THE HONORABLE JAMES A. REDDEN

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF OREGON

NATIONAL WILDLIFE FEDERATION, et. al, Plaintiffs, v. NATIONAL MARINE FISHERIES SERVICE and UNITED STATES ARMY CORPS OF ENGINEERS Defendant, and NORTHWEST IRRIGATION UTILITIES, PUBLIC POWER COUNCIL, WASHINGTON STATE FARM BUREAU FEDERATION, FRANKLIN COUNTY FARM BUREAU FEDERATION, GRANT COUNTY FARM BUREAU FEDERATION, and INLAND PORTS AND NAVIGATION GROUP, Intervenor-Defendants.	Civ. No. CV 01-640-RE **DECLARATION OF THOMAS K. LORZ (Summary Judgment)**

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I, THOMAS K LORZ, STATE AND DECLARE AS FOLLOWS:

1. I am a Hydraulic Engineer. I have worked at the Columbia River Inter-Tribal Fish Commission (CRITFC) since the fall of 1996. I hold a Bachelor of Science degree in engineering from Oregon State University and received my masters in engineering at Oregon State University in 1996, with my master thesis detailing the hydraulic modeling of potential design options for the Lower Granite Dam Surface Bypass Collector.

2. As an Hydraulic Engineer, my work responsibilities include:

- *Technical Consultant* – Technical consultant for the review of planning, design, construction and operation of anadromous fish passage and protection facilities on the Columbia and Snake River systems.
- *Inter-Agency Representative* – CRITFC representative at regional inter-agency committees to clarify points of concern and interact with regional agencies over facility design and operation for multi-purpose water projects.
- *Data Analysis and Reporting* – Prepare (individually or in collaboration with other fishery personnel) reports, manuals, study plans, computer simulations/models, project budget estimates and general information on fishways, fish facility configuration, and research topics, used by various state and federal agencies in design and operational decisions.
- *Facility Field Inspections* – 1) Conduct periodic engineering inspections of construction activities to assure that new facility designs will meet fish passage requirements; 2) Perform periodic field inspections of existing protective facilities to assure that they are operated in a satisfactory manner and in accordance with

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established criteria; 3) Analyze operational problems and recommends appropriate corrective action.

3. I currently serve as CRITFC's technical lead and representative for fish passage issues at the mainstem hydraulic projects on the Columbia and Snake rivers. I am CRITFC's primary member in the NOAA Fisheries Regional Process as outlined in the 2000 Biological Opinion for region consultation. I specialize in fish bypass forums. As part of this Regional Process, I regularly attend meetings of the Operation and Maintenance Work Group (FPOM), the Fish Facility Design and Review Work Group (FFDRWG), the System Configuration Team (SCT), and the Anadromous Fish Evaluation Process (AFEP). I also participate in Technical Management Team (TMT) as needed. These groups are comprised of technical staff from the states, tribes and federal agencies, specifically U.S. Fish and Wildlife (USFWS), NOAA Fisheries, Corps of Engineers (COE), and Bonneville Power Administration (BPA). Further, I am a member and regularly attend meetings of the Fish Passage Advisory Committee (FPAC) for the Salmon Managers, who are the technical and biological staff members for the fisheries agencies of the state, tribal and federal entities.

4. I have reviewed the final 2004 Biological Opinion on Operation of the Federal Columbia River Power System including the 19 Bureau of Reclamation Projects in the Columbia Basin" adopted November 30, 2004 by NOAA Fisheries ("2004 BiOp"), including its technical appendices; the review draft of the 2004 Biological Opinion that was published by NOAA Fisheries and dated September 8, 2004 ("draft BiOp"); the Updated Proposed Action ("UPA") prepared by the Corps of Engineers, Bureau of Reclamation, and Bonneville Power Administration; the SIMPAS model study and

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parameters included in the 2004 BiOp; comments prepared by the Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, Idaho Department of Fish and Game, Fish Passage Center, and Columbia River Inter-Tribal Fish Commission (sometimes referred to as fishery co-managers) on the draft BiOp; and the responses to comments provided by both the Action Agencies and NOAA Fisheries.

