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UNITED STATES DISTRICT COURT
DISTRICT OF OREGON

NATIONAL WILDLIFE FEDERATION, *et al.*

Civil No. 01-640-RE

Plaintiffs,

v.

2008 REPLY DECLARATION OF
KIM W. KRATZ, Ph.D.

NATIONAL MARINE FISHERIES
SERVICE, *et al.*

Defendants.

I, Kim W. Kratz, declare and state as follows:

1. On October 24, 2008, I provided a declaration in this litigation in support of the National Marine Fisheries Service's (NMFS' hereafter NOAA Fisheries' or NOAA's) 2008 Biological Opinion (BiOp) for the Federal Columbia River Power System (FCRPS) (NOAA AR A1, hereafter NOAA BiOp). There I described my qualifications and experience. I also explained certain technical issues concerning salmonid habitat mitigation actions for Columbia River tributaries and estuary that were evaluated in NOAA's BiOp. The issues I discussed in that declaration were raised in declarations prepared for the plaintiffs NWF and the State of Oregon by Mr. Frederick Olney, Mr. Edward Bowles and Dr. Jack Williams.

2. I have reviewed a second round of reply declarations filed by Mr. Olney, Mr. Bowles and Dr. Williams and now provide this declaration to respond to further comments and criticisms raised in their reply declarations.

3. This declaration is also based on information provided by and analyses prepared by NOAA staff in the Habitat Conservation Division and the Salmon Recovery Division. The purpose of this declaration is to address technical issues concerning the effects on listed salmonids of the offsite mitigation program for tributary and estuarine habitat required by the 2008 FCRPS Biological Opinion.

TRIBUTARY HABITAT ISSUES
Benefits From Habitat Mitigation Program

4. Dr. Williams erroneously states that in my previous declaration I repeatedly confirm "that the survival improvements from tributary habitat actions relied on in the 2008 BiOp for the period from 2007 through 2017...are not based on an analysis of specific habitat actions but on a commitment to achieve a particular percentage improvement in habitat quality from habitat actions within the next ten years." Williams Reply Declaration at ¶ 7. Mr. Bowles also raises this point in his reply declaration, ¶ 90. The RPA clearly describes how the benefits

from habitat actions form the basis of the Action agencies survival improvement commitments.

Implementation of the tributary habitat RPA actions are differentiated into two time periods,

2007-2009 (RPA 34) and 2010-2018 (RPA 35). “During 2007 to 2009, the Action Agencies will:

- Implement specific projects identified in Attachment B.2.2-2 (the 2007 to 2009 Fish and Wildlife Program decision and the expanded projects for 2008 and 2009) to address key limiting factors for populations with the highest biological need” (NOAA AR B.091, 2-26).

5. The referenced attachment identifies six tables of specific tributary habitat projects that will be implemented from 2007 through 2009. The tables identify projects by BPA project number, average annual planning budget and project description. Depending on the type of project, descriptions provide specific detail on the action and location. For example, the “UPA Wenatchee Passage Program will replace 9 barrier culverts in Alder Creek, Clear Creek and Beaver Creek with fish-friendly structures to provide 4.0 miles of spawning and rearing habitat for ESA listed Upper Columbia steelhead.” (NOAA AR.089, Appendix B, Attachment B.2.2-2, Table 1-a.).

6. Habitat quality improvement estimates for priority populations (NOAA AR.089, 2-37, table 2-8) for the 2007 to 2009 period were estimated based on implementation of those specific projects. The estimated changes to survival resulting from tributary habitat actions 2007 – 2009 (NOAA BiOp, Appendix 1, RPA Table of Actions, Table 5, pp. 44-46.) were based on those specific projects. Therefore, in contrast to Dr. Williams' assertion, the estimated survival improvements from tributary habitat actions implemented between 2007 and 2009 are demonstrably based on an analysis of the change in habitat quality that is estimated to result from specific habitat actions.

7. The Action Agency survival commitments for the 2010 – 2018 period were based on the same methodology that was used to estimate 2007 – 2009 project benefits even though the actions to be implemented during this later period were not as discretely defined. Tributary

habitat survival commitments made by the Action Agencies between 2010 and 2018 were based on potential changes in habitat quality from non-specific actions drawn from completed and developing recovery plans. Estimated survival improvements were based on an empirically driven model that described our current understanding of the relationship between habitat limiting factors and lifestage specific salmonid survival. That model, which will be refined annually (RPA 35), assumes that a given increase in habitat quality will equate to a corresponding increase in survival for that lifestage. To establish context for these actions, expert panels identified actions listed in completed and developing recovery plans and estimated the change in habitat quality that would result if those actions were implemented. The Collaboration Habitat Workgroup (CHW) then converted that change in habitat quality into change in survival. In that context, where the upper estimate of survival was based on the potential from actions listed in recovery plans, commitments to achieve a particular improvement in survival through changes in habitat quality are feasible and transparent. (e.g., NOAA AR C241, C274)

8. Dr. Williams correctly identifies that the Action agency commitments are not simply limited to satisfying specific funding caps but instead to achieve the stated habitat-based survival commitments. As described above, the estimated benefit of the Action Agencies habitat program was based on the benefit accrued from habitat projects to be implemented from 2007 – 2018. This habitat-based benefit conformed to the methods NOAA Fisheries used to detail how the Prospective Actions were likely to affect the thirteen listed species of salmon and steelhead. As described in the NOAA BiOp’s Chapter 7 (NOAA AR A.01), that analysis included whether the prospective actions met the *survival prong* of the jeopardy standard; and whether there was an adequate potential for recovery. Consequently, NOAA Fisheries based its assessment of the Action Agencies habitat program on achievement of the biological benefits in terms of survival and recovery. Hence, the estimates of change in habitat quality resulting from project

implementation were converted into estimates of change in survival. As a result, the RPA necessarily defines the Action Agency commitments in terms of biological benefit. See AR B.092 at C-1-17 to C-1-30 (Annex 2 to Tributary Habitat Appendix).

