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UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

PORTLAND DIVISION

NATIONAL WILDLIFE FEDERATION, et al.,

Plaintiffs,

v.

NATIONAL MARINE FISHERIES SERVICE, et al.,

Defendants.

Case No.: 3:01-CV-00640-SI

2015 REPLY DECLARATION OF RITCHIE. J. GRAVES, NATIONAL MARINE FISHERIES SERVICE. WEST COAST REGION
In Support of Federal Defendants' Cross-Motion for Summary Judgment

I, Ritchie J. Graves, declare and state as follows:

1. I filed an earlier Declaration on March 4, 2015 (Graves Declaration) on behalf of National Marine Fisheries Service (NMFS). In that Declaration I described my educational background and general work experiences relating to hydropower and water storage projects in the Columbia River Basin; their effects on salmon and steelhead; mitigation and enhancement measures to address these effects; and related research, monitoring, and evaluation activities. I also described my 9 years of experience working for NMFS specifically on the Federal Columbia River Power System (FCRPS) (Graves Declaration ¶¶7-8).

2. In preparation for this declaration, in addition to the information I previously reviewed (Graves Declaration ¶¶1-6), I have reviewed Ms. Kostow's Declaration, Mr. Olney's Second Declaration, and scientific literature they cite, other pertinent documents in NMFS or the Action Agencies' administrative records, and more recent, but related, scientific literature.

3. This declaration includes information provided and analyses prepared by Mr. Gary Fredricks, Mr. Paul Wagner, Mr. William Hevlin, Mr. Trevor Condor, and Mr. Blane Bellerud of my staff. The purpose of this declaration is to address technical issues raised by Ms. Kostow and Mr. Olney concerning: 1) questions and claims regarding the effects of the FCRPS and the efficacy of operations and structural modifications for ESA-listed salmon and steelhead actions required by the 2008 FCRPS biological opinion, and 2010 and 2014 FCRPS Supplemental biological opinions (e.g., latent mortality, flow, spill, transportation, etc.); 2) claims regarding 2008 FCRPS biological opinion performance standards; 3) claims regarding compensatory mortality and the efficacy of required predation management actions; 4) claims about the efficacy of the B-run steelhead kelt reconditioning program; and 5) other related issues raised.

I. EFFECTS OF THE FCRPS (KOSTOW DECLARATION)

Latent Mortality

4. Mr. Nigro (Nigro Declaration ¶¶30-35) suggested a means of assessing latent mortality[1] by comparing the SARs of up-river and down-river stocks. Ms. Kostow (Kostow Declaration ¶¶20-21) opines that I previously argued against Oregon's concerns about latent mortality (Graves Declaration ¶¶20-25). I disagree with this characterization. Neither I, nor NMFS, dispute that some level of latent mortality likely exists (see Nigro Declaration ¶35 citing Williams et al. 2005 and the 2000 FCRPS Biological Opinion). Ms. Kostow herself (Kostow Declaration ¶23) acknowledges this fact. I did, however, point out a number of substantive scientific issues (Graves Declaration ¶¶20-25) that have been raised with the up-river and down-river stock comparison used by Mr. Nigro (see Nigro Declaration ¶¶30-35) to assess the magnitude of latent mortality for Snake River spring/summer Chinook salmon. Mr. Nigro failed to disclose these issues and Ms. Kostow makes no attempt to refute them.

5. In reference to Figure D of her Declaration, Ms. Kostow asserts (Declaration ¶20, Figure D on page 12) that NMFS "must explain why the recent SARs of interior Chinook and steelhead populations are lower than the SARs of all other populations for which we have found SAR data." Ms. Kostow provides insufficient description for me to verify the accuracy, or indeed the year or years, which her Declaration's estimates are supposed to represent. NMFS displayed Lower Granite to Lower Granite SARs (2006-2010 outmigrants) ranging from 0.82 to 2.84% for wild Snake River Chinook salmon and 1.08 to 3.45 for wild steelhead (2014 Supplemental BiOp – Table 3.3-8, page 379). NMFS clearly considered the current status of interior basin Snake and

[1] Williams et al. (2005) defined latent mortality associated with the FCRPS as "any mortality that occurs after fish pass Bonneville Dam as juveniles that would not occur if the FCRPS dams did not exist" (Williams et al. 2005, cited in Nigro Declaration at ¶35).

Columbia River ESUs (including Recruit per Spawner information, which includes SARs) in making its determinations in the 2008 FCRPS Biological Opinion (SCA - Chapters 7 and 8) and 2014 Supplemental Biological Opinion (Section 2.1.1). In addition, the COMPASS model's post-Bonneville module used empirical data to assess the SAR's of fish based on their passage date at the Bonneville Dam tailrace (for both inriver migrants and transported smolts) out to the ocean and back to Lower Granite Dam as adults. In addition, salmon and steelhead SAR's are collected annually to assess the efficacy of transport and inriver survival, consistent with the Adaptive Management and Implementation Plan (AMIP). This information is sufficient for assessing the status and productivity of salmon and steelhead.

6. Ms. Kostow also failed to include recent SARs for upper Columbia River sockeye stocks in Figure D of her Declaration (Kostow Declaration, pg 12). Williams et al. (2014) estimated McNary to Bonneville Dam SARs of Columbia River sockeye stocks from 1985 to 2010. Since 2005, SARs for these stocks have been extremely high – ranging from 6.2 to 23.5%, which are substantially higher than Ms. Kostow reports for Bristol Bay, Alaska, sockeye which is an undammed system. These high SARs for fish migrating past 7 to 9 dams, do not comport with Ms. Kostow's overall theme – that mainstem dams are the primary factor dictating the SAR's of salmon and steelhead from the interior Columbia River - and would suggest that latent mortality, at least for sockeye salmon, was likely not a very substantial factor affecting adult returns in these years. While the hydrosystem has negatively affected salmon and steelhead ESUs and DPSs, these impacts have been substantially reduced through an overhaul of the system. However, the mainstem projects are not the only factor affecting SARs as Ms. Kostow argues.

7. Ms Kostow (Declaration at ¶23) and I agree that "some level of latent mortality exists." Ms. Kostow (and Oregon) obviously believes that the FCRPS, alone, is responsible for decreased

SARs (since the 1960s) whereas NMFS has determined that there are likely other important causative factors (ocean conditions, etc.) (see 2015 Graves Declaration ¶15) . I also disagree with Ms. Kostow's implication that NMFS is not "accounting for the full extent of the adverse effects of the FCRPS" and therefore cannot properly decide "upon the appropriate actions to include in a reasonable and prudent alternative" (Kostow Declaration ¶23). By definition, Recruit per spawner information captures all effects across all life stages. NMFS clearly has considered the effects of the hydrosystem and determined that the Reasonable and Prudent Alternative, as amended through the 2014 Supplemental FCRPS Biological Opinion, sufficiently addresses these impacts to satisfy the requirements of Section 7(a)(2) of the Endangered Species Act.

Flow and Travel Time

8. Ms. Kostow (Declaration ¶26) clarifies why Mr. Nigro's data (Nigro Declaration – Figure 1) terminates in the year 1985. I appreciate the clarification as this graphic could have been construed as a continuing downward trend, which is clearly not the case (Graves Declaration, Figure 1, page 8). However, Ms. Kostow does not clarify the apparent data discrepancies in Mr. Nigro's Figure 1 or otherwise explain why the figure is relevant in light of the flow data and analysis presented in the 2008 FCRPS BiOp (Graves Declaration¶12-13, Figures 1 and 2) .

9. In response to my questioning the logic of Mr. Nigro's use of July flows in his environmental indices (Graves Declaration ¶18 regarding Nigro Declaration ¶11, Figure 5), Ms. Kostow (Declaration ¶27) argues that Mr. Nigro was correct to include July flows in his environmental indices because "historic flows peaked in June with significant flows continuing into August." This in no way addresses the issues I raised with Mr. Nigro's analysis. Ms. Kostow attempts to further justify the use of flow data from the summer months when juvenile Snake River spring/summer Chinook and steelhead are <u>not</u> migrating through references to the ISAB's

recent density dependence report (ISAB 2015-1) about life-history diversity in the estuary. Ms. Kostow is mischaracterizing the ISAB report, which was describing the historical and contemporary presence of all stocks of Chinook salmon in the estuary. The ISAB report does not state, nor does it imply, that Snake River spring/summer Chinook or steelhead historically migrated through the mainstem Snake and Columbia Rivers during the July-August period. Temperatures were historically (1950s, and possible earlier) very high in the lower Snake River (72-78F) in late July and August (Karr et al. 1998; and USDA 1963) which would have curtailed juvenile migration during this period. Similarly, Mains and Smith (1962) trapped juveniles using nets hung from a highway bridge crossing to assess the migration timing of Chinook salmon in the lower Snake River in 1954 and 1955. They clearly demonstrated that the great majority of juvenile Chinook migrated prior to July in these years, noting that "In the Snake River, the seaward migration of chinook salmon was predominantly in the spring and generally corresponded to spring runoff."

