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UNITED STATES DISTRICT COURT
DISTRICT OF OREGON

NATIONAL WILDLIFE FEDERATION, *et al.*	Civil No. 01-640-RE
v.	2008 DECLARATION OF ROBERT P. JONES Jr., NMFS,
NOAA, NORTHWEST REG. NATIONAL MARINE FISHERIES SERVICE, *et al.* Defendants.	

I, Robert P. Jones Jr. declare and state as follows:

INTRODUCTION

1. I have trained and worked in the field of fisheries science and management, with special emphasis on salmon and steelhead of the Pacific Northwest since 1971.

2. I currently oversee Recovery Planning and hatchery and harvest compliance under the Federal Endangered Species Act (ESA) for the National Marine Fisheries Service (NMFS) in the states of Idaho, Washington, and Oregon. In this capacity, I was the primary contact for addressing hatchery issues during preparation of 2008 FCRPS BiOp.

3. Between 2000 and 2008, I was the Chief of Hatcheries and Inland Fisheries and my primary responsibility was to ensure that hatchery and fisheries management in Idaho, Washington, and Oregon is based on best available science and complies with the Federal ESA.

4. Between 1986 until 2000, my primary duties with the National Marine Fisheries Service included evaluating best available science leading to ESA listing determinations for Snake River sockeye salmon and fall Chinook, and spring Chinook salmon and lower Columbia River coho salmon.

5. In 1992 I co-authored the NMFS policy, Pacific Salmon and the Role of Artificial Propagation under the Federal Endangered Species Act.

6. I hold a Masters of Science in Fisheries Science (1994) and a Bachelor of Science in Fisheries Management (1978) from the University of Washington.

7. In this declaration, I address how hatchery programs were treated in the FCRPS Biological Opinion (Bi-Op). These programs are mitigation for the construction and operation of the FCRPS. My declaration refers to the Supplemental Comprehensive Analysis (SCA), which provides an inventory of hatchery programs and summarizes the best available science for assessing and operating hatchery programs. I also discuss the Bi-Op, which contains a Programmatic Hatchery Action intended to ensure that hatchery programs funded by the FCRPS Action Agencies as mitigation for the FCRPS are not impeding recovery of salmon ESUs and steelhead DPSs as well as a requirement to implement specific actions that preserve and rebuild genetic resources, reduce short-term extinction risk and promote recovery.

8. In preparing this declaration I have reviewed the following documents: the SCA, FCRPS Bi-Op, S.75 and S.76 (April 9, 2007 email to Jeff Stier) (Attachment 1), Berejikian and Ford, 2004, Araki et al. 2006 and 2007, and the declarations of Williams, Olney, and Bowles.

NMFS' Programmatic Assessment of Continued Hatchery Funding

9. The Programmatic Hatchery Action consists of two parts; 1) the adoption of programmatic criteria for funding decisions on FCPRS hatcheries that incorporate Best Management Practices (BMPs), and 2) the site specific application of BMPs in ESA Section 7, Section 10, or Section 4(d) consultations with NOAA Fisheries. The Action Agencies' fund more than 100 hatchery programs in the Columbia Basin. These programs are operated as mitigation for the construction and for the continued operation of the FCRPS. More recently, new hatchery programs or changes in existing programs have been implemented to enhance ESA-listed anadromous fish. RPA 39 states that the Action Agencies intend to continue funding hatcheries and to apply programmatic criteria to that funding, requiring recipients to adopt BMPs in their operations. There is no universal strategy or one-size-fits-all set of prescriptive "best management practices;" instead, Appendix C of the SCA identifies hatchery reform principles on which BMPs should be based at the site-specific level. Some examples of these principles include managing hatchery broodstock to improve hatchery-origin fish reproductive success rates in nature; reducing or phasing-out hatchery supplementation as viability of the target population improves and the need for supplementation declines; isolating hatchery-origin fish from interactions with natural populations that are not the target of hatchery supplementation; acclimating hatchery fish to the watershed to improve homing and reduce straying; conducting monitoring to track program performance and to facilitate

adjustments in hatchery operations etc.

10. National Wildlife Federation and declarants Mr. Williams and Mr. Olney question whether NMFS' final biological opinion assigned benefits to any species from the programmatic funding of hatcheries by the Action Agencies and the hatchery reform program that is expected to follow (Programmatic Hatchery Action), identified in the opinion as RPA 39. The answer is that no quantitative benefits were assigned at this stage to any species as a result of the commitment to continue funding and to implement BMPs in the future. NMFS will not know what actual quantifiable effects the adoption of BMPs may have on listed ESUs or steelhead DPSs until RPA 39 is implemented at each hatchery program and we can analyze the resulting program changes in site-specific ESA section 7 consultations.

