

**DAM PASSAGE WHITE PAPER
RESPONSE TO COMMENTS
March 2000**

This document provides NMFS' responses to review comments on the draft white paper titled "Passage of juvenile and adult salmonids past Columbia and Snake River dams." Formal reviews were received from Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Columbia Basin Fish and Wildlife Authority, and Fish Passage Center. Comments or analyses from Columbia River Inter-Tribal Fish Commission and U.S. Geological Survey were included in some of the fishery agency review comments.

Most sets of comments from reviewers were either identical or very similar. Comments received were divided into three categories for response: comments that were speculative in nature or addressed policy issues, comments that addressed minor aspects of the white paper or editorial format, and technical comments of a scientific nature.

I. Response to policy comments

Although the authors raise the issues of survival to adulthood and extra mortality, they do not discuss them in a way that puts proposed management actions in context.

The authors provide estimates of SARsthat have been hovering around 0.5%, but make no mention of the goal of two to six percent established by PATH.

...to date the hydro system is the only realistic explanation for mortality that affects the Snake River stocks and not their downriver counterparts.

.. The passage white paper.... does not put likely future risks of listed stocks in perspective relative to proposed management actions.

To date NMFS has not presented a plan by which these stocks will enjoy the multifold increase in survival necessary to ensure their survival and recovery.

...there is no acknowledgment that wild Snake River spring/summer chinook stocks have failed to return to vast areas of pristine habitat in some recent years...

....the white paper, while providing a reasonably good overview of passage issues, does not put the likely future risks of listed stocks in perspective relative to proposed management actions.

The purpose of the white papers was to summarize the scientific data available on the Federal Columbia River Power System at it is configured today. The data are available from a variety of sources, and NMFS relied most heavily on publications and contract reports as sources of information. The white papers do not address the possible effects on salmonids that might accrue from major changes to the present configuration of the hydropower system (e.g., drawdown or dam removal). We made no attempt to address policy issues, or various goals for in-river survival, escapement, recovery, and smolt-to-adult ratios (SARs). While the dam passage white paper does speculate about potential indirect effects that might occur as a result of hydropower system passage (e.g., delayed mortality), empirical data on these subjects are scarce. Other forums such as the Plan for Analyzing and Testing Hypotheses (PATH) and the Cumulative Risk Initiative (CRI) are addressing these issues. It is recognized that many of the impacts of dams identified in the white papers would decrease with removal of dams.

II. Response to editorial and minor comments

Minor comments on content, discrepancies, and editorial suggestions were much appreciated. Changes to the text were made as needed.

III. Response to technical comments

1. The section “Reach Survival” concluded that “efforts to improve direct survival through the FCRPS have worked” ...is a misleading statement

NMFS concurs with this comment. The sentence had been removed. In addition, we added information of the survival of subyearling chinook salmon, as measured through various sections of the hydropower system. These data indicate the survival of subyearling chinook is much lower than yearling migrants. In addition, we note that recent reach survival estimates for yearling migrants were made under conditions where runoff is average or above, and under conditions implemented since the 1995 Biological Opinion. Data on yearling migrant survival under low flow conditions would add to our understanding of direct survival through the FCRPS under a variety of environmental conditions.

2. The section entitled “Water Temperature Effects” alludes to higher mortality of summer migrants at juvenile fish facilities but doesn’t mention the extremely high mortality rates estimates by NMFS for fall chinook.

Concur. See response to Comment 1, above.

3. The section entitled “Effects of Bypass Systems on Smolt Condition” presents high descaling rates for sockeye but no attempt is made to link bypass descaling with the virtual disappearance of sockeye from the Snake Basin.

Comment noted. No change. The white paper indicates little is known about the relationship between descaling and survival, and do not speculate as to any cause and effect relationship. Similarly, we do not speculate that the decline of sockeye in the Snake River basin was related to changes in habitat and over-fishing (Wallowa Lake sockeye) or to management actions (use of rotenone to eradicate sockeye by Idaho Department of Fish and Game in the 1960s).

4. It is also unclear what led NMFS to believe that most of the mainstem mortality is due to dams. It is important to recognize that the relative importance of dams (versus reservoirs) would probably depend largely on flow conditions.

Comment noted. No change. The section titled “Project Survival” discusses how reach survival estimates for the Snake River were often partitioned into dam and reservoir estimates. For most reaches and years the majority of mortality during the spring migration was associated with dam passage. The white paper on flow-survival relationships discusses the importance of flow conditions.

5. Considerable discussion was devoted to surface bypass systems but this too is misleading.

NMFS concurs that surface bypass systems are still under development. We modified the text to better reflect and incorporate the comment that further development of tailrace release systems and testing will be required before any benefits to survival are known for surface bypass systems currently under development at FCRPS dams.

6. NMFS should acknowledge that current dissolved gas standards provide the best prospects for passage survival in a risk management sense....the relationship between physical signs and long term survival are unknown.....it is impossible to meet gas standards in forced spill situations....the prospects for correcting this shortcoming with gas abatement structures are uncertain.