10. Ms. Kostow (Declaration ¶28) asserts that Figure 4 in my earlier Declaration (2015 Graves Declaration, page 12) is misleading because it gives the visual impression that survival rates are increasing into the 2000s when in fact binning by two week increments is capturing an in-season survival pattern… not an actual increase in survival. I disagree that it is misleading. Survival rates have improved dramatically for the run at large. Faster migrations in recent years have reduced the numbers of juveniles migrating during the July 1 to July 14 period such that Fish Passage Center no longer makes survival estimates for this time frame. Migrating earlier (essentially joining the June 17-30 bin) has resulted in a demonstrable increase in survival. Juveniles migrating during the June 17 to June 30 period have clearly demonstrated increased survival across this interval of time (Graves Declaration, Figure 4, 2014 Supplemental BiOp,

Section 3.3.3.3). With regard to earlier migrants (May 20 to June 2 bin, or June 3 to June 16 bin), maximum survival rates do not appear to have increased (i.e., survival rates of around 80% did occasionally occur prior to 2004), but the consistency of these survival rates – in spite of variability in flows and other environmental factors – appears to now be consistently high (i.e., 70% to 80% for each bin), exceeding the expected survival rates assessed in the 2008 Biological Opinion (2014 Supplemental FCRPS BiOp, Section 3.3.3.3, pg. 362). The ISAB (2015-1, pg. 96) also noted this effect with respect to Snake River fall Chinook salmon: "Earlier emigration reduces exposure to unfavorable warmer water in the reservoir. Migration timing during the high abundance period is more similar to the migration timing prior to construction of the dams." To summarize, configurational and operational improvements have both increased survival for later migrating subyearling Chinook salmon and sped up their migration, which confers an additional survival benefit because earlier migrating fish tend to survive at higher rates.

11. Figure 4 in my earlier Declaration (2015 Graves Declaration, page 12) demonstrates improvement for Snake River fall Chinook, and Oregon does not respond to the other data demonstrating that the abundance of most ESA-listed species has improved coincident with the overhaul of the FCRPS that began in the 1990s, such as Figure 5 in my prior declaration and other available data (see Exhibit 1, pages 1-3).

12. Ms. Kostow (Declaration ¶29) disputes NMFS' claim that juvenile travel times have improved as a result of operational and configuration changes at the mainstem dams, citing examples in the action Agencies' 2013 Comprehensive Evaluation. NMFS does not dispute that juvenile travel times are slower with 8 dams in place than they were historically (see 2008 SCA, Chapter 5.1.2). However, configurational and operational improvements at the mainstem dams have reduced smolt travel times in recent years (Figure 1 below; Faulkner et al. 2014, Tables 17-

22); and would likely show an even more pronounced improvement compared to the 1980s and early 1990s, before the mainstem dams were overhauled to provide effective passage routes.[2] Moreover, both the Northwest Fisheries Science Center and the Comparative Survival Study, have concluded that installation of surface passage routes at multiple dams has contributed to reduced travel times for migrating juvenile salmon and steelhead (Tuomikoski et al. 2013, page xxiii and Faulkner et al. 2014).

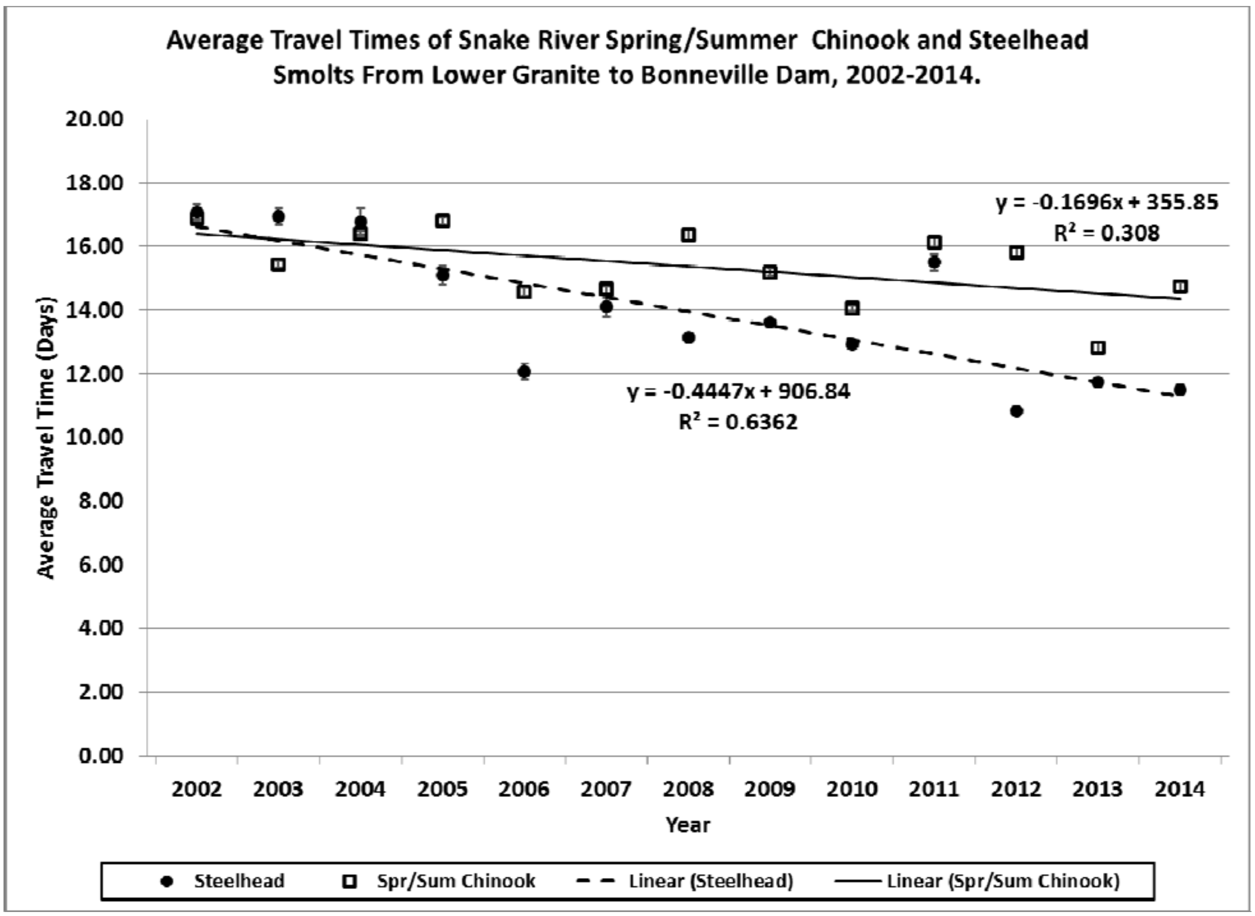

Figure 1. Average Travel Times (and standard errors) of Snake River Spring/Summer Chinook salmon and steelhead smolts from Lower Granite to Bonneville Dam, 2002-2014.
Source: Columbia River DART, accessed April 18, 2015. http://www.cbr.washington.edu/dart/query/esu_tt

[2] PIT tag based travel time estimates are only reported on the Columbia River DART website starting in 2002. PIT tags began to be used system-wide in the early 1990s, but few tagged fish and low detection rates limited their applicability in most mainstem river reaches until the late 1990s or early 2000s (Faulkner, 2014; Zabel 2014).

13. Ms. Kostow focuses solely on average water particle travel times (Kostow Declaration, Figure G), but neglects to display how smolts are actually behaving (Figure 1). It is clear that the average smolt is migrating through the mainstem migration corridor much faster than the average water particle travel time of “18.4 days (since 1968)” presented by Ms. Kostow (Kostow Declaration¶29). Ms. Kostow hypothesizes simply that faster travel times will occur in the highest flow years like 1997 and presumably 2011 (Kostow Declaration ¶29, supported by Figure H). Figure 1 illustrates that fish behavior is more complicated than Ms. Kostow suggests as the average smolt travel times in 2011 were actually higher (about 15-16 days) than in the substantially lower flow years of 2009, 2010, 2012, and 2013 (about 11-15 days) (see Kostow Declaration, Figure G, Panel B).

14. Ms. Kostow (Declaration at ¶30) asserts that water travel time and spill contribute to juvenile fish travel time. I agree. Faster moving water provides migrating juveniles with the opportunity to move more quickly downriver. Spill allows migrating juveniles to more quickly navigate through the forebay and pass through the dam – reducing travel times by several hours per project. However, Ms. Kostow fails to acknowledge that spill and flow measures are part of this RPA [analyzed using the Northwest Fishery Science Center’s COMPASS model]. As noted earlier, Ms. Kostow also fails to acknowledge data that suggests surface passage routes (e.g., spillway weirs, etc.) also have contributed substantially to reduced travel times for juveniles migrating through the mainstem dams (Tuomikoski et al. 2013, page xxiii and Faulkner et al. 2014, pgs 57-58) Lastly, NMFS fully identified the effects of the dams on juvenile travel times in the 2008 FCRPS BiOp (2008 SCA, Chapter 5.1.2) and has directed the Action Agencies to reduce this impact both operationally (by spilling water at the dams) and structurally (by constructing surface passage routes).