11. As discussed in the next section below, quantitative affects were calculated for hatchery reform actions that already have been implemented. NMFS determined that the specific actions required in RPAs 40, 41 and 42 would result in changes in abundance, productivity, spatial structure, or diversity. However, these changes are distinct from the Programmatic Hatchery Action in RPA 39.

12. NMFS is confident that the Programmatic Hatchery Action will increase the likelihood of the survival and recovery of affected ESUs and steelhead DPSs.

To that end, the Bi-Op did qualitatively analyze the effects of such a program, concluding only that the continued funding of these hatcheries and broad adoption of BMPs was likely to produce beneficial effects. Again, ascertaining those benefits (and any other effects) in more detail will be done through site-specific analysis. RPA 39 establishes a schedule for implementing BMPs and conducting the necessary consultations

NOAA's Quantitative Assessment of Hatchery Improvements.

13. There are two categories of actions to which NMFS did assign benefits to species in its final biological opinion: recent hatchery management changes in the basin, and requirements to implement specific hatchery reforms and safety-net and conservation programs that protect against extinction and that are identified in RPAs 40, 41 and 42. Regarding the first category, several recent changes in the management of hatchery programs in the Columbia River Basin required NMFS to assess changes to the average base period productivity due to either a reduction of hatchery fish on the spawning grounds of affected populations, or significant past management changes that would be expected – based on the scientific literature – to result in a change in the reproductive fitness of naturally spawning hatchery-origin fish relative to naturally spawning natural-origin fish. As a result of these changes, NMFS estimated a base-to-current survival multiplier for hatchery actions for several populations. This multiplier, and the effects to affected populations, is explained in its broad application to all actions in the Bi-

Op at pages 7-8 to 7-12 and in its specific application to hatchery actions in the next section entitled "NMFS' Survival Multiplier for Recent Changes to Hatchery Program Management".

14. In the second category, NMFS assigned qualitative benefits to a list of actions pursuant to RPAs 40, 41 and 42. RPA 40 calls for specific management actions at the Tucannon, Touchet River and Winthrop hatchery programs and for review of the John Day mitigation program. RPA 41 concerns the action agencies' funding of "safety net" hatchery programs designed to benefit fish populations at high risk of extinction. RPA 42 consists of a range of conservation actions designed to preserve and rebuild genetic resources.

<u>NMFS' Survival Multiplier for Recent Changes to Hatchery Program Management</u>

15. National Wildlife Federation has raised some questions concerning how the effects of specific hatchery management changes were accounted for in the base-to-current multiplier. The following explains in greater detail how the effects of these changes in hatchery management were accounted for in certain species.

16. First, a general description of this method and a restatement of the rationale for its use is probably in order. These points can be found in the Quantitative Hatchery Methods Appendix to the SCA at pages 13 *et seq*.

17. The Bi-Op’s analysis generally uses estimates of productivity, trend and population growth rate for a defined base period – generally the salmon brood years approximately 1980-1999. Here I focus on recruit-per-spawner productivity (expressed as geomean R/S), since this is the metric used for the purposes of the comparison in this methodology.

18. In the Bi-Op’s analysis, future population performance is projected from the pattern of past performance, unless something affecting the survival or reproduction of the population changes (SCA at 7-11). As indicated by the Interior Columbia Technical Recovery Team (ICTRT 2007), some factors that affect population performance have continued to change during the base period, and if the current management actions continue into the future, the projected biological performance will be different from that predicted from the base period patterns alone. In this instance, certain significant hatchery reforms were identified that would be expected to change the measured productivity of the naturally-spawning population relative to the average productivity during the base period.

19. This analytic method was used to assess productivity changes resulting from two classes of hatchery management actions that were deemed significant enough to result in almost immediate effects on overall population productivity. These were actions that significantly changed broodstock management, for

instance by switching from a non-local or highly domesticated broodstock to a locally derived broodstock, and actions that significantly curtailed straying of hatchery-origin spawners into a natural population. This is explained in the Quantitative Hatchery Methods Appendix to the SCA at pages 13 *et seq*. Specific rationales for the populations selected are explained, for example, in the Comprehensive Analysis at 5-16 – 5-17, in the Supplemental Comprehensive Analysis at 8.3-10 for populations in the Grande Ronde/Imnaha Major Population Group of the Snake River spring/summer Chinook salmon ESU, and at FCRPS Bi-Op 8.7-9 – 8.7-13 for Upper Columbia steelhead populations.

