are barged the worse the in-river migrating fish do and the better barging looks." ISAB 2008-5 at 35. In contrast to

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[2] This information comes from a March 24, 2015 Memorandum from The Fish Passage Center in response to my data request (attached as Exhibit 1) (posted on the FPC website at http://www.fpc.org/documents/memos/51-15a.pdf). Table G.9 is a comparison of the 2014 estimate of the proportion of Snake River basin smolt population in Lower Granite Dam forebay that are "destined for transportation" and the corresponding estimates from 2005 to 2013. For yearling Chinook, steelhead, and sockeye the results exclude transport at McNary Dam. Hatchery and Wild (W) estimates are provided. These were data, except the 2014 estimate, that were available to NOAA when they prepared the 2014 BiOp.

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the ISAB's statement, Mr. Graves says that increasing transport rates by an average of 5-10 percent (a number that does not reflect the range of transport proportions for wild steelhead presented in Table 3.3.4 of the 2014 BiOp, recent data as explained above, and the fact that it is based only on wild fish) would be unlikely to substantially affect observed in-river survival rates, and that survival rates do not seem to be strongly influenced by the transport rates in the range of transportation rates that have been observed since 2008. Graves SJ Dec. at ¶ 78.

86. In the 2014 BiOp, in contrast to Mr. Graves views in his paragraph 78, NOAA refers to uncertainty about the degree to which removing various fractions of juveniles from the river for transportation would have affected predation rates on juvenile fish remaining in the river, 2014 BiOp at 369, and characterizes this as an "important variable," *id*., along with system configuration changes occurring simultaneously, which complicated any retrospective analysis of how the 2008 BiOp operation would have performed relative to actual operation. Mr. Graves' statement that increasing transport rates by 5-10 percent (which appears to be a very low estimate of the increase based on ranges for wild steelhead in Table 3.3.4 and following full implementation of configuration changes, and does not take hatchery fish into consideration) "are *unlikely* to substantially affect observed survival rates," Graves SJ Dec. at ¶ 78, either reflects an analysis he has done that resolves the uncertainty about an "important variable" NOAA identifies (a variable about the degree to which removing various fractions of juveniles from the river affects predation rates) or reflects data not available in the 2014 BiOp.

87. Mr. Graves also says that survival rates do not seem to be strongly influenced by the transport rates in the ranges that have been observed since 2008, but implies they probably were in 2001, 2004 and 2005 when only a few migrants were left to migrate through the lower river. Graves SJ Dec. at ¶ 78. To provide perspective on his observations, the transport rates in 2001, 2004, and 2005 were 98.6%, 96.4%, and 94%, respectively. In one of my prior declarations, I reviewed Roby et al. (2008) which attributed part of the decline in bird predation rates on Snake River steelhead—from 34.7% in 2004 to only 4.9% in 2007—to the small number of fish left to migrate in-river in 2004 compared to the much higher number left to migrate in-

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river in 2007. *See* Olney 2008 SJ Dec. at ¶ 118. This conclusion was based on comparing one year, 2004, when less than 4% of the steelhead were left to migrate in-river (with corresponding high predation rates) to 2007 when, according to the FPC, the proportion destined for transport was 43.7% for wild steelhead and 47% for hatchery steelhead, or 53-56% destined for migrating in-river. Depending on the relationship between predation rates over a wide range of transportation rates, these data, which showed a relatively large reduction in predation rates (from 34.7% to 4.9%) could indicate that relatively small changes in transportation rates may significantly affect predation rates. Without a careful and reliable analysis of this relationship, which (as noted above) NOAA has not been able to perform and which Mr. Graves does not provide, Mr. Graves' statement that transport rates do not "strongly influence" survival rates appears to lack any relevant context, especially in light of the statement in the 2014 BiOp that this relationship is an "important variable" in evaluating juvenile survival. Transport rates in the ranges observed since 2008 could well influence in-river survival rates less than in the extreme years of 2001, 2004, and 2005 but still be significant and an "important variable."