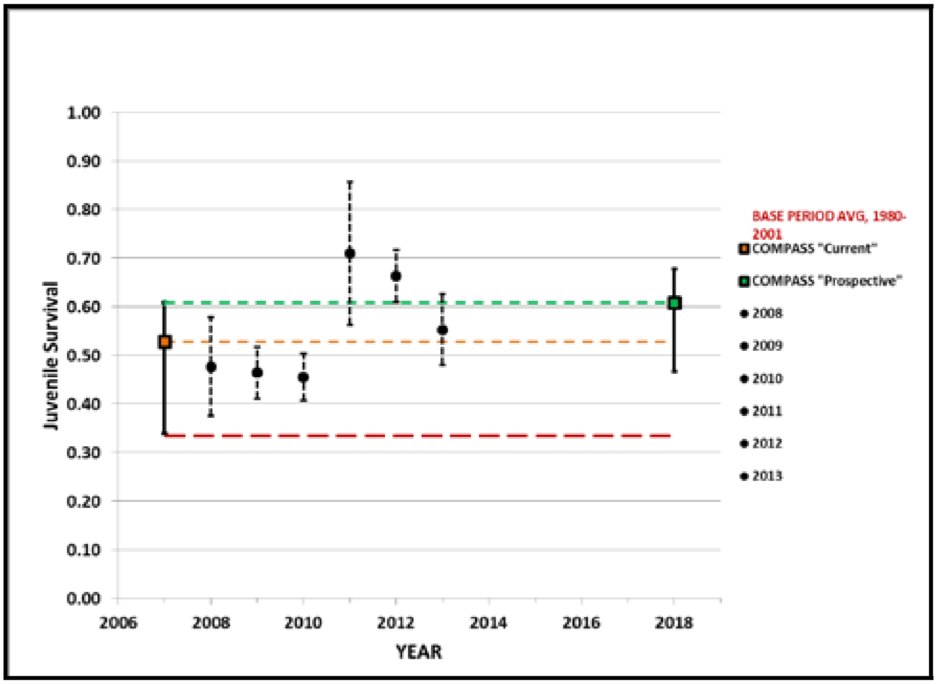

Figure 2a. Lower Granite to Bonneville dam survival estimates (standard error) for wild SR spring/summer Chinook salmon (2008–2013) compared to Base Period (bottom horizontal dashed line), Current (middle horizontal dashed line), and Prospective (top horizontal dashed line) average estimates (ranges are indicated by vertical bars) in the 2008 BiOp. Source: 2014 BiOp, Figure 3.3-2.

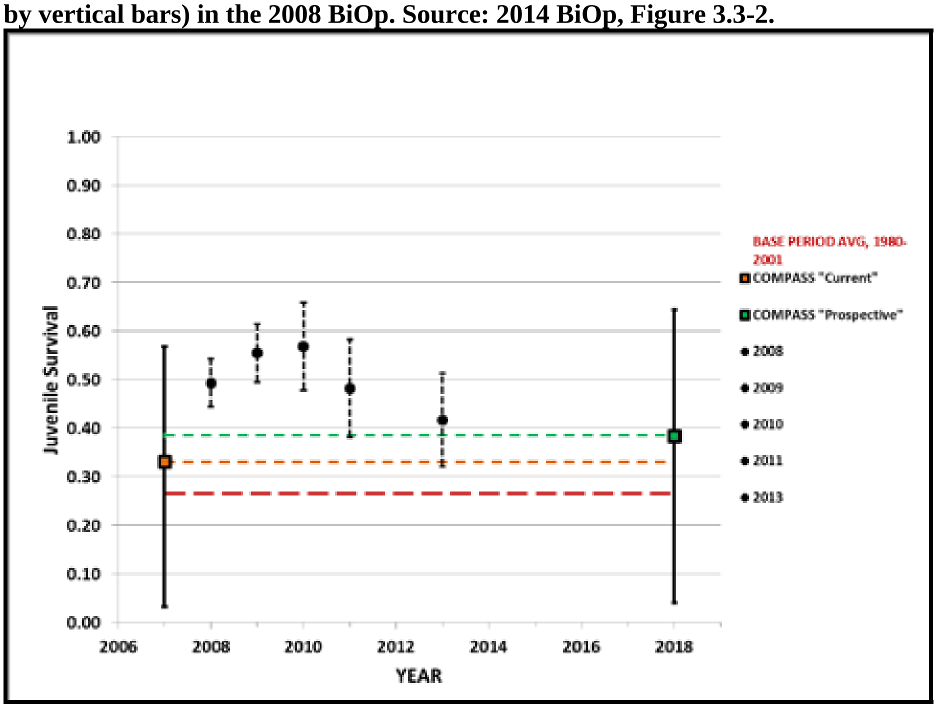

Figure 2b. Lower Granite to Bonneville dam survival estimates (standard error) for wild SR steelhead (2008–2013) compared to Base Period (bottom horizontal dashed line), Current (middle horizontal dashed line), and Prospective (top horizontal dashed line) average estimates (ranges are indicated by vertical bars) in the 2008 BiOp. Source: 2014 BiOp, Figure 3.3-3. Note: No estimate is available in 2012 because of low numbers of detections at Bonneville Dam and the Columbia River estuary.

15. Ms. Kostow (Declaration ¶29) also disputes NMFS' claim that juvenile survival rates have improved as a result of operational and configurational changes at the mainstem dams. Average inriver juvenile survival rates from Lower Granite to Bonneville Dam used by the Technical Recovery Team as "Base" parameters (1980 to 2001 migration years) in life cycle modeling were 33.4% for yearling Chinook smolts and 26.5% for steelhead smolts (2008 SCA, Hydro Modeling Appendix – page 1151 of 1230). Survival rates (with standard errors) depicted in the 2014 Biological Opinion (Figures 3.3-2 and 3.3-3, reproduced above as Figure 2a and 2b) indicate that survival rates have improved (from the Base Period) to levels meeting or exceeding NMFS' expectations for Prospective Actions.

Operations and Transportation

16. Ms. Kostow asserts that I "inappropriately transferred concerns" and am "confusing the details of the 2014 FCRPS BiOp with the 2015 Fish Operations Plan" (Kostow Declaration ¶31). There is no confusion here. The point of my earlier Declaration (Graves Declaration ¶¶26-27 responding to Nigro Declaration ¶¶50-53) was two-fold. First, because higher transport rates were considered in the 2008 FCRPS BiOp than have either occurred in recent years (similar to the 2015 Fish Operations Plan), or under the operation specified in the 2014 FCRPS Supplemental BiOp, the overall effect of transportation is <u>less</u> than NMFS considered in its foundational assessment in the 2008 FCRPS BiOp. Second, I specifically pointed out the differences between the operations recommended in the 2014 FCRPS Supplemental BiOp and recent operations implemented by the Action Agencies consistent with the 2015 Fish Operation Plan and described why these reductions would likely not be as consequential as Mr. Nigro implies. It should be noted that neither Mr. Nigro, nor Ms. Kostow actually estimates the number or proportion of juveniles that would be thus affected. This is likely because, although the changes in operations <u>could</u> occur up to 20 days earlier under the 2014 Supplemental FCRPS

BiOp (as correctly described by Ms. Kostow), this event would only happen if the vast majority (95% or more) of the fish had likely already passed the projects (see 2014 Supplemental FCRPS BiOp, Section 3.3.1.1, pg. 348). Finally, Ms. Kostow (Kostow Declaration ¶31) states that "when transportation is implemented, flow over spillways is reduced…). Ms.Kostow is in error. The decision to transport fish and the decision to spill water at a collector project are independent decisions. Spill levels influence only the proportion of smolts that can be collected for transport (e.g. increased spill reduces the number of smolts transported). The 2014 Supplemental FCRPS BiOp does not call for any reductions in spill during transport operations (2014 Supplemental BiOp, Section 3.3.1.1).

17. Ms. Kostow (Declaration ¶32) shares Oregon's Policy position that under no circumstance should transportation operations begin prior to May 1. Ms. Kostow provides no scientific justification for this position; she does not indicate how Oregon squares this position with the advice of the ISAB to continue "spreading the risk" (ISAB 2008-5, pg 1), nor does she consider any circumstances (e.g., extremely low flow conditions due to drought) that might cause regional managers to support an earlier (even marginally) date for starting transportation operations. "Positional" management on technical issues is contrary to how NMFS addresses operational issues in the regional scientific and technical forums. Each winter, NMFS and the Action Agencies present basic information (recent operations and structural improvements, juvenile survival and travel times, transport rates, transport : inriver SAR ratios, AMIP abundance indicators, etc.) to the Region Implementation and Oversight Group (RIOG)[3] for

[3] The Regional Implementation Oversight Group (RIOG) was established to provide a high-level policy forum for discussion and coordination of the implementation of the 2008 FCRPS BiOp and related BiOps. The overall purpose of the group is to inform the federal, state and tribal agencies that are actively engaged in salmon recovery efforts regarding implementation issues

policy level discussion and advice on how to generally implement the FCRPS BiOp in the coming year. During the spring, summer, and fall, members of the Technical Management Team (TMT) meet on a weekly basis (or more often, as needed) to consider in-season management information (migration timing of fish, reservoir elevations and refill probabilities, river flow and runoff forecasts, chum spawn timing, etc.) and advise the Action Agencies with respect to the hydro operations and transportation elements of the FCRPS BiOp. NMFS believes that this arrangement is highly beneficial as it provides a means of effectively addressing inseason management issues (at the technical level) and oversight and alignment (at the policy level). The effectiveness of the TMT (and other technical level implementation groups that oversee the development of research proposals, configurational changes at the dams, etc.) is predicated on regional technical representatives working to resolve complex issues that affect migrating salmon and steelhead in a collaborative manner.

18. Ms. Kostow (Declaration ¶33) responds to my earlier Declaration regarding curtailment of August spill (see Graves Declaration ¶28) by generically arguing that life history diversity is "good" and curtailing spill would somehow impair life history diversity, so curtailing spill is "bad." Ms. Kostow's argument is simply not supportable. First, she offers no evidence to dispute my earlier statements regarding the proportion of juvenile fall Chinook salmon that could be affected by this operation or of the SARs observed for transported and inriver migrating fish during August (Graves Declaration ¶28). Second, she displays little understanding of the historical run-timing of juvenile Snake River Chinook salmon prior to the construction of the Snake River mainstem dams – especially Snake River fall Chinook salmon (historically, nearly all of the juvenile Snake River Chinook salmon migrated prior to July - see ¶14 above). Third,

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from each sovereign's perspective (Source: February 2010 Hydro Dispute Resolution Procedures – Questions and Answers).