20. This method recognizes the ICTRT's method of calculating recruit-per-spawner productivity by including both natural-origin and hatchery-origin naturally spawning fish as "spawners"– but only including natural-origin fish as "recruits", or progeny of the previous generation. Thus the relative productivity – or reproductive effectiveness – of the hatchery-origin natural spawners has a very direct and often significant influence on the measured productivity of the population as a whole (i.e., all natural spawning fish, hatchery-origin and natural-origin combined).

21. The key modeling parameters that must be estimated in order to develop estimates of R/S productivity resulting from these classes of hatchery operational changes are the fraction of natural-origin fish in the total spawning population, or "*f*," and the relative reproductive effectiveness of the hatchery-origin fish that are

spawning naturally, or "*e*." The estimates NMFS used for "*f*" are based either on empirical information or on NMFS' expectation that current management actions will continue into the future. Estimates for "*e*" are based on the scientific literature (Berejekian and Ford 2004 and Araki et al. 2006 and 2007). For example, an "*e*" value of 0.20 indicates that hatchery-origin fish in a given population are only one-fifth as reproductively successful as natural-origin fish in the same population. Employing these factors, we estimated changes in productivity of nine salmon and steelhead populations in the Columbia Basin, described in Tables 1-9 of SCA Appendix I as "integrated productivity increase as a ratio."

Altogether, nine populations were identified that met the "significance" criteria described above. These nine populations are analyzed in Appendix I to the SCA, in Tables 1-9. NMFS has not definitively determined that these are the only populations in the Columbia-Snake basin which could experience measurable changes as a result of already-implemented changes in hatchery practices. However, based on the best available information, these nine populations are the only ones we were able to positively identify that met the criteria for significant management changes and where the projected biological performance will be different from that predicted from the base period patterns.

22. For each of these nine populations, NMFS examined the years that were used as the base period for the Bi-Op's estimates of geomean R/S. In the case of

populations in the Snake River spring/summer Chinook salmon ESU for example, these were brood years 1981-2000. Estimates were developed for present management, expected to continue into the future, and a current and future condition was compared to the average productivity during the base period.

23. I would like to provide some examples of how we calculated these estimates. Existing survey data estimates the percent of natural-origin natural spawners (the *f* factor) among the Upper Grande Ronde population of Snake River spring/summer Chinook salmon (example in Table 1 of the Quantitative Analysis of Hatchery Actions Appendix to the SCA). The *f* value represents the fraction of the naturally-spawning population that is composed of natural-origin fish. Starting in 1979, the *f* value was 1.00, meaning natural-origin fish made up 100 percent of the naturally spawning fish in this population. From 1986 onward, this population began showing the presence of hatchery-origin fish, as much as 99% of the natural spawners (in 1989). The average *f* value for the period 1986 thru 2005 is 0.58, or 58% natural-origin fish among the naturally spawning population. However, future *f* should reflect changing conditions and hatchery practices and for these reasons, NMFS used an *f* value of 0.67. This value more accurately reflects changes in the program, beginning in 1996, to build genetic resources and to promote recovery.

24. In Table 1, from 1979 to 2002 the *e* value, representing the relative reproductive success of hatchery-origin fish spawning naturally is 0.2. In the case

of Upper Grande Ronde Snake River spring/summer Chinook, this low relative rate is based on the fact that during these years the relevant hatchery was using non-local, domesticated broodstock. NMFS refers to this type of broodstock as “Category 1” (Berejikian and Ford, 2004). Based on a review of available studies, NMFS has concluded that Category 1 broodstock has a relative success rate of zero to 30%. Without the benefit of empirical data to show the exact success rate, NMFS has instead adopted an assumption of 20% relative success, or an *e* value of 0.2, as a best reasonable estimate for this category of broodstock. S.75 and S.76 (April 9, 2007 email to Jeff Stier).

25. Starting in 2003, however, an *e* value of 0.45 is more appropriate because of changes at the relevant hatchery. “Supplementation rescue programs were initiated (starting with a captive broodstock phase) to preserve and build the Chinook populations in the upper Grande Ronde in 1996” (April 9, 2007 e-mail to Jeff Stier, S.76). This change is the reason NMFS selected this population, among the nine analyzed in Appendix I of the SCA, based on the criteria described above (i.e., a significant change in broodstock management protocols). Because no additional hatchery management changes are anticipated that would meet our “significance” criteria, NMFS concluded that the future *e* will remain 0.45. This explanation applies equally to the populations examined in Tables 2, 3, 6 and 8. In Table 9, the *e* value is 0.20 throughout the past years, but similar changes in hatchery management made just in the last year means that NMFS can assume a future *e* of 0.45.