5. While NOAA technical staff has provided some responses to the wide range of comments posed to them regarding their draft BiOp, several key issues and comments have been left unanswered or were incompletely answered. Other comments were no responded to at all. Since the inadequacy of NOAA's response or the lack of NOAA's response to the comments of the fishery co-managers and others is not readily apparent, I discuss these issues in this declaration. Because of the technical complexity of the issues involved, I include technical background for clarity and explain the context of the issue with regard to NOAA's analysis in the 2004 BiOp.

Predator Control

6. CRITFC commented that benefits of the NPMP "heavy-up" should be included in the reference operation or removed from the UPA since the heavy-up operation were implemented in 2001 and 2004. A.R. Doc. C.231 at Appx. A, p. 35 (CRITFC comments). The "heavy-up" program will affect Northern Pike Minnows populations in preceding years from its implementation. Since the "heavy up" operations occurred in 2001 and 2004 system survivals have been affected. The BiOp analysis uses survival data from 2001, 2002 and 2003 in its retro analysis to estimate and calibrate the model's pool mortalities. A.R. Doc. A.1 at D-37 (2004 BiOp). Since the heavy-up program occurred in 2001, system survivals from the 2001 through 2003 inherently

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include the improvements credited to the "heavy-up" program. Therefore the survival improvements accredited to "heavy-up" have already been accounted for in the reference operation, and it would be double counting to credit the "heavy up" operation in UPA as well. Furthermore, NOAA failed to respond to the extensive comments provided to them by the Joint Technical Committee regarding the problems with improvement due to the "heavy up" operation. A.R. Doc. C.231 at Appx. A, Attach. 3, p. 10. (JTC 2-20 letter attached to CRITFC comments). These comments were also attached to the CRITFC draft 2004 BiOp comments.

Implementation of the Reasonable and Prudent Alternative from the 2000 FCRPS BiOp, the Updated Proposed Action, and the 2004 FCRPS BiOp

7. Several of the co-managers commented that the Action Agencies failed to provide specificity and detail regarding the particular measures and actions making up the UPA. *See, e.g,* A.R. Doc. C.237 at 5-7 (Oregon Comments) (the UPA "means everything to everyone, nothing to no one"). Several of the co-managers expressed concerns about implementation in the 2004 BiOp of those actions included in the 2000 BiOp's Reasonable and Prudent Alternative (RPA). At the eleventh hour, the Action Agencies produced a "crosswalk" describing the UPA's implementation of the RPA measures in the 2000 FCRPS BiOp. CRITFC staff reviewed and commented on the "crosswalk" and implementation of 199 RPA measures identified within it. In its comments on the draft 2004 BiOp, CRITFC noted that the RPAs that have been transferred to the UPA are no longer prescriptive with wording added in many cases that actions will only take place "as warranted". A.R. Doc. C.231 at Appx. A, p. 27 (CRITFC Comments). NOAA staff did not address the CRITFC comments but offered a response

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to a similar comment provided by Save Our Wild Salmon. A.R. Doc. C.293 at 1-13 (NOAA Response to 2004 Draft BiOp Comments)**.** NOAA's response dealt with the legal ramifications of their new interpretation of the jeopardy analysis but did not answer questions concerning the "as warranted" caveat in many of the proposed actions. Neither the BiOp nor the response to comments identifies who or what mechanism will determine whether an action is "warranted" or not. In addition neither the BiOp nor the UPA identify what the timing is for implementation of the former RPA actions nor do they identify specific objectives and elements to be measured for attainment of success. A critical part of NOAA's No Jeopardy finding for the 2004 BiOp is the implementation of the 2000 BiOp's RPAs to fill the survival gap between the reference operation and the UPA. Under the 2004 BiOp, many of these actions have become discretionary measures, yet the SIMPAS analysis assumes the RPAs to be implemented**.**

Survival Improvements Attributed To The UPA.