Ms. Kostow fails to disclose that at present, Snake River Fall Chinook salmon exhibit "high levels of genetic homogeneity in samples from natural-origin returns" meaning that there is very little or no genetic difference between hatchery and naturally produced fall Chinook salmon because of past hatchery practices and high proportions of hatchery fish on the spawning grounds (NMFS 2011). Thus, Ms. Kostow's alleged concerns about impacts to life-history diversity are overstated. Fourth, her mention of higher historical July flows is irrelevant to August operations, and the difference between actual and unmodified flows during August is actually much smaller than suggested by her choice to compare 1949-1959 [a series of higher runoff years] to 2000-2010 [a series of lower runoff years] (see Graves Declaration, Figure 2 depicting 2008 SCA, Figure 5.1-2 based on the 70-year water record for comparison).

19. Ms. Kostow (Declaration ¶34) relates (as did Mr. Nigro previously) that the use of the bulk spill pattern reduces spill levels at times due to increased levels of TDG (as compared to a uniform pattern) at Lower Monumental Dam. I agreed with Mr. Nigro on this point (Graves Declaration ¶29) noting "that more spill could be attained at Lower Monumental if the Action Agencies had adopted the recommended uniform spill pattern." I also agree with Ms. Kostow that more uniform spill patterns are used at many of the mainstem dams. However, there are other effects (how the width of a spillgate opening could injure or kill juvenile salmonids passing through it) that should be considered when developing a spill pattern. With respect to Lower Monumental Dam, Hockersmith et al. (2005) "observed significantly higher spillway survival in juvenile Chinook salmon survival in 2004 (95%) with a bulk spill pattern than we did in 2003 (83%) with a flat spill pattern," noting that the average gate openings in 2004 was 6 stops (about 6 feet), compared to only 3 stops in 2003 (about 3 feet). In 2009, flows were higher (around 100 kcfs) so gate openings were relatively wide for the uniform pattern and little difference in

survival between the bulk and uniform spill patterns that year (about 97% for each) (Hockersmith et al. 2010). The point is that Ms. Kostow (and Oregon) is focused solely on spill volume, but narrow gate openings, which are most likely to occur during low flow periods, can be an important consideration for designing safe and effective spill patterns.

20. Ms. Kostow (Declaration ¶35) gives several examples of regional parties supporting the importance of dam survival performance standards, suggests that NMFS' "approach to reporting passage metrics is confusing," then articulates that she knows that NMFS is aware of the differences between dam and system survival, before finally concluding that latent mortality as well as direct juvenile and adult mortalities all affect SARs and must be included. I will not comment on Declarations of other parties to which Ms. Kostow refers. I appreciate that Ms. Kostow agrees that NMFS understands these important distinctions (however others may consider the relative importance of the various metrics). As previously mentioned, latent mortality, direct mortalities, and SARs are all included within NMFS' Recruit per Spawner analysis.

21. Mr. Nigro (Declaration ¶¶60-62) asserted that there were many problems with the Juvenile Dam Passage Performance tests, which I addressed in my earlier Declaration (¶¶42-47). Ms. Kostow (Declaration ¶36) raises only a single issue – that tests should have "incorporated regionally defined low-moderate-high flow years" and that performance tests are more likely to "fail" during a low flow condition. As Ms. Kostow notes, I did describe why NMFS staff thought that The Dalles Dam performance test failed to achieve the 96% standard for steelhead in 2010, and the results of the 2011 test (which met the standard) after additional actions were taken to deter avian predators. As I previously indicated (Graves Declaration ¶42), "the average flow that occurs during the evaluations is a matter of chance (as the studies are scheduled well before any

runoff forecast information becomes available), only the specific project operations are targeted. Tests are not biased because actual conditions differ from planned conditions." It is just as likely that dams will be tested during lower flow conditions (as opposed to high flow years) - which would, if Ms. Kostow is correct in her assertions - bias the survival rates low (compared to average survival rates that would have been measured across the full distribution of flow conditions).

22. Ideally, once a dam is ready, testing would occur every year thereafter, ensuring that data is collected across the widest possible spectrum of environmental conditions. However, this is simply not practicable given the high monetary costs (~$4 million or more per study) and the number of juvenile salmon and steelhead that must be handled and tagged to conduct these studies. NMFS and the Action Agencies did evaluate the 70-year water record to assess the likelihood that consecutive performance standard tests would occur on either low or high flow condition years (the ones most likely to bias survival results in comparison to the broader distribution of flow years they are intended to represent), and determined that it was more likely to have consecutive low flow years than high flow years. The model used to estimate Juvenile Dam Passage Performance has been peer reviewed (ISAB 2006-2, 2006-6, 2006-7, and 2008-3); the model assumptions are shared and discussed with co-managers as part of the validation and assessment process, and the FCRPS Juvenile Dam Passage Performance Standard and Metrics document (2014 NMFS B417) was developed by the Action Agencies with help and review by regional resource agencies, including NMFS, specifically to address applicability given variable environmental conditions. Juvenile Dam Passage Performance standards tests are the best available means of assessing whether or not dam configurations and operations for juvenile fish passage are achieving an agreed upon survival goal.

II. (Olney Declaration)

Avian Predation

23. Mr. Olney again takes up the issue of compensatory mortality that has been a continuous dialogue in Declarations since 2008 (Olney 2nd Declaration ¶¶34-43). I am pleased that Mr. Olney finally grasps, and accepts, that this issue is not pertinent to the management of double crested cormorants at East Sand Island (Olney 2nd Declaration ¶35, ¶42, and ¶43).

24. Mr. Olney again argues that NMFS has not addressed the "relevance of compensatory mortality to evaluating the survival improvement from reducing tern mortality" (Olney 2nd Declaration ¶36); relates why he believes the tern predation actions differs from the cormorant predation action (Olney 2nd Declaration ¶37); and provides some mathematical examples of how assuming higher rates of compensatory mortality would decrement NMFS' assessment of survival improvements from this action (Olney 2nd Declaration ¶¶38-39). I disagree with Mr. Olney that these issues have not previously been addressed by NMFS or in my previous Declarations (2008 SCA, Section 7.2.5.1 and Section 8.3.5.6; 2010 Supplemental FCRPS BiOp, Section 2.2.5.1.1; 2014 Supplemental FCRPS BiOp, Section 3.5.2; 2008 Graves Declaration ¶45; 2008 Graves Reply Declaration ¶¶51-52; and 2015 Graves Declaration ¶¶58-61).

25. Mr. Olney reiterates (see 2008 Olney 2nd Declaration ¶¶16-20) his belief that NMFS should have applied a 50% adjustment due to compensatory mortality for tern predation in the 2008 FCRPS BiOp – effectively halving the assessed survival benefit of this action (Olney 2nd Declaration ¶40). Mr. Olney (Olney 2nd Declaration ¶41) cites past comments by the State of Idaho and NWF recommending that compensatory mortality should apply. I continue to disagree (2008 Graves 2nd Declaration ¶¶51-52, 2015 Graves Declaration 58-61). There are no new issues raised that have not already been considered by NMFS in its BiOps or thoroughly debated in our

previous Declarations (2008 SCA, Section 7.2.5.1 and Section 8.3.5.6; 2010 Supplemental FCRPS BiOp, Section 2.2.5.1.1; 2014 Supplemental FCRPS BiOp, Section 3.5.2; 2008 Graves Declaration ¶45; 2008 Graves Reply Declaration ¶¶51-52; and 2015 Graves Declaration ¶¶58-61). At the core, Mr. Olney overstates this issue to diminish the calculated benefit of this action so that plaintiffs may argue that there is a substantial "gap" in the 2008 FCRPS BiOp analysis, and it must therefore be vacated, remanded, etc.

26. From NMFS' viewpoint, there is little evidence that terns are consuming sick or injured fish in the estuary (which is not the case for inland colonies). Injured or diseased smolts from the interior Columbia River Basin have likely been removed from the population during the 100s of miles they have migrated to reach this point in the estuary by predators within or downstream of the hydrosystem. Essentially, NMFS staff views these surviving fish in the vicinity of the tern colony to be equally likely to return as adults. Therefore, an assumption that compensatory mortality is 0% in this instance, lacking evidence that predation is anything but random at this colony, is appropriate (2014 Supplemental FCRPS BiOp, Section 2.2.4.1, pg. 198-199).

27. In ¶¶44-49 of his second declaration Mr. Olney raises no new issues (see Olney Declaration ¶¶39-43; Graves Declaration ¶¶47-51), but asserts that:

> "none of these *[Graves]* 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" (Olney 2nd Declaration ¶49).

28. I disagree with Mr. Olney's apparent assessment that understanding <u>why</u> actions have not worked to date is not "relevant" to revising actions (e.g., learning that terns will nest at higher densities than previously documented, resulted in adaptive management requiring a

greater reduction in nesting habitat) to be effective in the future. I would argue that it is absolutely necessary. It seems equally clear and undisputable that substantially reducing the number of terns at East Sand Island will reduce the number of smolts being consumed (unless you believe that compensatory mortality is 100% - which even Mr. Olney does not argue – see Olney 2nd Declaration ¶40). I will grant that predicting, with absolute accuracy, the outcome of actions in biology is challenging. But, the full evaluation of the effectiveness of this action must, of necessity, occur after it has been implemented… and after the Caspian terns have equilibrated to the change – which could take several years. This is simply the reality of managing biological systems. That said, I remain confident that substantial reductions in nesting habitat taken in 2015 will achieve the targeted reductions in the size of the tern colony (and achieve the expected increase in juvenile survival) by 2018.