26. The explanation differs slightly for the reviews of populations in Tables 4, 5 and 7. In Tables 1, 2, 3, 6, 8 and 9 the hatchery fish experiencing changes were deliberately released into the affected population, whereas in Tables 4, 5, and 7 the hatchery fish included in the populations were strays. Tables 4, 5 and 7, therefore, calculate how changes to hatchery operations make a difference to these populations as a result of straying. By examining Tables 4 and 5, it is obvious that significant straying occurred between 1986 and 1994. This had the effect of reducing measured population productivity during those years and therefore reducing the average productivity observed for the population during the 20 year base period. Straying was almost entirely curtailed beginning in 1995. This would be expected to result in an improvement in the measured productivity of the naturally-spawning population, since the less productive hatchery fish (e=0.20) would no longer be counted as spawners. It would also be expected to lead to longer term improvements in the status of these populations in the future, since the potential negative effects of the hatchery strays have largely been eliminated.

27. Tables 4 and 5 represent the Minam River and Wenaha River Snake River Spring/Summer Chinook, while Table 7 shows the Entiat River UCR steelhead population. For each of these populations, significant numbers of hatchery fish of non-local, domesticated broodstock – fish derived from another ESU in the case of Minam and Wenaha – have strayed into the natural populations. However,

recent changes in hatchery management meant that current strays in Tables 4 and 5 are now derived from local broodstock of the same ESU and Major Population Group (MPG), while the hatchery at issue in Table 7 has been shut down. These changes reduce genetic risks to natural populations, but because they are strays and as such their productivity is still questionable, NMFS conservatively estimated their *e* factor to be 0.20, in recent years as well as in the future.

28. Finally, for the populations analyzed in Tables 7, 8 and 9, NMFS ran two different estimates, a low estimate and a high estimate. In Table 7, NMFS used two different future *f* values. For the low, conservative estimate, we used 0.22, which is the average *f* value from past years. However, because NMFS believes that management changes are likely to result in more significant benefits to the Entiat population, a high estimate was also calculated.[1] Productivity (R/S) for the Entiat population was calculated using both estimates (Table 8.7.6.1-1 of the SCA).

29. In Tables 8 and 9, NMFS ran low and high estimates with the same *f* value but with two different *e* values. In both cases, NMFS used a "future" *e* value of 0.45, as with other populations, because hatchery-origin fish effectiveness may be incrementally increasing over time due to incremental changes in hatchery

[1] Here, the management change is actually the termination of the hatchery program in the Entiat River and the end of any hatchery releases in 1999. After 2003, the only hatchery-origin fish among this population consists of strays (April 9, 2007 email to Jeff Stier, S.76). The changes also include new acclimation ponds in the Wenatchee River, which improves homing and should reduce straying into the Entiat River.

broodstock practices (S.76). However, we also looked at a more conservative estimated future *e* of 0.30.

30. In each of these nine cases, NMFS attempted, based on the best available science, to determine the effects of known, recent changes to hatchery operations affecting populations examined in the Bi-Op. Each case involves uncertainty, but by examining evidence from throughout the region on how broodstock and other management changes affect the productivity of hatchery-origin fish (and therefore the measured productivity of the entire naturally-spawning population), we developed the most reasonable estimates and calculations possible.

<u>Responses to Specific Points Raised by National Wildlife Federation</u>

31. In this section, I will respond to selected statements made by National Wildlife Federation and its declarants.

Olney and Williams Comments on Programmatic Hatchery Action

32. Mr. Olney (¶14) and Mr. Williams (¶26-29) each assert that for UCR steelhead, NMFS' jeopardy analysis improperly considered the effect of future hatchery actions which NMFS asserted would be the subject of later consultations. This is incorrect. As detailed above, only recent changes to hatchery programs are quantitatively analyzed in the Bi-Op. Prospective hatchery

actions, including actions described in RPAs 39, 40, 41 and 42, are expected to "preserve genetic resources" and "accelerate trends toward recovery as limiting factors and threats are addressed and natural productivity increases". "These benefits, however are not relied upon for this consultation pending completion of the future consultations" (SCA at 8.7-27). NMFS qualitatively analyzed the effects of the Programmatic Hatchery Action and concluded that the continued funding of these hatcheries and broad adoption of BMPs was likely to produce beneficial effects. However, no quantitative benefits can be assigned to individual populations as a result of RPA 39 until the action is implemented and site-specific consultations are completed.