Comment noted. No change. The white paper discusses the relationships between dissolved gas levels and signs of gas bubble disease. The white paper is focused on scientific information not management positions, risk-reward considerations, or the efficacy of future gas abatement actions.

7. The paper indicates passage is greater at night but fails to mention that passage improves during the day when spill is provided.

Concur. NMFS modified the text to reflect data collected in 1999 at John Day and Ice Harbor dams on the effect of daytime spill passage on diel distribution and forebay delay.

8. The discussion only marginally touches on the changes in spatial and temporal distribution of returning adult salmon. For example, no mention is made of the fact that dams have acted as complete barriers to migration

Comment is correct and noted. We present information relative to the hydropower system as it exists today. Causes of decline and passage obstruction are covered in many other documents and were not the focus of the white paper. While we do not address blockage of passage above dams, we realize that major spawning areas were occluded with the construction of Grand Coulee Dam, to a lesser extent Dworshak Dam, and the Hells Canyon Complex. We do discuss changes in Snake River fall chinook salmon spawning timing due to operations of the Hells Canyon Complex, and the subsequent effect on juvenile outmigration timing. We point out that sockeye salmon migrations are slightly earlier now than historically, and that steelhead now spend time in lower Snake River reservoirs. Little additional information regarding effects of the current FCRPS and its operation on spatial and temporal distributions exists.

9. ..the adult passage section leaves the reader with the sense that overall adult passage mortality is low, that fish ladders have resolved dam passage issues, and that marine mammals are the main source of adult passage loss.

Comment noted. The discussion on marine mammal predation was moved into the predation white paper. The passage white paper was modified to include a greater discussion of fallback and effects of temperature on Snake River fall chinook spawning. It is not the intent of NMFS to say to say that ladders have resolved the issues associated with dam passage. However, we do believe that the available information suggests that adult passage through the FCRPS is generally good. We note that fallback, unaccounted losses, lamprey passage, effects of passage on reproductive success, and hesitation at junction pools are areas of concern that need further study.

10. This (spill management) could be strengthened by citing the 1998 NMFS Biological Opinion which indicates survival rates are generally in the 97 to 100% range.

Comment noted. No change. The white papers are focused on scientific information, publications, and research reports, not management documents that summarize the information. The white papers are written to be appended to the upcoming Biological Opinion for the FCRPS. Including earlier Biological Opinions as citations would be a circular argument.

11. Spill Efficiency and Effectiveness....section places great emphasis on spill efficiency at The Dalles Dam...appears to be a means of justifying a reduced volume of spill at this project...

Comment noted. No change. The white paper makes no attempt to support any level of spill at The Dalles, rather, the available information on spill efficiency, effectiveness, and survival is provided.

12. Tailrace Passage...the statement that most juveniles pass the spillways at night contradicts the statements...thatfish passage during the day is high when spill occurs.

Concur. Text has been modified to address the comment. Also, see Comment 7, above.

13. Dissolved Gas Standards...the waiver process for spilling water at Dworshak Dam should be discussed.

Comment noted. No change. The waiver process is a management action.

14. GBD Monitoring...should include a summary of the results of biological and physical monitoring...

Concur. The NMFS report to Oregon Department of Environmental Quality (NMFS 1998a) is discussed.

15. Dissolved Gas Abatement...section should discuss operations...to reduce gas supersaturation. The section on spill should point out that operation of the hydrosystem for power production has placed limitations on the volume of spill that can be provided at certain projects. The discussion of spill patterns should also discuss the potential effect that navigation concerns have on implementing spill patterns for fish migration.

Comment noted. No change. These are management issues.

16. Fish Guidance Efficiency estimates...differ from Krasnow and Dey (1997) and the NMFS 1998 Supplemental Biological Opinion for the FCRPS....and should be reconciled.

Concur. The white paper has been modified to express the high degree of variability associated with FGE estimates. This high degree of variability prevents us from defining single point estimates of FGE for each project and species. Therefore, ranges in existing fyke-net, hydroacoustic, and radio telemetry estimates are provided.

17. Surface bypass premises... it should also be noted that Dauble et al. (1999) provided a summary ranking of the relative success of the surface bypass concepts being tested at various dams.

Comment noted. The text was modified to include the point that the performance of surface bypass prototypes has varied greatly, and none has performed as well as the Wells Dam system.

18. This (surface bypass) section should discuss the options for passing fish into the dam spillways, powerhouse tailraces, or conveying them into bypass systems for reentry downstream or for transportation.

Comment noted. No change. We tried not to focus on what might be possible in the future, rather, what we know about the hydropower system as it is currently configured. However, we did allow some discussion of future activities in the surface bypass section because the surface bypass prototypes are still being developed and tested.

19. Bonneville Second Powerhouse and The Dalles Dam powerhouse end collectors...concerns regarding discharging fish into...poor... tailrace... conditions.

Concur. Text modified as suggested.

20. Page 61. No supporting evidence is presented for the claim that “similar reach survival estimates through other reaches...indicated most juvenile salmonid mortality during the spring is associated with dam passage.