29. Mr. Olney summarizes his first Declaration (¶¶44-47) and earlier in his 2nd Declaration (¶¶34-37), before again using isolated statements from the Schultz et al. (2013) paper as evidence that reducing the number of cormorants is not likely to effectively reduce predation on juvenile salmon and steelhead (Olney 2nd Declaration ¶51). Mr. Olney raises no new substantive issues. I already acknowledged (Graves Declaration¶47) that multiple management actions took place at Leech Lake during the same period of time and that this, in turn, confounded the ability of researchers to determine the extent to which cormorant removal, specifically, improved conditions for walleye. However, this certainly does not prove that removing cormorants was ineffective as Mr. Onley implies.

30. Mr. Olney (2nd Declaration ¶52) returns to his theme that NMFS did not consider the Schultz et al. (2013) paper in the 2014 Supplemental FCRPS BiOp, a point I acknowledged earlier (Graves Declaration ¶47). Mr. Olney infers that the Shultz report (Schultz 2010) is cited

in the 2014 Supplemental FCRPS BiOp is, in some undefined way, inferior to the published Schultz et al. (2013) paper, but offers no specific examples, instead generally noting that peer reviewed literature is "better." Mr. Olney offers no new substantive issues. I think it important to note that agency reports[4] (e.g., Comparative Survival Study, Corps of Engineers or Bonneville Power Administration reports, etc.) are often, in my experience, at least as useful as peer-reviewed journal articles because they contain levels of detail that simply cannot be included in a shorter peer-reviewed journal article.

Kelt Reconditioning

31. Mr. Olney continues to criticize the kelt reconditioning program with respect to assessing the reproductive success of reconditioned kelts and the ability to collect candidate fish for reconditioning (Olney 2nd Declaration ¶¶53-71). Mr. Olney's criticism is based on 1) a selective review of the kelt reconditioning program reports; 2) a misleading representation of an initial effort that has been directed, via the Kelt Reconditioning and Reproductive Success Studies Project (BPA Project Number 2007-401-00), at research designed to evaluate approaches to kelt reconditioning and their effectiveness in terms of reproductive contribution and to provide direction to the goal of RPA 33 of the 2008 FCRPS BiOp (Graves Declaration ¶¶62-73); and 3) arguments based on personal opinion and not on scientific evidence (e.g. opining that "the 180 recondition kelts required" is a "very different goal…" than "long-term reconditioning as a tool to increase the number of viable females on the spawning grounds") (Olney 2nd Declaration, ¶59). In response to these points, I refocus on the history of the project, research results to date, and the implications for successfully implementing RPA 33 by producing sufficient numbers of

[4] The Corps of Engineers research proposals and research reports are peer reviewed in the sense that drafts are provided to agency co-managers for review and their comments are addressed in the final reports. Bonneville Power Administration projects are reviewed by the Independent Scientific Review Panel.

female kelts (equally viable to maiden spawners) on the spawning grounds to increase the productivity of targeted B-run populations by 6% (an estimated 180 females over base period estimates).

32. In 1999, the Confederated Tribes and Bands of the Yakama Nation (Yakama Nation) and the Columbia River Inter-Tribal Fish Commission (CRITFC) partnered on a project to find ways to improve the successful repeat spawning of steelhead in the Yakima River. The Yakama Nation's steelhead (kelt) reconditioning program was so successful that the Warm Springs, Nez Perce, and Colville tribes began similar programs. The Warm Springs Tribes' research at the Parkdale Fish Facility suggests that kelts are just as reproductively viable as maiden spawning fish (Hatch et al. 2014). This means that every steelhead kelt has the potential to be a valuable contributor to ESA-listed steelhead populations and doubling the number of kelts that need to be initially collected as Mr. Olney suggests (Olney 2nd Declaration ¶59) would not be warranted. Mr. Olney (¶¶55-57) implies that because the Parkdale studies use a different stock of fish with physiological and energetic difference that "only migrate over one dam" (Olney 2nd Declaration ¶57) the information obtained from these studies is not applicable to the Snake River kelt reconditioning program. I disagree. The goals of the programs are similar and it is valid to apply information gained regarding the biology of reconditioned steelhead across basins and programs. This point is especially true for the component of the reconditioning program evaluating the release of rematured females directly into natal spawning habitat (where they won't have to migrate past any dams in order to spawn).

33. The 2008 BiOp and Columbia Basin Fish Accords recognized the potential ability of kelt reconditioning to contribute to steelhead populations and included funding for programs by the Yakama Nation in the Upper Columbia and CRITFC in the Snake River. The Yakama Nation

and CRITFC are coordinating with the Chelan Public Utility District, Douglas Public Utility District and the U.S. Fish and Wildlife Service to construct an "isolation building" at the Winthrop National Fish Hatchery in Winthrop, Washington for kelt reconditioning. Not accessible to the public, the facility reduces fish stress by keeping the surroundings quiet during their reconditioning period. Steelhead kelts are reconditioned through the summer months and returned to the Methow River near Pateros, Washington in the fall so they can spawn again in the following spring. The objective of this program is to increase the number of wild spawners in the Methow Basin. [See more at: http://www.critfc.org/fish-and-watersheds/fish-and-habitat-restoration/restoration-successes/steelhead-kelt-reconditioning/#sthash.Vm5GHriD.dpuf]

34. The Snake River kelt reconditioning program released 34 reconditioned B-run steelhead in 2014; 69 in 2013; and 9 in 2012. Research on steelhead physiology is providing direction to increase future kelt releases through assessments of rematuration,[5] diet improvements, and holding skip spawn individuals for a longer period of time to increase their reproductive contribution (skip spawners take an extra year to recondition, but produce larger females with more eggs). The abundance of kelts migrating downstream in the Snake River is more than sufficient for reconditioning programs. The abundance of kelts migrating past Lower Granite Dam was estimated at 39,910 in 2012 and 19,630 in 2013, the majority of which were wild fish (Colotelo et al., 2013 and 2014). Kelt collections are occurring at Lower Granite Dam and improvements in the juvenile bypass system at this project (scheduled for completion in March, 2017) are also expected to substantially increase the proportion of kelts in "good" condition, as this system is a known source of injury for these larger fish (2014 Supplemental FCRPS BiOp,

[5] Rematuration in steelhead kelts is the sequence of events in the brain-pituitary-gonad endocrine axis that occurs during the year before a repeat spawning event. Rematuring females can be identified by elevated plasma estradiol and vitellogenin levels from late summer onward.

Section 3.3.4.3, pg.. 385) addressing another of the issues raised by Mr. Olney (2nd Declaration 68). Additionally, collections of strictly B-run steelhead are taking place at Fish Creek (Lochsa River) and the South Fork Clearwater River, where 35 B-run steelhead were put in the kelt reconditioning facility on March 3, 2015, following spawning for the localized broodstock program led by Idaho Department of Fish and Game.

35. A Snake River Kelt Master Plan is being developed to guide construction of a production-level kelt reconditioning facility to fully address RPA 33. Budget for the construction of the facility is part of the Fish Accords Agreement, so the construction project already has dedicated funds sufficient to cover anticipated costs.[6]

36. The Yakama Nation and CRITFC (Hatch et al. 2014 and 2015) developed a model to examine population recovery from the perspective of a kelt reconditioning program. The model mimics iteroparity[7] in ways explicit to body condition, reconditioning, and release method. They have shown that repeat spawners contribute up to 10% of spawning if sufficient kelts are captured and reconditioned, consistent with existing data on survival and maturation rates and estimates of repeat spawner fecundity. This modeling tool provides the means to examine several questions regarding potential avenues for recovery, and to implement adaptive management options for doing so. Yakama Nation and CRITFC staff have published 5 manuscripts,[8] given 14 professional presentations in 2014, and are regionally recognized experts in this field.

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[6] About $2 million is designated (see http://www.cbfish.org/Project.mvc/Display/2007-401-00).

[7] Iteroparous organisms (like steelhead) are cabable of reproducing multiple times during a lifetime. Semelparous organisms (like salmon) reproduce only once before dying.

[8] Caldwell, L.K., Pierce A.L., Riley L.G., Duncan C.A. & Nagler J.J. 2014 Plasma nesfatin-1 is not affected by long-term food restriction and does not predict rematuration among iteroparous female rainbow trout (Oncorhynchus mykiss). PLoS One 9 e85700.

37. Mr. Olney (2nd Declaration ¶¶71-72) casts aspersions at NMFS' 0.9% credit for the survival improvement stemming from increased operation of The Dalles Dam's ice and trash sluiceway (Graves Declaration ¶¶68-69) because "there is no mention in Appendix J of including potential actions for improving the upstream survival of first time spawners" (Olney 2nd Declaration ¶71). He does not dispute the fact that this survival benefit occurred (or that it likely improves survival for all migrating Snake River steelhead, not just steelhead from B-run populations); arguing only that because this action wasn't considered in the original analysis, NMFS shouldn't be able to consider it now as a means of contributing to the larger Snake River kelt management program (RPA 33). This argument is irrational and does not acknowledge the important adaptive management principles of the 2008 FCRPS BiOp's framework that provide flexibility to continue to improve management under the BiOp.