9. Dr. Williams raises the issue of the uncertainty and risk associated with the survival benefits that were estimated by the habitat approach. (Williams Dec at ¶¶ 8 and 9) Dr. Williams' concerns do not appear to be focused on whether the habitat program will result in habitat and biological benefits, but focus on his speculation whether these benefits can be precisely identified and the risk that they will be unattainable. Dr. Williams confirms, see *infra* at ¶9, that the “2008 BiOp appears to attempt to address this risk by relying on the commitment to achieve a particular percentage survival increase, rather than the projected increases themselves, coupled with a process that calls on the action agencies to identify additional and substitute projects as necessary to achieve this commitment.” I responded to similar concerns on uncertainty and described how the BiOp considered that uncertainty in my previous declaration at ¶¶12-24.

10. Dr. Williams erroneously states that I confirmed in my previous declaration that projections of increases in survival are based on qualitative evaluations. See Williams Declaration at ¶ 9. Although Dr. Williams is correct that improvements in habitat quality were estimated by biologists familiar with local conditions¹, the conversion of habitat improvement to survival increase was completed by the Action agencies using the approach described in the *Approach To Estimating Survival Benefits Of Habitat Actions* (B0092 Annex 2 Attachment C1). The empirical basis of, and assumptions underlying, the approach that was developed and applied to convert habitat improvement into survival is clearly described: “the Habitat

¹ Footnote 2 on p. C-1-9 to the Comprehensive Analysis [NOAA AR B.0092] describes the expertise of the local biologists enlisted in these efforts as “employed by sovereign tribes and State and Federal agencies and were intimately familiar with the biological and physical status and needs of anadromous fish as well as the salient details entailed in subbasin and recovery planning processes for the salmon and steelhead populations they addressed.”

Workgroup began by exploring existing lifecycle models in search of common relationships that could be used to guide professional judgment. Examination of relationships in EDT was difficult, because of the complexities of the model. The workgroup found no simple functions in EDT that could be used to guide professional judgment. On the other hand, the Shiraz model (Scheuerell et al. 2006) and work by McHugh et al. (2004) were more transparent and provided analytical relationships between habitat attributes and survival. These models included relationships for temperature, fine sediment (embeddedness), flows, and cover (cobble and wood) for different juvenile life stages and for pre-spawning adults.” (*id.* p. C-1-20.)

11. Dr. Williams, at ¶¶ 10-12, takes issue with the habitat monitoring requirements of the RPA, stating that “there appears to be little, if any, effectiveness monitoring required for the habitat actions by the 2008 RPA”. This is not true. As I stated in my first declaration, RPA Actions 35 and 57 describe mechanisms for project implementation review, model refinement, and empirical studies that will be used to confirm that habitat improvements are being implemented as expected and that estimates of the associated survival improvements are consistent with the commitments in the Biological Opinion. Dr. Williams confirms that “an implementation and effectiveness monitoring program also likely would be very expensive. In addition, there is evidence that designing and implementing a rigorous effectiveness monitoring program to detect changes in salmon survival from habitat projects may be quite challenging.” See *infra* ¶12. Not all Tributary Habitat Actions can be monitored for physical (habitat) and biological effectiveness, nor can the effects of actions be measured for all populations. The RPA recognizes that cost-effective, but rigorous, analytical tools are needed to assess the potential effects of habitat actions on population productivity across the many populations that will be treated with habitat actions. Analytical tools range from the simple (professional-judgment-guided model of the Remand’s Collaboration Habitat Workgroup) to the very complex

(Ecosystem Diagnosis and Treatment Model). The ultimate objective required by RPA actions 35 and 57 is to refine existing models through the integration of new empirical data into a transparent model that can be applied across different landscapes and populations, and provides reliable results.

12. The RPA's habitat effectiveness monitoring requirements were developed in consideration of the objective of effectiveness and accountability. The RPA requires the Action agencies to implement pilot study research in select basins (Wenatchee, Methow and Entiat river basins in the Upper Columbia River, the Lemhi and South Fork Salmon river basins, and the John Day River Basin) to quantify the relationships between habitat conditions and fish productivity (limiting factors) to improve the development and parameterization of models used in the planning and implementation of future habitat projects. The RPA requires implementation of habitat status and trend monitoring as a component of the pilot studies in the Wenatchee, Methow and Entiat river basins in the Upper Columbia River, the Lemhi and South Fork Salmon river basins, and the John Day River Basin to determine the effectiveness of habitat actions implemented to address limiting factors. Action effectiveness studies will be implemented to evaluate the effectiveness of specific actions implemented to address factors limiting salmon viability. For example, studies will be implemented in the Entiat River Basin to study treatments to improve channel complexity and fish productivity. Similarly studies in the Lemhi River Basin will be implemented to study treatments to reduce entrainment and provide better fish passage flow conditions. Action effectiveness studies in Bridge Creek of the John Day River Basin will be implemented to study treatments of channel incision and its effects on passage, channel complexity, and consequentially fish productivity. Project and watershed level assessments of habitat, habitat restoration and fish productivity will be implemented in the Wenatchee, Methow and John Day basins. Finally, research and monitoring results from these studies will be

integrated within existing and newly developed habitat relationships and models. The underpinnings of NOAA's approach to habitat effectiveness monitoring in the RPA are addressed in the FCRPS Biological Assessment (NOAA AR B.0092, B.2.6-3-4).