8. CRITFC, the State of Idaho, the State of Oregon, and the Fish Passage Center all expressed concerns with the level of survival improvements attributed to operations under the UPA, noting that the increased survival percentages were uncertain. Among such concerns, these co-managers noted that NOAA likely overestimated the survival improvement for turbine passage, most notably at John Day Dam. A.R. Doc. C.293 at 1-37, 1-41 (NOAA Response to 2004 Draft BiOp Comments)**.** In its response, NOAA technical staff merely refers the commentators to either section 6.3.1.2.2, page 6-58 and 6.4.1.2.2, page 6-81 of the 2004 BiOp. A.R. Doc. C.293 at 1-37, 1-41 (NOAA Response to 2004 Draft BiOp Comments)**.** These sections state that the Biological Index Testing, BIT, for turbines will be completed by 2010 at several dams, and that this will

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lead to a 1% survival improvement in turbine passage at those locations. NOAA, however, provides no data that would indicate this benefit could be realized. Actual field measurements have yielded a different result, which NOAA's response fails to indicate. Contrary to NOAA's response, after the new Minimum Gap Runners (MGR) were installed at Bonneville 1 and compared to retuned existing units, no statistical benefit in direct survival was measured. This was after a complete overhaul and installation of new units with the MGR technology, which is far more extensive than Biological Index Testing. The BiOp, on the other hand, assumes that through a simple index testing program, the Corps will be able change the operating range of the units at John Day Dam so as to alter the hydraulics in the turbine, draft tube and tailrace and achieve a 3% or 9% survival improvement depending on affected species. This assumption is very optimistic considering the actual experience at Bonneville Dam.

9. In regard to John Day Dam, NOAA reasons that the turbine survivals at John Day are uniquely low compared to other projects, and therefore large improvements in survival should be possible. NOAA partially recognized our comments and decreased the turbine survival improvement generated by the BIT program at John Day, but still credited the turbine operational changes a 3% survival improvement for spring migrants and 9% for summer migrants. A.R. Doc. C.231 at Appx. A, p. 46 (CRITFC comments); A.R. Doc. A.1 at 6-81 (2004 BiOp)**.** This is notable considering that survival improvements at other projects resulting from the BIT program barely achieve a 1 – 2% improvement. Further it will be difficult if not impossible to measure and verify these levels of improvement. Contrary to NOAA's response to comments, the table below shows, turbine survival at The Dalles and McNary are similar to John Day:

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Turbine Survivals at Lower Columbia Projects

	Spring Survival Average of Chinook & Steelhead	Summer Survival SubYearling
John Day	82%	72%
The Dalles	84%	84%
McNary	69%	74%

The John Day and The Dalles survival rates are the current survival rates used in the 2004 BiOp. A.R. Doc. A.1 at D-39 to D-41 (2004 BiOp**)**. The McNary survival rates were presented by Perry et al. at the November 15-18, 2004 annual review of the Corps of Engineers' Anadromous Fish Evaluation Program (AFEP). *See* USACE, AFEP Annual Review 2004 [synopsis], 41 (November 2004). I am a member of the AFEP committee and personally attended the annual AFEP review. The AFEP program is coordinated by the COE and is included in the NOAA Regional Forum.

10. In the BiOp, NOAA used the BIT strategy to justify the improvements in turbine survival at John Day and other dams. However, the Corps of Engineer's Turbine Survival Program (TSP), which is also "guided" by the NOAA regional forum and headed by the Action Agencies, has been reviewing possible explanations not related to the BIT strategy to explain the lower than expected turbine survivals at these all these projects. The primary focus has been at John Day. Based on a research paper by Cada et al. (March 1997)[1] a possible explanation for these lower than expected survivals could be due to impacts resulting from rapid pressure changes that juveniles experience when passing through the turbines. *See* A.R. Doc. B.240 (TSP Phase 1 Report) at 177 (referencing Cada et. al, 1977)). In past research studies of turbine survival, juvenile fish were released through hoses directly into the turbine units to insure that sufficient

[1] Available at http://hydropower.id.doe.gov/turbines/pdfs/doeid-10578.pdf.