38. To summarize, nearly 1/6th of the necessary improvement to "B-run" Snake River steelhead kelts has already been achieved via the ice and trash sluiceway operation at The Dalles Dam. Studies, conducted primarily by tribal experts, have yielded substantial information regarding techniques and conditions that are necessary to successfully recondition kelts and assess their viability on the spawning grounds. Yakama Nation, CRITFC, and Nez Perce tribal

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Buelow, J., C.M. Moffitt. 2014. Physiological Indices of Seawater Readiness in Postspawning Steelhead Kelts. 2014. Ecology of Freshwater Fish.

Hernandez, K., Copeland, T., Wright, K. Quantitative Assesment of Scale Resorption in Migrating and Spawning Steelhead of the Snake River Basin. Transactions of the American Fisheries Society 143:1562-1568, 2014.

Penney, Z. L. and Moffitt, C. M. 2014. Proximate composition and energy density of streammaturing adult steelhead during upstream migration, sexual maturity, and kelt migration. Transactions of the American Fisheries Society 143:399-413

Penney, Z.L., and C.M. Moffitt. 2014. Fatty acid profiles of white muscle and liver tissue in stream-maturing steelhead during early migration and kelt emigration. Journal of Fish Biology.

staff are working, in cooperation with NOAA and the Action Agencies, to construct a permanent kelt reconditioning facility and address the remaining technical issues (including collecting adults for the program) to ensure that RPA 33 will be successfully implemented. I believe it is appropriate for NMFS to rely upon their expertise and I am confident that the collective efforts of these parties will achieve the objective of the Snake River kelt management plan.

Adult Survival Rates

39. Mr. Olney (2nd Declaration ¶¶73-76) summarizes information provided in the 2014 Supplemental FCRPS BiOp (Section 3.3.3.1) relating to adult conversion rate (minimum survival) estimates, and correctly notes that current survival rates for Snake River spring/summer Chinook salmon, sockeye salmon, and steelhead (2008-2012) appear to have declined compared to the assessment made in the 2008 FCRPS BiOp (2002-2007 data for Chinook salmon, 2002-2006 data for steelhead, and 2006-2007 surrogate data for sockeye salmon). Mr. Olney summarizes some of the discussion in our earlier Declarations (Olney Declaration ¶¶66-72; Graves Declaration ¶¶71-78). He raises no new substantive issues.

40. Mr. Olney, intent on demonstrating that "positive expectations of future population improvements for most of the Snake River populations are at least more uncertain than anticipated" (Olney 2nd Declaration ¶75), is essentially urging NMFS to rush to a judgement that the discrepancy in survival rates is the result of some vague and undefined failure of the fishway systems at the mainstem dams (Olney 2nd Declaration ¶76). His only rationale for this claim being that there was an adult passage issue relating to temperature at Lower Granite Dam in 2013 (Olney 2nd Declaration ¶76). These issues were fully discussed in the 2014 Supplemental FCRPS BiOp (Section 3.3.3.1) and in my previous Declaration (Graves Declaration ¶¶71-78).

41. Mr. Olney's assertions are erroneous. With respect to the temperature-related passage issues observed in 2013 at Lower Granite Dam, the Corps of Engineers, NMFS, and co-managers have agreed upon both short-term and long-term measures to address this specific issue and to date, they have proven effective (citation).[9] Furthermore, the great majority of the effects on spring/summer Chinook and sockeye salmon are observed in the lower Columbia River, between Bonneville Dam and McNary Dam (2014 Supplemental FCRPS BiOp, Section 3.3.3, Table 3.3-1) , not in the Snake River, as implied by his 2013 Lower Granite Dam example.

42. Mr. Olney (2nd Declaration ¶76) oddly argues that NMFS "does use the positive results of the new PIT tag data, i.e., the fact that some species are surviving at higher rates that it initially estimated, to support their conclusion that fishway operations are not likely to be the causative factor in the declines for other species." This is perfectly logical and Mr. Olney is unable to articulate how these passage systems, operated in a similar manner for many decades, would suddenly (from 2002-2007 to 2008-2012) start discriminating against spring Chinook adults from the Snake River, but not affect spring Chinook from the Upper Columbia River. He also fails to note that sockeye survival rates in the McNary to Lower Granite Dam reach appear to be 4.3% higher than originally projected. Lastly, he fails to consider that steelhead fisheries

[9] The long-term action required by the 2014 Supplemental FCRPS BiOp is being addressed through the design and construction (scheduled for 2015-2016) of a structure to deliver cooler water to the upper fishway and trap [Corps 4535; Corps 3120, 19446]. In the short-term, submerged pumps proved effective in delivering sufficient amounts of cool water to the entrance to maintain fish passage during the summer months with peak temperatures in 2014. Pumps will again be used during the summer months in 2015 to maintain passage conditions for adult migrants.

also occur within the McNary to Lower Granite Dam reach[10]– the area where nearly all of the survival discrepancy is observed.

43. To summarize, NMFS fully identified and discussed the issues raised by Mr. Olney in the 2014 Supplemental FCRPS BiOp (Section 3.3.3.1) and is tracking the overall abundance of adult salmon and steelhead reaching Lower Granite Dam (2014 Supplemental BiOp, Section 3.7 – see Figures 3.7-1 to 3.7-6). The RPA's requirement to install PIT tag detectors at many of the mainstem dams has proved to be effective at alerting regional managers to a potential issue requiring further evaluation (using dam counts alone, without these detectors, managers would never have known discrepancies were occurring). NMFS, rationally, chose to enlist the aid of the Northwest Fisheries Science Center and is cooperating with state and tribal co-managers to jointly assess the potential for hydro-related, harvest-related, or other environmental factors to be causing the losses observed in these reaches; rather than reacting based on assumptions that it must be the result of a problem with adult fishways as Mr. Olney apparently favors. Following this review, I am confident that NMFS and regional co-managers will develop effective corrective actions which will be implemented, resolving this issue.

Transportation and Straying

44. Mr. Olney (2nd Declaration ¶¶77-79) reiterates issues he raised in his earlier Declaration (Olney Declaration ¶¶70-72) that I fully addressed in my previous Declaration (Graves Declaration ¶¶75-78). Mr. Olney continues to mischaracterize my statement by refusing to compare the likely outcome of transport operations proposed in the 2014 Supplemental FCRPS BiOp (Section 3.3.3.4) to the appropriate standard -that is, the original transport rate estimates

[10] Kraig (2014) indicated that over 11,000 steelhead were harvested (based on catch record card returns) between McNary Dam and Lower Granite Dam in – primarily between in 2011; Kraig, 2014)

summarized in the 2008 FCRPS BiOp (Chapter 8.1.1.2; Chapter 14, summary tables 14.2 and 14.3; and SCA Hydro Modeling Appendix, pg 1149 of 1230). Mr. Olney mistakenly argues that there is a negative effect on Mid-Columbia steelhead populations (from Snake River steelhead straying into these populations and spawning there) because the 2014 Supplemental BiOp directed the Action Agencies to increase transport rates, compared to those observed in recent years (see 2014 Supplemental FCRPS BiOp, Section 3.3.3.4, especially Figure 3.3-8). Both the 2008 FCRPS BiOp and the 2014 Supplemental FCRPS BiOp discuss how juvenile transportation increases stray rates in returning adults. Simply put, compared to transport rates assessed originally in 2008, the proposed transport operations will still result in a substantial decrease in average transport rates and a corresponding substantial decrease in Snake River steelhead straying into Mid-Columbia River steelhead populations.

45. Mr. Olney (2nd Declaration ¶¶79-88) continues to speculate about substantial negative effects that will occur as a result of the modest increases in transportation rate allowed in the 2014 Supplemental FCRPS BiOp (Section 3.3.3.4, Table 3.3-6 and related discussion); claiming it will "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 inriver" (Olney 2nd Declaration ¶¶80). Again, Mr. Olney applies the wrong frame of reference to assess these effects – recent years as opposed to the original assessment in the 2008 FCRPS BiOp. He provides no evidence that transport rates in the range being discussed will substantially affect juvenile survival rates (though at very high rates of transport this is certainly the case – see discussion of spill and transport operations my earlier Declarations (2008 Graves Declaration ¶¶22-31 and 2008 Graves Reply Declaration, ¶¶19-31).

46. Mr. Olney (2nd Declaration ¶¶81-82 and ¶¶85-87) takes issue with my characterization that transport rates would likely increase by 5-10% and suggests that transport rates on the order of 50% would "substantially affect observed in-river survival rates" (Olney 2nd Declaration ¶85). Mr. Olney simply subtracted transport estimates included in Table 3.3.4 of the 2014 Supplemental FCRPS BiOp from 50% (assuming that operations would always yield this transport rate) to calculate differences ranging from -0.5 to 21.6%. My estimate was based on the average transport rate from 2008-2013 (about 40%), and my understanding, based on discussions with my technical staff, that operations to collect and transport "about 50%" of the juveniles would still typically result in transport rates somewhat lower than 50% being realized – so an average increase of 5-10% over the recent average is reasonable. Differences in methodology aside, Mr. Olney's conjecture is misplaced as millions of smolts will be migrating in-river – sufficient numbers to "swamp" existing predators – and it is highly unlikely that measurable decreases in the survival of in-river migrating smolts will result. Mr. Olney appears unaware that 2004 was a maximum transport year, when over 95% of the wild steelhead smolts were likely transported (spill was turned off and all but research fish were collected and transported in these years) (Faulkner et al. 2014, Table 23). Comparing survival rates of in-river migrating fish during a maximum transport year to what is likely to result from implementing the 2014 Supplemental FCRPS BiOp transport operations – as he does in this instance is a gross and erroneous exaggeration.