13. Dr. Williams identifies in ¶ 12 issues with NOAA's habitat approach that were identified in a paper prepared by the NWF plaintiffs and submitted to NOAA in the Fall of 2006 prior to the completion of the final methodology (See AR C340). Specifically, Dr. Williams argues that the habitat approach was deficient in (1) the need for transparency and clear documentation of the names, qualifications, and expertise of the specific individuals responsible for analytical inputs and methods; (2) the linear habitat relationship used in the approach; and, (3) the potentially misleading way in which hypothesized habitat benefits are aggregated across multiple assessment units for many of the individual populations.

14. With respect to the first issue, the names of those individuals participating in the Collaboration Habitat Workgroup are listed in NOAA's Administrative Record for each meeting (i.e., NOAA AR C.123, C.145). I previously discussed the general criteria used to solicit participation in the local technical panels charged with assessment habitat (See Kratz Declaration at ¶ 6 citing NOAA AR B.92 at C-1-9). Attendance sheets were kept for every meeting by USBR and/or BPA. For example, see attendance sheets for the Idaho meeting attendance see e-mail from Vince Kozakiewicz to Kim Kratz dated 12/08/2006 in NOAA's Supplemental AR Package e-mail file S.2.1. Additionally Nez Perce Tribal biologists supplemented the original tables for populations in their area of expertise such as Little Salmon, Clearwater, South Fork Salmon after the internet accessible GoToMeeting. The following emails demonstrate the extent of the effort to use the best available information from the local biologists. (*Id.* Email threads between Emmit Taylor, NPT, and Vince Kozakiewicz, NOAA, dated 4/4/2007-4/20/07, between Heidi McRoberts, NPT, and Vince Kozakiewicz, NOAA, dated 9/13/06-12/5/06, between Jennifer

Boie, NPT, and Vince Kozakiewicz, NOAA, dated 11/21/06, between Kent Werlin, NPT, and Vince Kozakiewicz, NOAA, dated 10/27/06- 11/30/06, between Rebecca Lloyd, NPT, and Vince Kozakiewicz, NOAA, dated 8/22/06-11/16/06, from Ruth Wooding, Sawtooth NRA, to Vince Kozakiewicz, NOAA, dated 11/13/06, between Janet Hole, ID Soil Conservation Commission, and Vince Kozakiewicz, NOAA, dated 11/15/06-11/21/06.

15. With respect to the second issue, the linear habitat relationship, the rationale for the development and application of the relationship is fully treated in the *Approach To Estimating Survival Benefits Of Habitat Actions* (NOAA AR B92 Annex 2 Attachment C1, see also NOAA AR C340 at 8-10 and NOAA AR C262 page 1 of 52). Finally with respect to the final issue, Dr. Williams highlights the potentially misleading way in which hypothesized habitat benefits are aggregated across multiple assessment units for many of the individual populations (See Williams Declaration at ¶ 15), he does not identify what was misleading about the way that NOAA aggregated habitat benefits. I do not think NOAA's approach was misleading.

16. In ¶¶16-19, Dr. Williams uses the Pahsimeroi River population of Snake River spring/summer Chinook as an example to discuss his concerns on the habitat approach. Dr. Williams does not dispute the benefits that would accrue from the proposed action in the Pahsimeroi, only the potential that actions will be implemented. The RPA assumes that the actions will occur but Action 35 permits the Action agencies to adaptively manage implementation and substitute actions of equal survival benefit if a proposed project is unfeasible. Dr. Williams reported that Trout Unlimited was forced to return project funds and walk away when they were unable to implement their action. In contrast, the Action Agencies, as federal agencies working with other federal agencies and other state and tribal sovereigns have broader recourse and resources to pursue and secure replacement actions to achieve equal survival benefits. The fact that Trout Unlimited chose to abandon their projects does not mean

projects in this tributary cannot be completed. I gave an illustration of the benefits of sovereign collaboration in my previous declaration, ¶¶ 20-22.

17. Dr. Williams makes the point that a multiplier less than 1.41 is equally consistent with the information provided in the Pahsimeroi example (See Williams Declaration at ¶ 19). However, it should be noted, it could also be higher. Of all the populations looked at in Budy and Schaller (2007) (NOAA AR B.51) the Pahsimeroi showed the highest potential for improvement. Our analysis is in line with theirs. In fact the “potential” for the Pahsimeroi is much higher than 41%. The greater potential means there is room to achieve the 41% increase in survival specified by the NOAA RPA. The attachment to Dr. Williams declaration identifies specific additional projects within the “categories of actions” used to estimate this “potential” developed earlier with local input that could be implemented, if necessary.