88. Elsewhere, NOAA says that the success of in-river juvenile fish survival during 2008-2013 is proof that Snake River steelhead survival past eight dams greatly exceeds the improvements it predicted would be needed by 2018. Juvenile reach survival estimates for wild yearling Snake River steelhead ranged from about 42% to 57% between 2008 and 2013, about double the average survival rates estimated in the 2008 BiOp for the Base Period (26.5%), and higher than both predicted survival rates for the Base-to-Current adjustment (range 3.3% to 56.9%, mean of 33.1%) and those for the Current-to-Prospective adjustment (range of 4.0 to 64.4%, mean of 38.5%). At the same time, the 2014 RPA proposes to transport substantially more fish than were transported between 2008 and 2013, which as the ISAB 2008-5 has said, could have the result that "the more fish barged the worse the in-river migrating fish do and the better barging looks." ISAB 2008-5 at 31. NOAA is thus proposing a change (increase) in transport rates when they are uncertain about, and have not analyzed, the effect that this "important variable" will have on the in-river survival rates that they point to as evidence of

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success. Among other unaddressed issues in this choice, as I explained in my prior declaration, it is likely that transporting significantly more fish would increase predation rates on juvenile fish migrating in-river and reduce in-river survival rates as compared to those observed under recent operations.

89. In paragraphs 60-68 of his summary judgment declaration, Dr. Christopher Toole addresses a point I discussed in paragraphs 62-65 of my prior declaration. In the paragraphs below, I describe my initial observations from 2008 in order to place Dr. Toole's most recent comments in context and then discuss in more detail Dr. Toole's statements.

90. In my 2008 summary judgment declaration at paragraph 93, I quote a statement from NOAA in the 2008 BiOp as follows: "Populations for which R/S is expected to be greater than 1.0 generally have estimates that are considerably greater than 1.0 (mean approximately 1.20). By providing additional benefits to stronger populations, the Prospective Actions help offset problems with poorly performing populations, supporting the viability of the DPS as a whole." I noted in paragraph 94 of my declaration at that time that the mean R/S for all 16 of the B-run populations after Prospective Actions were implemented was 0.9975, i.e., the weakest component of the DPS. I further stated in paragraph 95 that, given NOAA's statement that strong populations can offset weaker ones, it appears that NOAA's overall no-jeopardy finding for the steelhead DPS is based on at least an implicit assumption that the performance of the weaker B-run populations can be offset by the stronger A-run populations. I pointed out in the same paragraph that this implicit assumption was not consistent with NOAA's analysis which assesses the status of the aggregate A-run and B-run populations separately and with how they treat B-run steelhead in the harvest consultations where their impacts are not offset by the stronger A-run populations.

91. In paragraph 65 of my most recent declaration, I said that NOAA had not addressed in the 2014 BiOp the implications of continuing to rely on the 2008 BiOp's use of aggregate dam count data for the individual Snake River steelhead populations, or describe risks that may be associated with continued use of these data, or consider any alternative approaches.

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In paragraph 63, I said that there are no Extended Base Period estimates for the various jeopardy metrics for these populations, yet NOAA states "all new estimates are within the 2008 BiOp's 95% confidence limits." In paragraph 64, I explained that the 2014 BiOp does not discuss how this limitation on calculating metrics affects projected survival benefits assigned to individual Snake River steelhead populations. And at paragraph 65, I said one of the risks of continuing to rely on 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. I went on to say that, 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 of habitat actions much more difficult and less reliable.

92. In his most recent declaration, Dr. Toole responds to the points I made in my paragraph 65 by saying "I don't believe that this uncertainty can accurately be evaluated at this time." Declaration of Dr. Christopher Toole at ¶ 64 (hereinafter "Toole SJ Dec."). He then describes two approaches to provide a range of perspectives on this uncertainty but indicates both have shortcomings that make them inappropriate for anything other than illustrative purposes and that both approaches do not appear or seem reasonable. *Id*. at ¶¶ 65-67. In his paragraph 68, Dr. Toole says "In summary, Mr. Olney's concerns about the new steelhead information affecting tributary habitat quality index estimates are unfounded because those estimates do not rely on the information that has changed."

93. Dr. Toole's comments focus quite narrowly on how my concerns affect the estimation of *habitat quality improvements* (HQI) in the 2008 and 2014 BiOps. I agree with his statement that the HQI estimates are developed by expert panels. He does not mention, however, that these HQI estimates are converted to survival improvement estimates by the action agencies. I also agree, as Dr. Toole says in his paragraph 63, that there is no way the classification of a population as A-run, B-run or some new as-yet unnamed category would have any effect on the

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estimation of HQIs by the expert panels.

94. These points, however, are not relevant to the risk I described in paragraph 65 of my declaration regarding continuing to rely on uncertain aggregate dam count data when evaluating the change in survival of individual populations in response to tributary habitat measures (e.g., HQIs estimated by the expert panels and then converted to survival benefits by the action agencies) or other RPA actions. The lack of any valid population data will make assessing the survival increases that are supposed to result from various habitat actions much more difficult and less reliable. The RPA and NOAA's analysis rely on monitoring, and the ability to make future adjustments if actions being implemented do not increase survival as predicted, to support the conclusion that the survival benefits of these actions are reasonably certain to occur in the face of uncertainty over the accuracy of the estimated benefits.