33. Mr. Williams (¶ 30-33) states "NOAA's no-jeopardy finding for Snake River spring/summer Chinook appears to rest on consideration of the hatchery prospective actions even though there is no multiplier for these actions in the actual quantitative analysis". As with his assertions regarding UCR steelhead, this is incorrect. Only recent changes that met the criteria for significant management changes and where the projected biological performance will be different from that predicted from the base period patterns were considered for quantitative benefit. Prospective actions pursuant to RPAs 40, 41 and 42 and the programmatic implementation of BMPs at action-agency-funded hatcheries under RPA 39 were only afforded qualitative consideration in the jeopardy analysis. Further, Mr. Williams fails to differentiate between existing safety-net programs

"required to continue under the Prospective Action" versus future site-specific implementation of RPA 39.

34. Mr. Williams (¶ 31) states, "NOAA points to the future operation of the 'Tucannon hatchery supplementation program' as a qualitative factor supporting its conclusion that this population will meet its recovery and survival metrics." This is incorrect.. The Bi-Op states in § 8.3-28, "[i]n the near term, the Tucannon hatchery supplementation program provides a reserve for maintaining diversity, potentially accelerating recovery pending increases in natural productivity. In the longer-term, proportional contributions of [hatchery-origin fish] to natural spawning would have to be reduced to achieve ICTRT diversity criteria". NOAA expects this to be accomplished pursuant to RPA 40.

Williams Comments on the Hatchery Survival Multiplier

35. Mr. Williams (¶39) asserts that "NOAA's quantitative methods are structured in a way that tends to remove from the quantitative analysis any assessment of whether the kinds of integrated hatchery programs that are part of the current hatchery actions will substantially reduce long-term fitness, and thus the likelihood of recovery." The assessment Mr. Williams is asking for does not yet exist. The method Mr. Williams refers to explicitly uses best available information and estimates only the changes in the relative reproductive effectiveness of hatchery-origin spawners. This is a necessary simplifying

assumption and is acknowledged in the Bi-Op's supporting materials and considered qualitatively in the analysis itself. See Quantitative Hatchery Methods Appendix to the SCA at pages 13 *et seq*. It is also an assumption that underlies the alternative lambda calculations in the 2000 BiOp, since only changes in the relative reproductive effectiveness of hatchery-origin spawners are considered in that method. NOAA estimated the productivity of all natural spawners combined in the 2008 Bi-Op (i.e., the combination of hatchery-origin and natural-origin fish that spawn naturally). NOAA did not have absolute estimates of natural-origin fish productivity (i.e., effectiveness) nor did it have any estimates or assessments of hatchery-origin fish effects on natural-origin fish fitness in cases where natural-origin and hatchery-origin fish spawn naturally as part of the same population. Any changes in the fitness of natural-origin fish because of past and continuing interactions between hatchery-origin and natural-origin fish are captured in the baseline. When the effects of major new hatchery actions were not captured in the baseline, new science gave NOAA "*e*" values for hatchery-origin fish and these values were used to calculate base-to-current productivity for the combination of hatchery-origin and natural-origin natural spawners. The Bi-Op requires the action agencies to fund comprehensive new fitness studies (one in the UCR for steelhead and one in the Snake River for fall Chinook) to better understand and estimate the effects of hatchery programs on natural-origin fish productivity.

36. Mr. Williams (¶40) incorrectly asserts that "[t]he specific technical rationales underlying '*e*' or 'future '*e*' values are not fully described." The "*e*" values originate from best available science (Berejikian and Ford 2004; Araki et al. 2006 and 2007) and are described in the SCA, Appendix I, page 18. As discussed above, "*e*" values are based on science which has been significantly updated since the 2000 FCRPS BiOp, which just estimated a high *e* and low *e* to establish a range.

37. Mr. Williams (¶41) incorrectly argues that "NOAA assumes the average productivity of wild spawners will not change and therefore provides little information relevant to potential increases in the productivity of wild spawners within most or all of the nine populations analyzed." Again, the information Mr. Williams is asking for does not yet exist. The Bi-Op requires the action agencies to fund comprehensive new fitness studies (one in the UCR for steelhead and one in the Snake for fall Chinook) to better understand and estimate the effects of hatchery programs on natural-origin fish productivity.