18. Mr. Bowles (Bowles Dec ¶ 92) states “. . . there is no record in the Biological Opinion that spatial relation was taken into consideration.” In fact, NOAA looked at potential impacts on Spatial Structure (SS) and Diversity (D) as defined by the Interior Columbia Technical Recovery Team (TRT). We evaluated action for benefits if the actions could reduce spatial structure and diversity risk using the ICTRT methodology. For example, the Pahsimeroi Chinook CHW table (the attachment to Dr. Williams declaration; another version in AR CO274 p. 83 of 117), Columns 14a-16 illustrate the impact to the population’s spatial structure and diversity. In this example SS changing from M-L (Medium-Low) and H-L (High-Low) for the two assessment units, but the overall Life History effect did not change since it was influenced by the influence of hatchery fish. Although the Proposed Action did not affect either SS or Diversity because no actions were proposed in the upper Assessment Unit, the NOAA did evaluate the effect of actions on the spatial structure of populations where the ICTRT had completed population viability analyses.

19. Mr. Bowles, (Bowles Dec ¶ 93) continues to advance the conclusions of the paper by Budy and Schaller (NOAA AR B.51, page 16) that a strategy that relies largely on tributary restoration to mitigate for known mortality imposed at other life stages (e.g., migration through hydropower dams) is risky, with a low probability of success. I have reached a different conclusion than Mr. Bowles. The RPA actions implementing habitat actions (RPA actions 34-37) are intended to ensure a high probability of success. These RPA actions are structured to improve habitat and increase population survival through implementation of restoration actions identified in developing or completed recovery plans for salmon and steelhead. The goal of a recovery plan is to increase the viability of each population in an ESU to the extent that the ESU can be delisted from the ESA. The ESA requires that recovery plans must contain a description of site-specific management actions necessary to achieve the plan's goal for the conservation and survival of the species. The Action agencies have committed to habitat quality improvement and population survival improvements for priority populations that are within the maximum identified potential. The RPA Actions governing habitat actions contain the following provisions to maximize the effectiveness of the habitat mitigation strategy 1) specific survival improvement commitments to be achieved through implementation of habitat projects, 2) requirements for replacement actions of equal benefit if initial projects prove infeasible, and 3) for accelerated project implementation if performance does not meet expectations at periodic Comprehensive RPA Evaluation reports.

20. Mr. Bowles is correct when he points out in ¶ 94 that the high improvement potential that Budy and Schaller associated with the Lostine, East Fork Salmon, and Valley Creek are inconsistent with the lower improvement potential identified by the CHW. However, the reason for the contrasting estimates is simple; NOAA did not attribute habitat or survival improvements for actions on federal land which comprised more than 90% of the area occupied

by these populations. Populations like the East Fork Salmon and Valley Creek inhabit substantial areas of federal ownership. Linda Ulmer, representing the Forest Service and the Bureau of Land Management made it clear that those agencies were not in a position to commit specific habitat actions for evaluation in the FCRPS BiOp remand process. (See Comments on pages 9-11 of attachment filename “April 3_031406draft” attached to an e-mail from Linda Ulmer, USFS, to David Devine, NOAA, RE: Draft Status Report dated April 14, 2006 in NOAA AR Email Package C.2.1, Filename: 2005-10-07_to_2006-05-31.pdf). Therefore, the apparent inconsistency in survival improvement potential for these populations that Mr. Bowles references is the result of potential from actions on Federal lands managed by the US Forest Service and the BLM not being considered whereas federal lands were included in the assessment reported in the Budy and Schaller paper.

21. It is important to remember that the Action Agencies and the NOAA RPA focused habitat improvement actions toward areas where populations were determined to have recruits per spawner (R/S) less than 1.0, therefore in need of survival improvement. Populations exhibiting $R/S > 1.0$, like the Lostine River, East Fork Salmon River, and Valley Creek populations received less focus. In cases like these, the potential gains from habitat may be much higher than the commitments made by the Action agencies, such as here were federal lands included, but the full potential need not be evaluated because the populations already had a $R/S > 1$.

22. Mr. Bowles points out in ¶ 94 that the low improvement potential that Budy and Schaller associated with the Yankee Fork, Catherine Creek, and Tucannon are inconsistent with the higher improvement potential identified by the CHW. However, Budy and Schaller only considered “physical factors associated with stream degradation that influence components of temperature and substrate...whereas there are other factors associated with land and stream use

that may reduce fish survival...[such as] effects of water diversions...” For example, the Yankee Fork is degraded from historical condition from past dredge and other mining activities. *See, e.g., S.31. See also, BR057055, Catherine Creek (developed from original draft(GR chinook + specific actions.xls) from local workgroup attached to email from Kim Kratz to Merlin Smith, dated 5/4/2007, 9:37:40 A.M. in 2007-03-29 to 2007-08-14.pdf), and BR057070, Tucannon. The commitment by the action agencies considers actions outside of those evaluated by Budy and Schaller and fall within the improvement potential calculated in collaboration with the local biologists.*

Estuary Habitat Issues

Estuary Module is Appropriate as a Basis to Develop Survival Benefits

23. Mr. Olney (Olney Reply Dec. at ¶¶37, 38) indicates that he pointed out that the estuary module acknowledged several limitations with establishing the 20% survival improvement target, including that the target was inherently subjective, that the survival improvements should not be considered to represent actual numbers of surviving fish, and that survival improvement numbers were for illustration only. Mr. Olney also noted that the ISAB, in their review of the module, indicated among other concerns that the module did not meet ISAB standards as a scientific document. The ISAB characterized the limiting factors used to develop the 20% target as “potential limiting factors,” and said the survival improvement target should be viewed as a planning tool only. NOAA does not disagree that the 20% survival improvement target was developed for planning purposes. However, the 20% figure and survival improvement numbers are not as subjective as Mr. Olney implies because it was based on the best professional judgment and best available data. In fact, the 20% survival improvement target in the estuary module has been the subject of considerable scientific discussion by NWFSC, the ISAB and others. To date, no alternatives have been advanced and the target remains a useful framework for characterizing the potential for achieving survival benefits in the estuary. In reference to the