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numbers of migrants pass through the units to generate a statistically valid survival estimate. Recently, a new generation of survival studies using radio tag technology has allowed for adequate numbers of fish to be released well upstream of projects and still generate a statistically valid turbine survival estimate. These studies present a situation more akin to natural migration compared to hose releases. Juveniles that are released through hoses directly into the units are acclimated to atmospheric conditions and therefore experience a small pressure change when going through the turbine. On the other hand, juveniles released upstream of the project are acclimated to whatever depth they are migrating at. When these more naturally migrating upriver released fish pass through the turbines they experience a sudden and extreme change in pressure to which their bodies are unable to adjust rapidly, causing decreased survival rates when compared to the hose released fish. Refer to the table I generated below from the TSP Phase 1 Report (A.R. Doc. B.240):

Comparison of Turbine Survival by Release Mechanism

Project	Year of Study	Survival	Release Mechanism
McNary	2002	87.3% +/-3%	Direct Hose Release
McNary	2004	67.3% +/-7%	Upstream Release
John Day	2003	85.10%	Direct Hose Release
John Day	2004	76.4% +/-9%	Upstream Release

11. The Cada et. al. paper discusses a possible explanation for this circumstance. By analogy, the fish released through the hose mechanism could be thought of as represented by a diver close to the surface then brought rapidly to surface. There is very little pressure change for this diver. However, the fish released well above the project would be represented by a diver who is much deeper in the water column and

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then rapidly brought to the surface. The depth at which the diver starts at will dictate the change in pressure and thus the potential damage done, from minor effects (ears popping) to sever impacts (the bends).

12. The theory, that effects from rapid pressure changes may cause more extensive injury and mortality than pervious noted, was presented by COE representatives at a TSP meeting I attended on September 30, 2004 at the Portland District Office. The COE representatives informed the regional parties at the meeting that laboratory studies had been conducted during 2004, to test this hypothesis and preliminary findings indicated that in laboratory conditions, fish acclimated at different depths did experience sever injury and mortality when subjected to rapid pressure cycling akin to that found in a turbine. If the theory proves out in further laboratory studies and field research, then turbine survival improvements under the BIT strategy outlined in the BiOp would not be realized since the BIT program will only alter the operation range of the turbines and not affect pressure changes in the turbine environment. Migrants would still be exposed to this rapid and extreme pressure changes. As more and more studies are conducted using migrants that are not hose released, turbine survival estimated at other projects may also experience these dramatic decreases in the current perceived turbine survival. The BiOp's assumed improvement in turbine survival is at best optimistic and highly questionable. NOAA staff are aware of this information, but for whatever reason it is not reflected in the 2004 BiOp or response to comments.

Summer Spill

13. CRITFC, The State of Oregon, and the Fish Passage Center commented extensively on the need to evaluate spill for summer migrants in the Snake River. A.R.

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Doc. C.293 at page 1-25 and 1-26 (NOAA Response to 2004 Draft BiOp Comments). The BiOp states that due to uncertainty regarding the benefits of transportation, the status quo operation will continue. A.R. Doc. A.1 at 5-16 (2004 BiOp). The BiOp describes uncertainty in estimating the differential delayed mortality that occurs in transported and non-transported populations below Bonneville Dam. This differential mortality or "D" is a measure of the relative success of in-river versus transportation survivals. A "D" value of 1.0 would indicate that in-river and transported fish populations survive equally well once they have passed Bonneville Dam. "D" values considered for Snake River fall Chinook have been reported by Toole as ranging from D=0.18 to D=0.41**.** A.R. Doc. A.1 at Appx. D, Attachment 5, page 5-5 (2004 BiOp)**.** A "D" value of 0.18 would indicate that fish transported to below Bonneville Dam survived to adulthood only 18% as well as their counterparts that successfully passed Bonneville Dam by in-river passage routes.

14. The importance of "D" maybe illustrated by reference to the analyses performed by NOAA during the summer of 2004. NOAA's SIMPAS analysis performed for the 2004 summer spill case showed that with a "D" value of 0.20, in-river summer migrants experiencing a no spill condition had approximately the same survival as transported fish. If spill were available, overall survival would be higher for in-river migrants than survival for transported population. Although requested to do so by CRITFC and others, NOAA did not perform an analysis with spill at the collector projects and a range of "D" values to estimate a survival gap between the Reference operation and the UPA. A.R. Doc. C.231 at Appx. A, page 14 (CRITFC comments)**,** A.R. Doc. C.293 at page 1-25 and 1-26 (NOAA Response to 2004 Draft BiOp

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Comments). A range of "D" or an estimate for "D" determined from NOAA's using best professional judgment combined with an analysis of summer spill operations would have represented a "spread the risk analysis" scenario called for by the co-managers. NOAA does not report any such study in the 2004 BiOp record. It is the co-managers belief that such a study would help to insure that the reference operation portrayed the maximum benefit for listed species.