38. Mr. Williams (¶47) argues that "NOAA's base-to-current hatchery adjustments … is [sic] not supported by available scientific evidence…. NOAA's reliance on this assumption has the effect of excluding from the analysis the adverse changes in the fitness of NOF that already have occurred and that will continue to occur in the future because of past and continuing interbreeding with HOF and potential density-dependent or other ecological effects". NOAA

provided a detailed analysis of this issue. Appendix C and D of the SCA explicitly show how gene-flow potentially can affect fitness (benefit or reduce) based on the influence of hatchery-origin fish (i.e., the hatchery fraction of natural spawners). Appendix D also describes how, where and when hatchery-origin fish can affect the viability of natural-origin fish. In addition, there are two specific ways that the Bi-Op deals with changes in the fitness of natural-origin fish ("NOF") as a result of interactions with hatchery-origin fish ("HOF"). First, changes in the fitness of NOF that already have occurred because of past and continuing interactions between HOF and NOF are captured in the baseline. Second, RPA 39 was designed to determine the continuing and future effects (genetic, density-dependent and ecological effects) of the 100+ Action Agency-funded hatchery programs and identify particular issues to be addressed in the site-specific ESA consultations.

39. Mr. Williams (¶ 57, 59) states that "NOAA Fisheries' base-to-current hatchery adjustments for these populations also will be optimistic" "should the productivity of UCR steelhead ultimately prove similar to that of these example populations that have been studied" (i.e., the productivity of natural-origin fish is lower than NMFS assumes). The problem throughout his declaration is that Mr. Williams assumes interbreeding is substantial and that changes in the fitness of natural-origin fish already have occurred and will continue. However, based on NMFS' review of "hatchery information for the period 1936 to present, including the origin, and the number and location of hatchery-origin fish releases," UCR

steelhead interbreeding between hatchery-origin fish and natural-origin fish may be low. S.76 (April 9, 2007 email to Jeff Stier). Mr. Williams provides no documentation or evidence to support his assumption that interbreeding between hatchery-origin fish and natural-origin fish is substantial.

40. Mr. Williams (¶ 60) avers that "NMFS has not provided evidence in the SCA or 2008 BiOp indicating that these programs, or others above 7-8 dams could be maintained at dramatically higher PNI values under current management". Mr. Williams (¶61) further states that "the agency does not discuss why the new integrated hatchery programs… will be able to maintain the 67% natural-origin adult fish on the spawning grounds beyond the first 4-5 years…." NMFS has not established a one-size-fits-all goal for PNI. The average *f* value for the period 1986 thru 2005 is 0.58 (SCA Appendix I, Table 1), or 58% natural-origin fish among the naturally spawning population. However, future *f* should reflect changing conditions and hatchery practices and for these reasons, NMFS used an *f* value of 0.67. This value more accurately reflects changes in the program, beginning in 1996, to build genetic resources and promote the recovery of the Chinook population.

41. Mr. Williams (¶63) argues that, "additional populations also affected by similar hatchery programs are not evaluated by NMFS,". Mr. Williams cites to two examples to demonstrate his point: Wenatchee spring Chinook and Imnaha spring/summer Chinook. However, these populations did not meet the standard

for analysis in SCA Appendix I. The standard for inclusion in this analysis is populations which experienced effects from changes in hatchery management practices that were not captured in the baseline period (1980-1999). For example, the Entiat steelhead program was terminated after 1999 and changes to a local broodstock (starting with a captive broodstock program) in the Grande Ronde system did not have any effect until 2003. In Mr. Williams' examples, broodstock changes in the Wenatchee took effect in 1993 and in 1985 for similar changes in the Imnaha. These changes took affect during the base period and the effects of those changes were already captured in the baseline productivity estimates.

42. Mr. Bowles (¶ 178)_incorrectly states, "the BiOp does not identify or explain the specific hatchery actions that have already been implemented and are expected to produce the large baseline-to-current survival improvements in the Grand Ronde basin." The Bi-Op describes the specific hatchery actions in detail. For example, changing broodstocks from Rapid River spring Chinook that are not part of the ESU (and therefore poses the greatest risk to a locally adapted salmon) will improve the productivity of naturally spawning fish. Bi-Op at 8.3-10. Appendix I of the SCA specifies the two factors leading to improved natural-origin fish productivity: changes in the hatchery-origin fish fraction of natural spawners, and changes in the "*e*" value or fitness value of hatchery-origin fish.