ISAB, NOAA did not ask them to provide a determination of the estuary module meeting the “standards as a scientific document.” While the estuary recovery plan module (AR C931) was never intended to be an empirically-based scientific paper, it is a scientifically-based document that is used to guide recovery actions for ESA-listed salmonids in the Lower Columbia River. It compiled all the best available information on the estuary to date, including review by technical experts and developed a set of management actions with targets.

24. Mr. Olney (Olney Reply Dec. ¶¶ 38-39) recognizes the value of the module as a recovery planning guide but opines that it is not a proper basis for developing specific survival estimates. The application of module in developing the survival improvement targets for the BiOp is described in the AR S.47. The Action Agencies used the best available science to develop the attachment D-1 and to translate the information from the estuary module into estimated survival benefits of ocean-type and stream type fish. The estuary module represents the best available information and current thinking on this subject, and the Action Agencies and NOAA continue to rely on it.

Technical Expertise Used in the Development of Attachment D-1 to Appendix D of the CA.

25. In his reply declaration (Olney Reply Dec. ¶ 38), Mr. Olney states that no outside experts had reviewed the survival estimates developed in Attachment D-1 to Appendix D of the CA, which is where the survival estimates for the CA that were used in the 2008 BiOp were developed. While outside experts did not review attachment D-1, the methodology was based on the estuary module, which was developed using technical experts familiar with the ecology of the Lower Columbia River estuary and all of the relevant scientific information. The draft module was available for full public review and comment as was the Action Agencies’ BA and CA which included the estuary benefits. Technical experts involved in the review and development of the estuary module include NOAA’s NWFSC, regional NOAA staff, Lower

Columbia River Estuary Partnership staff, Lower Columbia Fish Recovery Board staff, various topic experts, and the ISAB. Future evaluation of survival benefits for federal projects will utilize an expert regional technical group and refined habitat survival models as described in RPA Actions 36 and 37.

Survival Benefit Numbers of 9.5% and 5.7% are Valid and Not Overly Optimistic.

26. Mr. Olney makes a number of criticisms of the 9.0% and 5.7% estimated survival benefits in the BiOp. First, he takes issue with my discussion of the Northwest Fisheries Science Center's review of the estuary habitat project benefits (AR C.688) (Olney Reply Dec. at ¶ 40). He attempts to make the case that based on AR C.688, that the 9.0% and 5.7% estimated survival benefits in the BiOp are too large and overstate the project benefits in the BiOp and that Dr. Kratz misunderstands NWFSC's review. He discusses the number of projects (21 versus 35) used to calculate survival benefits, the numbers of years (2000-2006 to the 2007-2018) used to develop the survival benefit numbers, and how the survival benefit numbers in the BiOp versus this memo were developed.

27. In response to Mr. Olney, it is important to understand the differences between the NWFSC approach and the one developed by the Action Agencies. The NWFSC calculated the mean survival benefits of projects implemented from 2000-06 and extrapolated the number of projects that might need to be implemented to achieve the stated survival benefits in the BiOp. Most importantly, the BiOp did not estimate numbers of projects to be implemented. In contrast, the approach employed in the BiOp used the entire suite of 2007 – 09 federal projects to estimate future years (2010 – 2018). This suite of projects was used because earlier projects from 2000 – 06 were in developmental years for the estuary restoration program and do not reflect the full present/proposed funding levels. As a result, the 2007-09 projects reflects a base-level of funding and habitat projects that represented preferred restoration techniques and the preferred type,

value, and ecological function of areas to be restored. Thus, future projects to be selected via RPA 37 will be based on improved habitat selection criteria and strategies, increased scientific scrutiny, and proven technologies and methods. It is expected that these projects will continue to improve over projects resulting from the 2000-06 estuary baseline.

28. Second, Mr. Olney (Olney Reply Dec. ¶¶ 41, 42, 43, 50) continues to question the estimated benefits of estuary habitat projects and the number of projects needed to meet the estuary survival benefits anticipated in the BiOp. According to Mr. Olney, his recalculation of survival benefits based on five projects suggests that many more projects than planned would have to be implemented to achieve the stated survival improvements. The apparent difference between the number of projects anticipated and the number of projects Mr. Olney asserts are needed to achieve the Action Agency commitment to survival benefits is not addressed in the 2008 BiOp or its supporting documents. The five projects Mr. Olney references were representative of one year of funding. It is anticipated that in future years, an equivalent level of funding may bring more or less projects, but it is the quality of the project rather than the quantity of projects that should produce desired results. Mr. Olney misunderstands the estimated survival improvement for projects to be implemented 2007 – 09 in the BiOp that was based upon a mix of known projects (14, including projects labeled “project 1 through 5”) and two years of implementing CRE-8.1 and 8.3 (Pile Structure Removal). BPA also committed to funding additional projects within this time period (assuming the same resources required to fund projects 1 – 5, plus an additional 33% of this amount). The Corps also proposed to fund additional projects which are expected to provide benefits equivalent to the survival benefits of projects 1 – 5 for three years. The survival benefits associated with this entire portfolio of 2007-09 projects are the basis for future estimates of survival benefits between the years 2010–18. In terms of the number of projects, there is general consensus with NOAA and the Action Agencies

that fewer, larger projects which will enhance the value and function of estuarine habitats important to ESA-listed salmonids will be more valuable for ensuring functioning habitat systems than by implementing many smaller, projects that may not be physically connected to one another or performing similar habitat functions. As stated above, the BiOp did not establish a specific number of projects or funding levels; instead, the BiOp uses projects proposed to be implemented in 2007-09 as a basis for establishing future survival benefits. RPA 37 will implement additional measures to ensure that actions implemented over the 10 years of the BiOp will produce survival benefits consistent with the commitments identified in the BiOp.