15. While I do not agree with the use of the SIMPAS model to analyze system survivals, to illustrate the significance of providing spill at transport projects in the summer to implement a "spread the risk strategy", I prepared a SIMPAS study using the same inputs as NOAA used for the UPA and the reference operation, except I included spill at transport projects for summer migrants and used a range of "D" values to estimate the survival gap. My analysis shows a relative survival gap of -30.0% for a "D" value of 0.20, which was the agreed upon value during the summer spill analysis conducted in 2004. CRITFC, *Comments Regarding Amended Proposal for FCRPS Summer Juvenile Bypass Operation,* 10 (June 14, 2004)[2]; U.S. Army Corps / BPA, *Amended Proposal for the FCRPS Summer Juvenile Bypass Operations,* Appx. A, p. 3 (June 8, 2004).[3] This indicates that the UPA proposal for 2014 system configuration resulted in a 30% relative increase in system mortality when compared to a reference operation that included spill at the collector projects. The overall total relative survival difference for a range of "D" values from 0.18 to 0.41 was -34.5% to 4.6% in my SIMPAS study. In contrast,

[2] Available at http://www.salmonrecovery.gov/docs/summer_spill/SS3_comments/Tribal/Columbia_River_Inter-Tribal_Fish_Commission.pdf

[3] Available at http://www.salmonrecovery.gov/docs/summer_spill/add_AppA_sumspillprop.pdf

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NOAA's analysis generated a relative juvenile system survival difference (including latent effect i.e. "D") range of (-) 0.7 to (-) 1.6%. A.R. Doc. A.1 at 6-50 (2004 BiOp**)**. The reason there is such a difference between my SIMPAS study's relative survival difference and the 2004 BiOp's, is that both the reference operation and UPA proposal outlined in the 2004 BiOp, transport nearly the entire Snake River fall Chinook population. Therefore regardless of a "D" value the relative difference between the reference and UPA will be negligible. This limited comparison demonstrates that NOAA's assumptions underlying the reference operation in the BiOp do not portray the maximum potential benefit for Snake River Fall Chinook.

16. CRITFC commented on the BiOp's use of reservoir life history of fall Chinook to justify not making changes to summer operations. A.R. Doc. C.231 at Appx. A, page 55 (CRITFC comments)**.** NOAA has not responded to CRITFC's comment, although the BiOp does note that a significant number of returning adult fall Chinook were undetected migrants. A.R. Doc. A.1 at 5-18 (2004 BiOp**).** The BiOp does not discuss how many of these undetected migrants are comprised by reservoir life history fall Chinook. Further, the BiOp does not reveal that the percentage of reservoir fall Chinook is highly variable for both wild and hatchery Chinook. According to the data and graphs presented in the CRITFC comments, reservoir migrants appear to represent a large majority of the run when in river conditions are poor. A.R. Doc. C.231 at Appx. A, page 55 (CRITFC comments). The relative proportions of ocean-type and reservoir-type fall Chinook may simply reflect flow and in-river survival conditions for the ocean-type migrants. Additionally, flow and survival conditions in the following year, for the yearling component of the population, would also influence the proportions of reservoir

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versus ocean migrants. Both of the years reported by Connor (1995 and 2001) provided sub-optimum conditions for in-river migration. The increase in reservoir Chinook migrants could just be an indication that in river conditions were so poor in these years that the ocean-type migrants suffered catastrophic mortality and by default the only adults returning were the ones that did not emigrate during the poor river conditions. NOAA does not acknowledge this information.