95. To make these adjustments, information on the survival response of individual populations is necessary, but NOAA cannot reliably do this for Snake River B-run steelhead, the weakest component of the DPS, at this time. As Dr. Toole points out, relying on Base Period productivity estimates for the three populations in the Snake River steelhead DPS that do have empirical information sufficient to calculate their abundance and productivity, to represent the remainder of the populations, does not appear reasonable. Toole SJ Dec. at ¶ 64. And as he also says, an alternative relying on the aggregate returns of Snake River steelhead to Lower Granite (not separated by A-run and B-run) also does not seem reasonable. *Id*.

96. NOAA's ability to detect the effectiveness of habitat actions aimed at increasing Snake River steelhead survival, in terms of population response and survival changes is, therefore, even more uncertain than for other species. Their reliance on being able to do this to make future adjustments for steelhead is even more uncertain. The 2014 BiOp does not describe or discuss this increased uncertainty as a result of its prior methods now being acknowledged as invalid. Verifying that survival benefits to stronger populations have offset problems with poorly performing populations—which they relied on in their 2008 BiOp analysis—to support their conclusions about the performance of the DPS as a whole, will be difficult, or nearly

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impossible, without the kind of population specific data they currently lack.

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 3rd day of April, 2015, at Woodland, Washington.

FREDERICK E. OLNEY

Earthjustice
705 Second Ave., Suite 203
Seattle, WA 98104-1711
(206) 343-7340

EXHIBIT 1

FISH PASSAGE CENTER

847 NE 19th Ave., Suite 250, Portland, OR 97232
Phone: (503) 833-3906 Fax: (503) 232-1259
http://www.fpc.org/
e-mail fpcstaff@fpc.org

MEMORANDUM

TO: Fred Olney

FROM: Michele DeHart

DATE: March 24, 2015

RE: *Transportation Proportion Table* prepared for the Draft FPC Annual Report

The following table is from the Fish Passage Center Draft Annual Report (presently being developed) and was revised upon our own review. The revision was required because 2014 was the first year in which all smolt transportation sites started transporting smolts on the same day, rather than the staggered start dates of previous years in which the start of transportation was staggered with the earliest start date at the upstream site (Lower Granite) and the latest start date at the most downstream site (Lower Monumental). In 2014 all sites began transporting at the same date which means that fish that may have been bypassed at Lower Granite would be susceptible to being transported at the downstream sites. Therefore, we revised the method for calculating the "destined for transport" proportions. The previous approach assumed fish passing LGR prior to transport would not be subject to transport at downstream dams. That was appropriate for past years' operations but not for the new operation in 2014. The new method accounts for fish bypassed at one dam and then later transported at downstream dams.

Table G.9. Comparison of the 2014 estimate of the proportion of Snake River Basin smolt population in Lower Granite Dam forebay that are "destined for transportation" and the corresponding estimates from 2005 to 2013. For yearling Chinook, steelhead, and sockeye the results exclude transport at McNary Dam. Hatchery (H) and Wild (W) estimates are provided.

Species/ age group	Transport Proportion									
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
Yearling Chinook	0.39 (H) 0.30 (W)	0.37 (H) 0.38 (W)	0.20 (H) 0.20 (W)	0.42 (H) 0.40 (W)	0.24 (H) 0.40 (W)	0.36 (H) 0.40 (W)	0.493 (H) 0.488 (W)	0.242 (H) 0.168 (W)	0.611 (H) 0.579 (W)	0.92
Steelhead	0.31 (H) 0.46 (W)	0.32 (H) 0.48 (W)	0.24 (H) 0.28 (W)	0.36 (H) 0.48 (W)	0.39 (H) 0.42 (W)	0.46 (H) 0.48 (W)	0.41 (H) 0. 447 (W)	0.47 (H) 0. 437 (W)	0.76 (H) 0. 793 (W)	0.94
Subyearling Chinook	0.47 (H) 0.42 (W)	0.30 (H) 0.61 (W)	0.41 (H) 0.41 (W)	0.46 (H) 0.42 (W)	0.56 (H) 0.49 (W)	0.511 (H) 0.448 (W)	0.581 (H) 0.463 (W)	0.357 (H) 0.358 (W)	0.521 (H) 0. 562 (W)	0.809
Sockeye	0.38	0.58	0.61	0.395	0.33	0.654	0.62	0.532	0.592	0.859