29. Third, Mr. Olney (Olney Reply Dec. ¶¶ 41, 48) asserts that the calculation of survival benefits is wrong because of the “extrapolation” used from 2007-2009 to 2010-12, 2013-15, and 2016-18. Mr. Olney misunderstands the estimate of survival benefits that relate to the Pile Structure Program in future years. Mr. Olney misses the fact that the adjustment he references relates to “3 years of program implementation in each of the three 2010-18 time periods compared to 2 years of program implementation in FY 2007-09.” His error is that this adjustment is only for CRE-8 Piling and Pile Dike Removal program. The adjustment occurred because implementation of CRE-8 in the 2007-09 time period only related to two (2) years because it is a new program with implementation just beginning during 2007-09. However, in the period 2010-12, there are three potential years of implementation and the survival benefits were adjusted by adding one additional year.

30. Mr. Olney also asserts (Olney Reply Dec. ¶ 49) that as project 8.1 in the estuary module (piling and pile dike inventory, test and demonstration project) transitions in 2010-18 to a piling and pile dike removal effort (CRE 8.2), the result is that three times the total possible survival units (2.4), in addition to the value for the completed project (0.8), are added in error to

the survival estimates. Mr. Olney argues that this amounts to an over-estimate of 7% of the ocean- and 11% of the stream-type survival benefits projected for 2010-17.

31. Mr. Olney does not understand how survival benefits were assigned for these future time periods. Beginning with the 2010-12 time period, CRE-8.2 was substituted for CRE-8.1 because CRE-8.1 was established as a demonstration project in the estuary module while CRE-8.2 was the actual implementation project. CRE-8.1 was assigned .82 survival units for two years of the 2007-09 period of implementation while CRE-8.2 (plus CRE-8.3 monitoring) was estimated to provide 1.82 survival units per three-year period (2010-12, 2013-15, and 2016-18). This increase was justified by the assumption that survival benefits would increase in 2010 after benefitting from the lessons learned after the implementation of the CRE-8.1 demonstration projects and the addition of one more year of implementation per time period. Mr. Olney is wrong, no double counting occurred in the substitution of CRE-8.2 for CRE-8.1.

32. Fourth, Olney (Olney Reply Dec. ¶ 43) indicates that “the total ocean- and stream-type survival benefits of 9.0% and 5.7% exceeded the total possible benefits from the sub-actions used to derive the survival benefits from 2007-17, which I estimated would be 5.6% and 2.8% using the methods NOAA describes, and even exceeded the maximum total benefits of 8.6% and 4.9% which I estimated if one were to assume that all possible estuary habitat module actions and sub-actions were fully implemented.” Mr. Olney (Olney Reply Dec. ¶ 44) and Mr. Bowles (Bowles Reply Dec. ¶ 84) also attempt to make the case that even if CRE 8.2 (Remove Priority Pilings and Pile Dikes) was included their estimates only increased to 6.8% for ocean and 4.0% for stream-type life histories (from 5.6% and 2.8%) which is still considerably lower than the 9.0% and 5.7% estimates derived by the consultant and employed as the basis for the estuary survival benefits adjustment in the 2008 BiOp.

33. Mr. Olney and Mr. Bowles do not understand the assumption for assigning survival benefits in the future periods of 2010–18. They are confused because these estimates exceed the total estuary module survival benefits relative to the five pertinent module actions. The five estuary module actions identified in the BiOp (CRE-1, CRE-8, CRE-9, CRE-10, and CRE-15) were only selected because they could be directly associated with the federal projects previously implemented by the Action Agencies in 2000–06 and 2007–09. It is anticipated that other actions from the estuary module, or even actions not yet anticipated in the estuary module, will be selected based on input from expert panels (RPA 37) and implemented between 2010 and 2018.

34. Further, Mr. Olney’s and Mr. Bowles’ comments also erroneously assume that Action Agencies are limited to past implementation practices rather than opportunities that exist in the future due to program advancements informed through adaptive management. Based on RPA action 37, survival benefits will be assigned to future projects as they are identified using the expert regional technical group and feedback from on-going research, monitoring and evaluation efforts. In the event that habitat based survival improvement were significantly overstated, the Action Agencies will implement replacement projects to provide habitat improvements sufficient to achieve the ESU/DPS-specific survival benefit estimated for each affected project.