17. A paper by the same author cited in the 2004 BiOp, Connor et al. August 2002 in the North American Journal of Fisheries Management, concludes that the majority of the reservoir type Chinook appears to originate in the Clearwater. The Upper Snake reach accounted for no more than a couple of percentage while the Lower Snake had more variation with an average of nearly 9% for the years of 1994 to 1999. A high of 18.5% occurred in 1996 which was a cooler and higher flow year than normal. The Clearwater averaged 52.7% for the years 1992 – 1994. As the paper indicates these varying percentages are related to river temperatures and this matches closely with current and past reservoir operations at Dworshak that aid in making conditions favorable for the reservoir type life history. Further, if it was not for the creation of the reservoirs from the construction of the hydro electric projects this life history would not exist.

18. It is questionable to draw such strong conclusions as those presented in the BiOp to comments based on SAR information for fall Chinook from different life histories, since none of the tagging studies were set up to measure SAR's for that purpose. It is obvious that yearling fall Chinook will return at higher rates than sub-yearlings. Whether this is an improvement in management operations is unknown , since the yearling fall Chinook come from the sub-yearling population and we do not know

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what mortality rate this population experiences before becoming yearling Chinook. If river conditions were improved for the sub-yearling migrants this would be an even greater boast to the overall fall Chinook population since more ocean migrants would survive and there would also be the potential for more reservoir migrants to survive to a yearling life history. A comprehensive Snake River fall Chinook juvenile migration study is badly needed.

19. CRITFC, The State of Oregon, and the Fish Passage Center commented on the need to evaluate higher levels of spills for spring migrants in the reference operation. A.R. Doc. C.293 at 1-24, 1-27 (NOAA Response to 2004 Draft BiOp Comments)**.** The BiOp states in appendix D that a sensitivity analysis was performed to review this comment. A.R. Doc. A.1 at D-7 (2004 BiOp**)**. However, the sensitivity analysis was flawed. NOAA staff only looked increasing spill at Lower Granite. This is problematic since the spill efficiency at this project is based on RSW information. There is very limited (two years) data to determine the spill efficiency with the RSW. Further, the equation for spill efficiency used in the analysis had to be extrapolated at the higher spill volumes, which would include the volumes described in the sensitivity analysis. The equation that was generated using artificial values for the upper values of spill volumes is very flat after about 35% spill. Therefore any spill above the 35% level will pass very few additional fish and therefore show little to no improvement overall. The analysis is based on highly uncertain information.

20. A more robust sensitivity analysis would look at increasing spill at all projects where possible and comparing the results to the original analysis to determine the magnitude of change. The risk by selecting only one project to increase spill at, is

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this project my or may not show a benefit, it is dictated by the specific operations at that project. A better way is to test the concept of increased spill everywhere practical; if no increase in survival is shown over the base analysis then the analysis is insensitive to this change. If an increase or decrease is depicted, then a project by project analysis should be undertaken to determine the operation that would provide the maximum benefit for list fish, however this was not done in the BiOp.

21. Inputs in the SIMPAS analysis used in the BiOp need to be updated at several projects to incorporate recent data that were available during the remand process, which indicate a large discrepancy between what is used in the model and what was estimated from the research done in 2004. This information was presented at the Annual AFEP review held November 15 -18, 2004. The most notable changes are as follows: (The Modeling parameters for the BiOp analysis are depicted on D-39 – D-41 of the BiOP) A.R. Doc. A.1 at D-39 – D-41 (2004 BiOp).

- Ice Harbor spillway was 97% during the bulk spill operation as opposed to the assumed 96% spillway survival used in the analysis. Fall Chinook had a similar increase from 96% to 97% for the bulk spill pattern.
- McNary dam had the largest change in parameters. Spillway survival was estimated at 97% for spring Chinook as opposed to 95% used in the BiOp analysis. For steelhead spillway survival was reported as 99% as opposed to the 95% estimate used in the BiOp analysis.
- Turbine survival at McNary depicted the largest change from the 90% turbine survival used in the analysis, for both spring Chinook and steelhead, where the recent research estimated the survival through turbines was 68% for spring

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Chinook and 70% for steelhead. Fall Chinook also depicted a drastic change of turbine survival from 82% used in the BiOp analysis, to 74% from the more current research.