47. Mr. Olney (2nd Declaration¶¶83-84), using Fish Passage Center data, argues that wild steelhead are collected and transported at a substantially higher fraction than are hatchery steelhead. He implies that because the 2014 Supplemental FCRPS Opinion transport operation is "to achieve the goal of transporting about 50% of juvenile steelhead" that this must be referring

to total steelhead, not wild steelhead; resulting in an actual transport rate substantially higher than 50% for wild steelhead. Mr. Olney is in error. First, NMFS uses Northwest Fisheries Science Center estimates of hatchery vs wild transport rates. These rates were 34.8% vs 36.8% (2010), 37.8% vs 36.1% (2011), 26.7% vs 28.4% (2012), and 35.0% vs 40.0% (2013), for hatchery and wild steelhead, respectively (Faulkner et al. 2014, see Table 23).[11] These estimates typically do not differ substantially as Mr. Olney suggests. Second, Mr. Olney (2nd Declaration ¶83) is mistaken in thinking that "transporting about 50% of juvenile steelhead" referenced in Table 3.3-6 of the 2014 Supplemental FCRPS BiOp applies to all steelhead. All of the COMPASS modeling in the 2008 FCRPS BiOp as well as the technical reviews throughout the 2014 Supplemental FCRPS BiOp (see Section 3.3) are focused primarily on the naturally produced component of the Snake River steelhead DPS.

48. Mr. Olney (2nd Declaration ¶88) correctly identifies the seeming paradox that NMFS, on the one hand, estimates that in-river survival rates - especially those for wild Snake River steelhead – have increased substantially more than expected in the 2008 FCRPS BiOp analysis, but on the other hand, is calling for an increased transportation rate. The issue comes down to balancing these two pathways in order to increase the number of adult steelhead returning to Lower Granite Dam. NMFS annually scrutinizes seasonal transport benefits and discusses its findings with the regional managers through the appropriate forums. Transport-to-inriver SAR ratios continue to indicate that more wild adult steelhead would return to Lower Granite Dam if they were transported after May 1 than if they were left to migrate inriver (2014 Supplemental FCRPS BiOp – Section 3.3.3.4, see Figures 3.3-9 and 10). Increasing the number of adult salmon and steelhead that return to the spawning grounds upstream of Lower Granite Dam is the

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[11] Note the 2014 Supplemental FCRPS BiOp cites this paper as Faulkner et. al. 2013 which was a draft report available to NMFS at the time. The report referenced here, is the final report.

rationale behind NMFS' recommendation to somewhat increase transportation rates for the remainder of the BiOp period (2015-2018). Mr. Olney again raises the specter of predator swamping (Olney 2nd Declaration ¶88). As I stated earlier in this Declaration, I do not agree with Mr. Olney's conjecture that 2014 Supplemental FCRPS BiOp transport operations would result in substantially decreased in-river smolt survival rates. NMFS has carefully weighed the factors raised by Mr. Olney and recommended slightly increasing transportation as a means of improving adult returns of steelhead while minimizing risks to other salmon and steelhead species migrating at the same time.

I declare under penalty of perjury that the foregoing is true and correct. Executed on Tuesday, May 5, 2015, in Portland, Oregon.

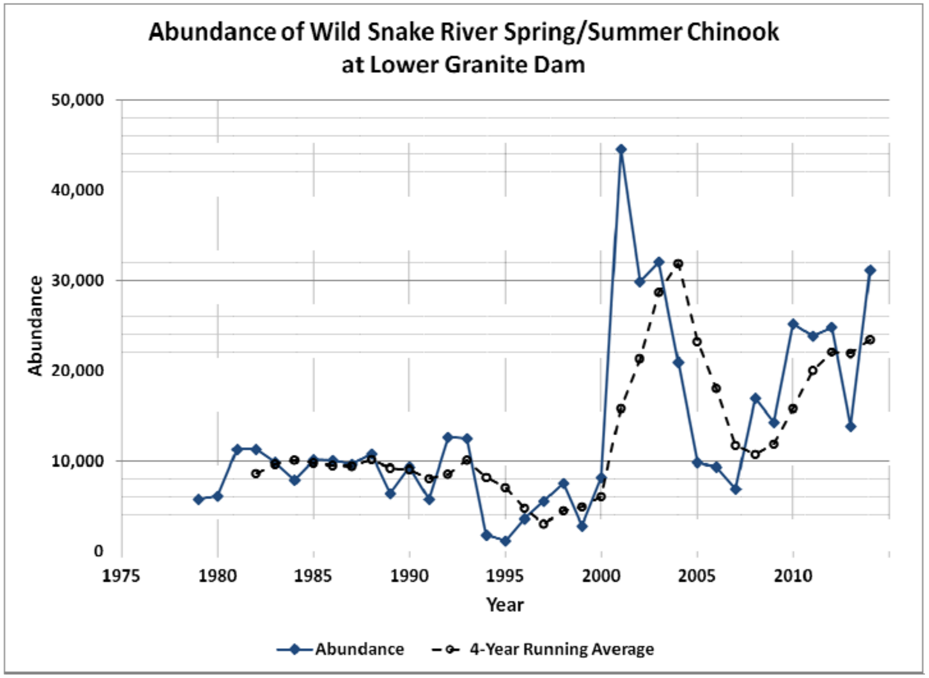
Ritchie J. Graves

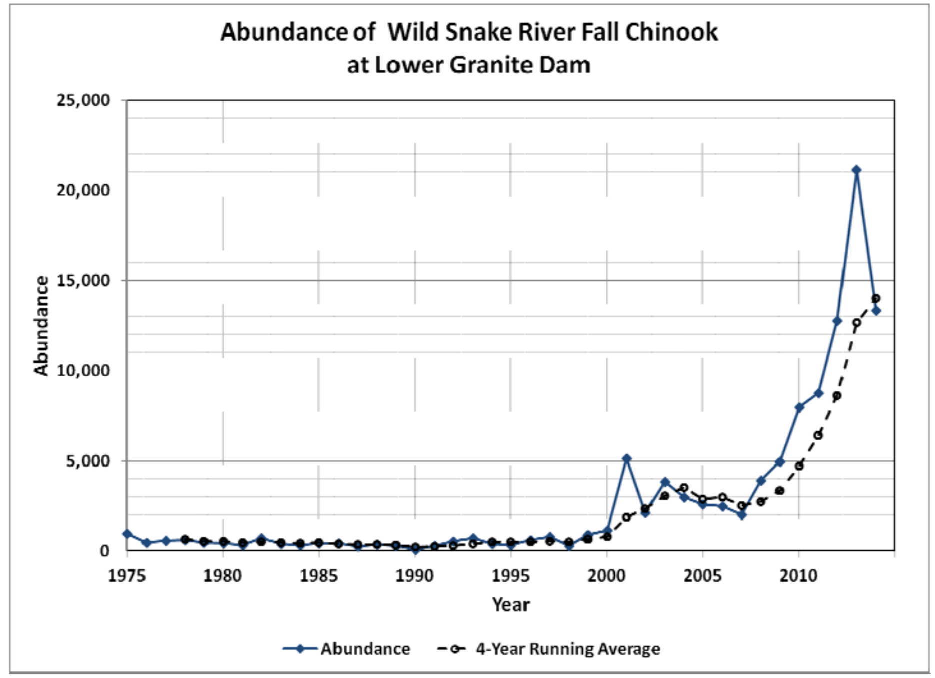
[*Ritchie J. Graves*]