Concur. We added the following: ... hatchery steelhead passing through Little Goose Dam was estimated at 96% and was nearly equal to the estimated reach survival from Lower Granite Dam tailrace to Little Goose Dam tailrace of 95.4%, resulting in <1.0% estimated reservoir mortality during that year in that reach (Hockersmith et al. 1999). Muir et al. (In review) further examined hatchery steelhead survival estimates for 1997 through the Lower Granite tailrace to Little Goose tailrace reach. They partitioned the estimate, and estimate survival through Little Goose Dam and the Little Goose reservoir to be 96.0 and 99.4%, respectively.

21. Key uncertainties associated with juvenile passagethere are questions about the effects of the hydrosystem and juvenile salmonid passage facilities on juvenile lamprey.

Concur. Text modified to address what information exists on juvenile lamprey passage through mechanical bypass systems. Information on survival through reservoirs, past dams, and through routes of passage, and timing of passage is lacking and couldn't be discussed.

22. Pg 66. Reasons for SAR differences between multiple bypass and non-bypassed or once-bypassed fish are incomplete.

Concur. Text modified to include bypass passage as a cause of the reduced SARs.

23. Pg. 66. Limitations in performance measures. NMFS still seems to maintain that further studies are needed before any significant changes to the current hydrosystem configuration and operation are made.

Comment noted. No change. The white paper statement is pointing out that with existing tools and population abundances, deriving information on stock specific performance is difficult and limited. The reviewer is reading too much into this statement. No management or policy outcomes are intended.

24. Pg. 68...wording in the section on extra mortality....is misleading.

Concur. Text modified to clarify the discussion.

25. The discussion of fallback indicates that few fish are directly injured or killed by fallback. However, the potential impacts of fallback on delayed mortality and gamete viability and any proposed studies on these effects have not been discussed.

Text modified to include recent data from Keefer and Bjornn (1999) on survival to Lower Granite for fish that fell back, versus those that did not. Fallback is discussed as an uncertainty. The white paper attempted not to discuss proposed studies. It is interesting to note that NMFS did propose a study to evaluate to effects of hydropower system passage (including fallback) on adult reproductive success starting in FY00. This proposal was not supported by Idaho Department Fish and Game, who provided the comment, above.

26. Cooler water from Dworshak Reservoir can lower Snake River temperatures....can be negated by releases from Hells Canyon...

Comment noted. No change.

27. The..occurrence of head burns in fish ...should summarize information regarding the present state of knowledge of head burns...

Concur. Text modified to include available information.

28. Fallback should be carefully defined. Possible fallback rate for wild versus hatchery fish. Table 12 appears limited. PATH uncovered ...72 spring/summer chinook fallback studies...

Comments noted. Table 12 was very limited and was removed. We did not define fallback because we used recent radio telemetry data which can accurately monitor each tagged individual's behavior, and in this context, fallback is similar to that described in the comment (i.e. fallback is when a fish passes back down the river via a route other than a fish ladder). We did not consider the PATH analyses of dam counts because they evaluated existing analyses of dam count data. The recent radio telemetry database provides a much richer body of scientific information.

29. The comparison of adult survival rate from Ice Harbor in recent (1991-93) versus earlier periods....is based on different methods.

Concur. Text modified to reflect the difference.

30. Temperature...in the Snake and Columbia Rivers....is an increasing problem.

Comment noted. Text modified.

31. Marine mammal marks....not clear how the predation and passage white papers will be integrated...discussion of animal injury rates at Lower Granite from 1990 through 1993 is inadequate.

Concur. The discussion of marine mammals was moved to the predation white paper. The dam passage white paper discussion of head burn injury rates at Lower Granite was expanded, and information from Bonneville Dam was included.

32. Juvenile conclusion 1: direct survival...is likely to be lower than it was before many of the FCRPS dams and reservoirs were in place. It should be highlighted that the direct survival of recent years occurred under good flow conditions.

Comments noted. As noted in the introductory remarks, the white papers do not address improvements that might accrue from dam removal. We do note that Raymond's (1979) estimates of survival from the Salmon River to Ice Harbor Dam was 89%, and it was 33% after the completion of Lower Monumental and Little Goose Dams. Also, we point out in both the text and conclusions that recent estimates of direct survival were obtained under good flow conditions and under the measures implemented in the 1995 and 1998 Biological Opinions.

33. Juvenile conclusion 4..should also note that increased mortality of juvenile fish may occur after they exit the bypass systems because of high predation at the bypass discharge points.

Concur. Outfall predation below Bonneville Dam First and Second Powerhouses is discussed.

34. The paper needs to provide the management context for the review...

Concur. A forward section addressing this issue has been added to clarify the purpose of the white papers.

35. The paper also needs to better address experimental design issues and how study assumptions affect results.

Commented noted. We concur that these kinds of details are important when considering the results of research studies. However, the subject of dam passage is very large, a detailed review of individual experimental designs and assumptions was outside scope of the white paper.