These changes would impact the overall system survival estimates generated from the SIMPAS model. These changes would greatly affect operations that favor spill. Since the reference operation uses 24 hours spill at all projects and the UPA does not, the survival gap between these two conditions would increase.

22. To illustrate this point one only needs to review the operations at McNary in 2004. The reference operation has 24 hours spill at McNary while the UPA does not, only over-generation spill is provided. (Over-generation spill is generally a limited amount of spill and occurs only when river flows exceed turbine operating requirements.) The research conducted at McNary in 2004 indicated that the limited over-generation spill provided during daylight hours did not provide good survival conditions. This could be attributed to the short duration of the spill. The project survival at McNary during the day with only over-generation spill for spring Chinook was 78%, while survival during the nighttime planned spill operation was 94%. For steelhead the spill versus no spill comparison was 85% to 100% with spill at night. This data only reflects direct passage survival; no benefits to forebay delay have been accounted for. Therefore a reference operation with 24 hours spill which would likely generate survivals similar to the current night-time only spill will generate better survivals than the UPA case which only includes night time spill with spill during the day dependant on hydraulic capacity..

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Removable Spillway Weirs (RSWs)

23. The 2004 BiOp employs the installation of removable spillway weirs (RSWs) to achieve what it asserts to be "improved juvenile survival at federal dams compared with existing conditions for all ESUs." A.R. Doc. C.289 at 3 (2004 UPA)**.** CRITFC, State of Oregon, State of Alaska, The Fish Passage center, and Save Our Wild Salmon all commented to NOAA that the benefits of RSW are still highly uncertain and the reliance of them in the UPA may be misplaced or misleading. A.R. Doc. C.293 at 1-37 (NOAA Response to 2004 Draft BiOp Comments**)**. NOAA responded that, due to these risks, the Incidental Take Statement in the Remand BiOp calls on the Action Agencies to "evaluate juvenile project-specific passage survival both before and after configuration and/or operation modifications [at mainstem FCRPS projects] to ensure that these modification result in improved passage survival." A.R. Doc. A.1 at 10-10 (2004 BiOp)**.** This response, however, does not address the underlying comment that RSWs do not appear to provide the asserted additional survival benefit.

24. NOAA fails to explain in any detail in the 2004 BiOp or the NOAA response to comments just what RSWs are and how they work. The RSW is a large metal structure that is placed in an existing spill bay to aid in juvenile salmonid passage. The concept is to pass water over the RSW instead of forcing the migrants to pass under the existing gate in the spill bay. The RSWs pull water from the surface in hopes of attracting the juveniles toward it. Since juveniles migrate at varying depths in the river but usually in the upper third of the water column it is theorized that they will find the RSW more easily. It is expected that since the RSW draws water from the upper part of the water column it will be more efficient at passing fish then using standard spill bays

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with water passing under the spill gates. Since these structures are designed expressly for passing juveniles safely downstream the survival should be similar or better then existing spillbay. The current cost of these structures is approximately 12 -14 million dollars as indicated by the Columbia River Fish Mitigation budget. However, the RSW at Lower Granite dam currently provides similar survival through the spillway when compared to spill bays without RSW. However, the RSW utilizes a smaller volume of water spilled. While RSWs represents a potential economic benefit, its benefits to survival are uncertain and may not be an improvement over baseline survival.

25. The RSW currently installed at Lower Granite has only two years of data on its performance, 2002 and 2003. No data was collected in 2004 due to low water conditions, which precluded spill operations in the Snake River. These tests were only conducted in the spring, no RSW evaluation for fall Chinook has occurred. Salmon managers have requested to perform a summer evaluation numerous times, but to no avail. Joint Technical Committee Memorandum (December 14, 2004)[4]; Joint Technical Committee Memorandum (August 13, 2004)[5]; Joint Technical Committee Memorandum June 29, 2004[6]; Joint Technical Committee Memorandum (May 10, 2004)[7]. Of those two years of data collection in the spring, only one year included survival data (2003). Under the 2003 analysis, the RSW and the spillway produced different point estimates of survival, however these point estimates, and thus the survival differences, were not statistically different. NOAA nonetheless used these point estimates in its SIMPAS analysis. CRITFC commented to NOAA that the study showed no statistical difference,