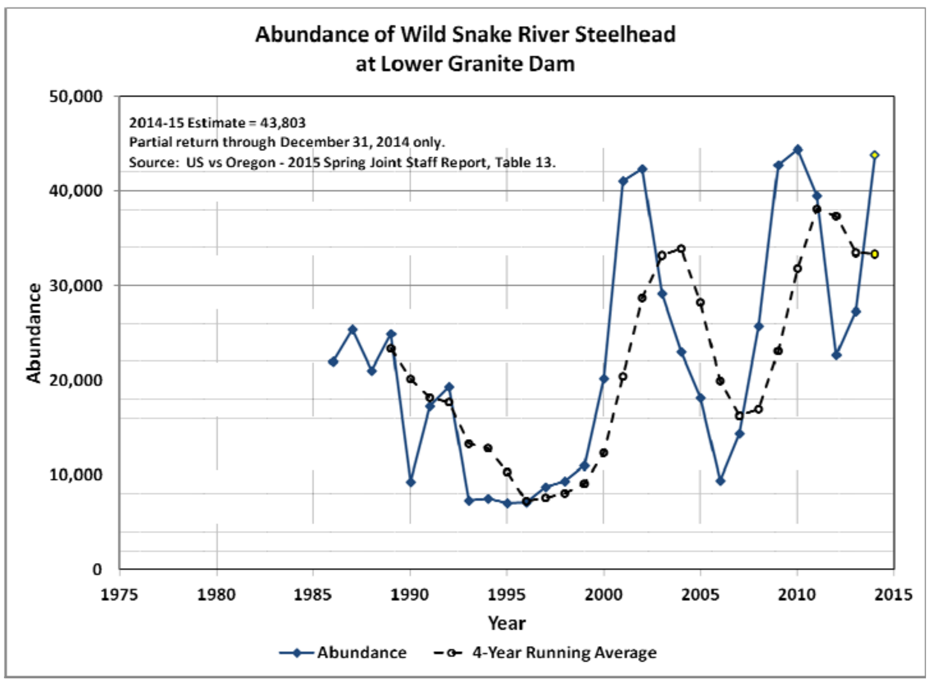
EXHIBIT 1

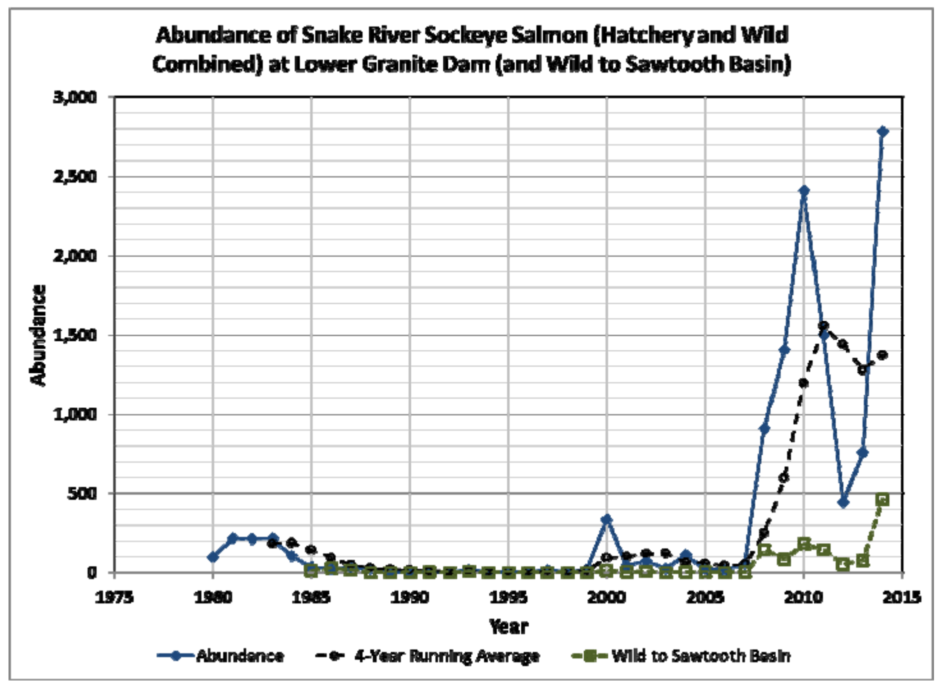
Annual abundance (and four-year running averages) of naturally produced Snake River spring/summer Chinook salmon, fall Chinook salmon, steelhead and sockeye salmon at Lower Granite Dam [***page 1***]; Upper Columbia River spring Chinook salmon at Rock Island Dam, Upper Columbia River steelhead at Priest Rapids Dam, and Yakima River steelhead (Mid Columbia River Steelhead - Major Population Group) at Prosser Dam [***page 2***].

Data Sources:
Idaho Department of Fish and Game,
Nez Perce Tribe,
Confederated Tribes and Bands of the Yakama Nation, and
Washington Department of Fish and Wildlife.









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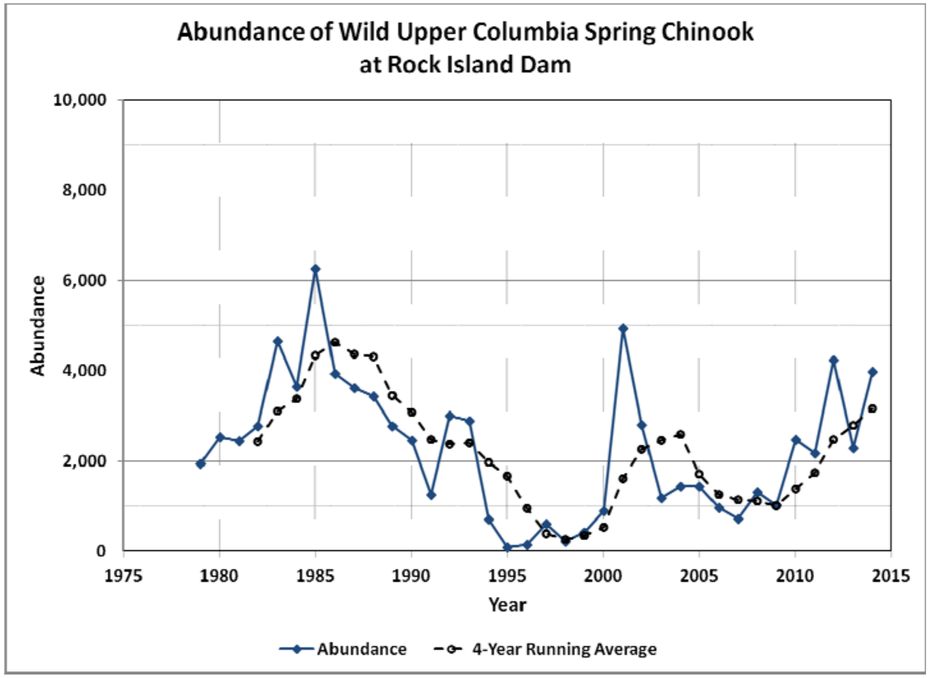

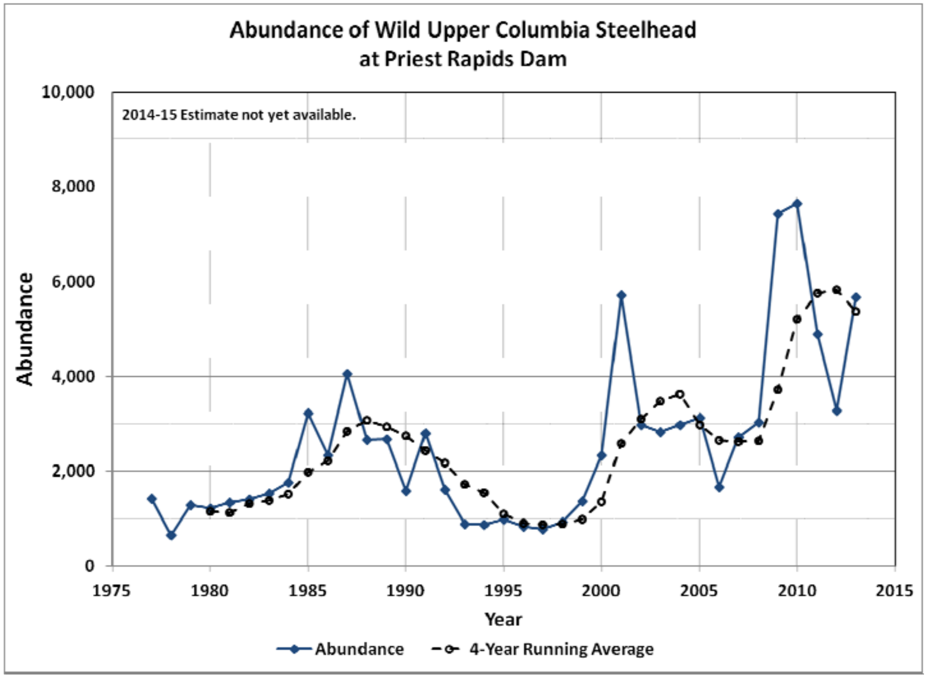

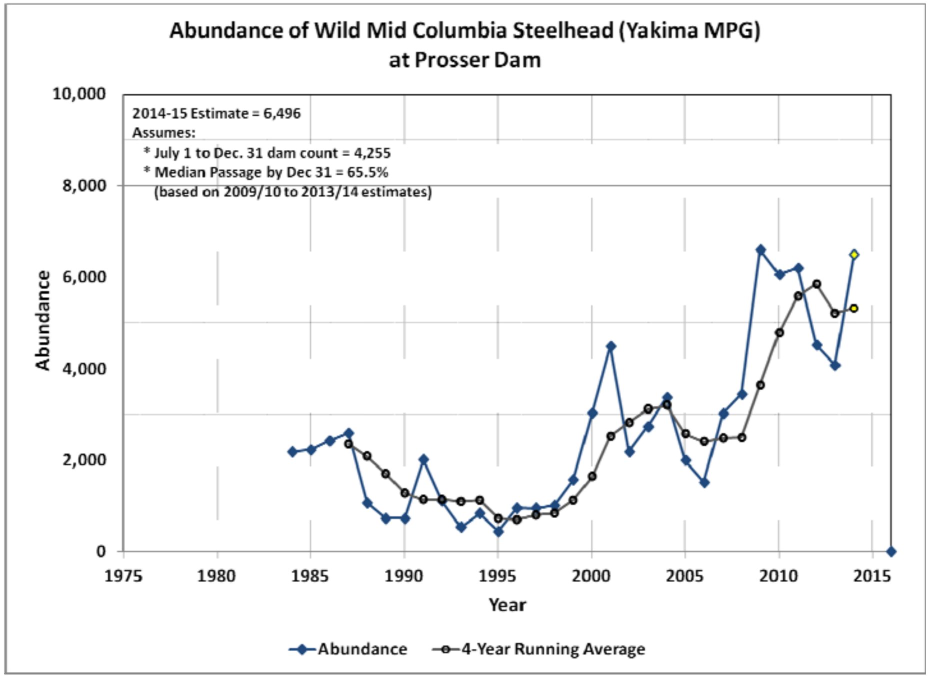

Graves Reply Declaration, Exhibit 1, Page 3