The September 4, 2007, Memo from the NWFSC (AR C.0680) Resulted in a More Comprehensive Set of RPA Actions

35. Mr. Olney summarizes (Olney Reply Dec. ¶ 51) several additional concerns that he states Dr. Varanasi raised about the survival benefit estimates in her September 4, 2007, memorandum (AR C.0680). In the memo, the NWFSC identified, that the total amount of habitat proposed (number of acres) to be restored was not specified so they could not determine the relative magnitude of the effort. However, the BiOp did not identify the totality of habitat

restoration projects to be implemented. The BiOp did identify the process to collect this information in the reporting requirements for RPAs 36 and 37 so that the magnitude of effort could be determined and tracked through annual and comprehensive RPA reporting requirements. The NWFSC comment stated the 20% improvement target from the Columbia River Estuary Recovery Plan Module was not an empirically derived estimate of the improvement needed to recover salmon populations. This is correct, however the mitigation associated with the BiOp is not intended to achieve complete recovery of salmonid populations, but to ensure adequate potential for recovery. Third, the NWFSC also stated that “additional quantitative analyses will likely be required to determine the level of habitat restoration needed to achieve a specified level of benefits.” In fact, Action RPA 37 builds upon this statement to ensure the collection of appropriate metrics needed to refine habitat survival models and enhance our ability to establish survival improvements. Fourth, the NWFSC questions whether the 6% and 10% targets for increased survival will significantly improve the status of salmon and steelhead populations in the Basin. However, that is not the appropriate standard with which to measure the estuary habitat program. Instead, the estuary habitat program should be measured against its effectiveness in achieving the mitigation requirements of the BiOp. Finally, the NWFSC also raises a valid concern regarding identifying habitat restoration projects that are sufficiently distributed throughout the lower Columbia River estuary to allow salmon life history diversity to be expressed and to improve survival. However, at the time of review only a subset of estuary program projects were identified so the ultimate distribution of projects implemented through the year 2018 was not discernable. The estuary module references eight reaches (A-H) in the lower Columbia River. These reaches were developed in collaboration with LCREP, the Action Agencies, and NOAA. Since we are implementing the BiOp in conjunction with the estuary module, it is NOAA’s intent to work with the Action Agencies via implementation of

RPA 37 to ensure selected projects are appropriately distributed throughout the lower Columbia River.

36. Mr. Bowles (¶ 83) asserts that the BiOp does not provide sufficient documentation of how benefits were assigned to understand how the benefits of habitat projects were determined. He also feels that the adjustments actually given appear overly optimistic and inconsistent with the Estuary Module. The assignment of survival benefits to federal projects was based upon the ecosystem criteria developed by regional experts to evaluate the technical merits of the project and the level of certainty that those benefits would be realized. Based upon the ecosystem criteria evaluation, the number of acres restored, and the relative importance of the project to specific estuary module actions, a discrete assignment of survival units was assigned to each project. Simply put, the process for assigning estimated survival benefits is documented in the document *Estimated Benefits of the Federal Agency Habitat Projects in the Lower Columbia River Estuary* (Appendix D, Attachment D-1 of the CA [AR S.47]). The document is based on the estuary module. The estuary module builds on the most recent available science for the estuary and is quantitative as is possible given the region's understanding of the ecological relationships in the estuary. As part of BiOp implementation, an expert regional technical group will integrate emerging information to refine our understanding and enhance the rigor of our analysis.

Costs and Funding of Estuary Projects in the BiOp are Reasonable

37. Mr. Bowles (Reply Dec. ¶85 and Mr. Olney (Reply Dec. ¶ 47) believe there is an inconsistency between the Estuary Module and the Biological Opinion's estimates of costs and survival benefits for habitat actions. For example, Mr. Bowles states that the estuary module cost estimates far exceed the funding effort identified in the BiOp. Similarly, after evaluating the cost of the estuary module's 23 actions, Mr. Olney's concluded that the estuary module estimates far

exceed the funding effort identified in the BiOp. Unfortunately, Mr. Bowles and Mr. Olney arrived at their conclusions because they failed to consider the difference in scale between the estuary module and the BiOp. The estuary module identifies costs for 23 broad-scale actions; these costs can be considered ‘level of effort’ costs that were informed by the past implementation of projects and projections of what may be possible to implement in the future. On the other hand, the BiOp costs were developed using the specific costs of projects within discrete time periods (e.g., 2000-06 and 2007-09) and projecting those program costs forward into the 2010-18 time periods. Regardless, NOAA Fisheries analysis of the estuary actions focused on biological improvements and was not based on the amount of the associated costs to secure those improvements.

Protection/Restoration Projects in the BiOp

38. Mr. Olney (¶¶¶ 45, 52, 54) and Mr. Bowles (Bowles Reply Dec. ¶¶¶ 63,88,89) assert that a significant portion of the survival benefits NOAA uses in its analysis are attributed to estuary module actions and sub-actions that would protect existing habitat. In their opinion, protecting the quality of existing habitat may help maintain existing baseline conditions but do not actually improve estuary conditions or that maintain existing conditions does not add to or increase current salmon survival rates.