[4] http://www.fpc.org/fpc_docs/joint-technical/205-04.pdf
[5] http://www.fpc.org/fpc_docs/joint-technical/139-04.pdf
[6] http://www.fpc.org/fpc_docs/joint-technical/111-04.pdf
[7] http://www.fpc.org/fpc_docs/joint-technical/65-04.pdf

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and furthermore, that the study was not designed to evaluate spillway passage. A.R. Doc. C.231 at Appx. A, page 46 (CRITFC comments)**.** After reviewing past years of data collected regarding spillway survival at Lower Granite the estimated survival, 98%, appears to the be the same as the estimated survival through the RSW, 98% as well. NOAA concurred with these comments and adjusted their analysis to reflect this change A.R. Doc. C.293 at 1-30 (NOAA Response to 2004 Draft BiOp Comments**)**. Thus, as NOAA acknowledges, there is no direct survival benefit – in terms of per fish survival – at Lower Granite between the RSW and a regular spillbay.

26. For the RSW to generate a benefit in project-level survival, the RSW must pass more fish than the standard spill program at the individual project or have better passage survival then existing spill bays. However, the extent to which an RSW attracts more fish than a regular spill bay has yet to be adequately tested. To date, there has not been a direct comparison of RSW to a similar spill program so the likelihood of a net survival benefit from an RSW is still uncertain and claiming such benefit is a bit misleading. For the Lower Granite RSW survival test (2003), 24 hour operation of the RSW in the spring was compared to the 12 hours of regular nighttime spill. The 24 hour RSW operation increased fish passage over the spillway compared to the 12 hour BiOp program (by 14% for yearling Chinook, 17% for wild steelhead, and 15% for hatchery steelhead). CRITFC and many of the region's salmon managers requested that a comparison be done between the standard spill program operated for 24 hours/ day (not 12 hours/day) and the 24 hour/day RSW operation to give a better understanding of the project survival benefits. The Action Agencies, however, have resisted performing any sort of comparison of 24 RSW operations to a 24 hour "standard" spill, i.e. no spill bays

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with operating RSW. While the 2003 spring test showed an "improvement," with the 24 hours RSW operation, it is highly likely that the same level of improvement or even better would not have been achieved through 24 hour spill. Until they perform such analysis, it is misleading for them to assert that RSWs provide "improved juvenile fish passage" as they do in the UPA (page 3). A.R. Doc. C.289 at 3 (2004 UPA).

27. The only benefit the RSW appears to have is an economic one since an RSW allows for less water to be spilled to get slightly more migrants to pass over the spillway. Without knowing how 24 hour RSW operations compare to a standard 24 hour BiOp spill program, it is misleading for the NOAA to say that the RSW provides any survival benefit. It is more appropriate to say that the RSW allows for less spill and provide more water for turbine generation. It may be possible to achieve the estimated benefits of an RSW with the current dam configuration by just altering the spill pattern, increasing the duration of spill hours, or increasing the volume of spill verses having to wait until 2014 for the full RSW benefits that were credited to the UPA scenario in the BiOp to be realized.

28. The fact that RSWs are really economically driven is further revealed by the current schedule for RSW installation, which does not appear to consider survival implications. Ice Harbor is the next location for an RSW, with installation scheduled for early 2005. However, current operations with bulk spill appear to generate very high project survival at this project. As presented at the Annual AFEP review held November 15 -18, 2004, 98% of the juvenile spring Chinook used the spillway at a survival rate of 97%. It is unlikely that the RSW will be able to achieve these levels of passage survival. The best percentage of fish passage achieved over the spillway with an RSW at Lower

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Granite was 78% in 2002 and 66% in 2003 and this included all fish passed by both the RSW and the associated training spill. While RSWs are a valid alternative for project improvements, they need to be installed at projects where spillway survival or passage can not be improved by altering project operations. While RSW may provide economic benefits at the currently scheduled installation sites, they will not be able to provide a survival benefit that could not be achieved by merely changing the spill pattern from flat to bulk, duration from 12 hours to 24 hours, or the spill volume, where necessary.

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I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Dated this 11th day of February 2005.

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