39. There are a total of 12 acquisition projects identified in the 2000-06 and 2007-09 time periods in the BiOp. Ten of these projects have an associated or future active restoration component as part of the project. The purchase of land for protection and subsequent active or passive restoration represents an important challenge to restoring habitat in the estuary (and elsewhere). Because restoration actions often must be targeted to a specific geographic location in the estuary, often acquisition is an important aspect of significant projects. If land acquisition is required for restoration work, it becomes a phase of the restoration project no different than

restoration planning, design, implementation, and monitoring. The appropriate mix of restoration versus protection projects and the type of restoration projects implemented in the future will depend upon specific project proposals, estuary priorities, opportunities, and information learned from research, monitoring, and evaluation. This is the essence of RPA 37 of the BiOp. In the event that acquisition projects can be related to current or future active restoration work or passive return to improved function, in which the acquisition aspect of the project is crucial to the pending restoration component, the assignment of survival benefits may be appropriate. My statement (Kratz Dec. at ¶ 30) was also not intended to address the “base-to-current survival adjustment” as has been purported by Mr. Bowles (¶87) and Mr. Olney (¶ 54). The statement was made to indicate that there is some value to acquiring habitat protection projects, especially when coupled with restoration projects or passive restoration which facilitates the achievement of improved ecological functions upon which salmonids depend. Passive restoration means the acquired habitat is retired from development and subject to improvement by natural processes without active human intervention. Outside of wilderness areas, it cannot be expected that habitat acquisition projects will not ultimately be accompanied by either active or passive restoration efforts to improve habitat condition of the acquired habitat, thereby reducing the adverse effect of those factors which currently limit salmonid viability. In this context, I reiterate the statement in my previous declaration that habitat acquisition, including where active restoration is not planned, adds increased survival benefits by arresting and, through active or natural processes, improve an otherwise declining baseline so that by the end of the RPA’s 10 year implementation protected and improved habitat will provide benefits that would otherwise not have been achieved because of the value of passive restoration. Ultimately, the capacity of future habitat actions to improve survival will be determined in consideration of the assessment by technical experts adhering to the review and selection process identified in RPA 36 and 37.

40. Mr. Olney (Olney Reply Dec. ¶ 55) asserts that, “The methodology in Appendix D, Attachment D-1 of the CA, which describes the approach used in the 2008 BiOp to estimate habitat improvement and survival benefits, would have to be changed significantly in order to give more weight to restoration benefits to achieve what Dr. Kratz is asserting could occur.” My assertion about survival benefits accruing from restoration projects is based on the methodology in Appendix D.

41. Mr. Olney (Olney Reply Dec. ¶ 56) further addresses his concerns with the treatment of habitat protection actions and how he perceives they are considered in the BiOp. Mr. Olney refers to a NWFSC memorandum (AR Doc. C680), indicating that Dr. Varanasi the memo author, needed data on the numbers of acres restored, not acres protected, in order to judge the relative magnitude of the proposed restoration effort. Mr. Olney asserts that I did not specifically address this factor in my September 7, 2007, memorandum. AR Doc. 688. In fact, Dr. Varanasi in her September 4, 2007, memorandum (AR C.0680) highlights the point that the number of acres restored is an important metric required to track action implementation and refine relationships with salmon survival. In response, the BiOp, RPA 36 and 37, specifically requires the tracking and reporting of restored acres as a performance metric.

Integrated Pest Management Projects.

42. Mr. Olney indicates (Olney Reply Dec. ¶ 46) that: “There was an Integrated Pest Management project in the baseline projects list for 2000-06 which the estuary module assigned low survival units as a result of the uncertainty of ecological-type projects. CA, Appendix D, Attachment D-1, Table 3. He notes that no noxious weed projects made it into the projects planned for implementation from FY 2007-09.

43. Mr. Olney correctly states that no noxious weed management projects were implemented in FY 2007-09. However, since the approach taken in the BiOp relies on


prioritizing actions based, in part, on estimated survival improvement, this type of low benefit action would not be a priority to implement in FY2007-09. Mr. Olney is simply confirming that the BiOp's approach to identify and prioritize projects and areas is adaptive and responsive to iterative analyses based on new information on the relationship between type of actions, habitat quality, and salmonid survival.

The BiOp Provides the Necessary Requirements and Safeguards for Project Selection, Monitoring, and Reporting.

44. Mr. Olney (Olney Reply Dec. ¶ 57) summarizes his declaration by asserting that NOAA's estuary habitat analysis in the BiOp fails to address uncertainties, relevant factors, and includes the omissions and errors that do not appear to provide an appropriately rational or cautious and conservative basis for identifying a commitment that can be realistically achieved. I disagree with Mr. Olney's summation. RPA 36 specifically directs the Action Agencies to fund and implement habitat restoration projects, and provide replacement habitat projects as needed. RPA 37 specifically establishes a process for project selection and the use of new information to refine survival benefit estimates. RPA 38 specifically describes implementation of the piling and pile dike removal program. The RPA also includes specific reporting requirements on progress, and in RPA 37, use of research monitoring and evaluation to estimate the change in overall estuary habitat and change in population survival. There are two important points to remember to consider regarding the estuary portion of the BiOp. First, the Action Agencies have committed to achieving the 9.5% and 5.7% survival improvement. Achieving those survival commitments is assured through appropriate mechanisms for review and revision based on tracking monitoring and evaluation. The Action Agencies incorporated the major relevant factors (i.e., threats and limiting factors) affecting estuary restoration into the development of survival improvement estimates through reliance on NOAA's estuary module (Appendix D, Attachment D-1 of the CA [AR S.47]). Second, the approach in the BiOp is a conservative one which requires two levels of

expert technical review for project selection, requires replacement projects should implementation prove infeasible, and stipulates accelerated implementation if anticipated survival improvements are not achieved (RPA Actions 36, 37). We have provided sufficient rationale and regulatory safeguards in our BiOp via our RPA actions for the estuary (36, 37, and 38)

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 16, 2008, in Portland, Oregon.



Kim W. Kratz