UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
525 NE Oregon Street
PORTLAND, OREGON 97232-2737

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Northwest Power Planning Council
851 SW Sixth Avenue, Suite 1100
Portland, OR 97204-1348

Attention: Mr. Mark Walker and Ms. Wendy Koch

RE: National Marine Fisheries Service's (NMFS) comments on the report "Mainstem Passage Strategies in the Columbia River System: Transportation, Spill, and Flow Augmentation" by Giorgi et al., 2002.

Thank you for the opportunity to comment on the subject report. The report, within the scope covered, is fairly complete, factual, and supports the short-term Reasonable and Prudent Alternatives in the NMFS 2000 FCRPS Biological Opinion (NMFS 2000a). It is our understanding that the Northwest Power Planning Council will use our comments on this report, as well as the report itself, for information during its rulemaking process on mainstem amendments to the Fish and Wildlife Program. We believe, however, the Council would have benefitted from having Giorgi et al. review and incorporate comments into a revised final report.

In general, we find the report to provide a good summary of available information on fish transportation, spill, and flow augmentation. However, we believe there are some omissions, inconsistencies, and incorrect statements in the report that need to be clarified. Therefore, we offer the following comments for the Council's consideration as it deliberates during its rulemaking process on Mainstem Fish Passage issues in the Fish and Wildlife Program. This letter also incorporates comments from the NMFS Northwest Fisheries Science Center.

Executive Summary

Page ix. The statements suggesting additional species and dam-specific survival estimates are needed and that passage modeling may afford the only practical means to evaluate the relative benefits of various spill scenarios appear to provide inconsistent and contrasting recommendations.

Page ix. NMFS does not have a water quality standard for total dissolved gas (TDG). The states and the U.S. Environmental Protection Agency (and in some cases the Tribes) have authority to promulgate water quality standards for the mainstem Columbia and Snake rivers. Each year the U.S. Army Corps of Engineers (Corps) obtains a water quality variance from the states of Oregon and Washington that allows an average of the highest 12-hours of gas readings each day up to

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120% TDG in the tailraces below each mainstem Columbia and Snake river dam to implement the NMFS spill program under the 2000 FCRPS Biological Opinion.

Page x. Although discussed elsewhere, the statement here that there is little evidence supporting a flow/survival relationship should discuss the potential that flow does impact fish downstream of Bonneville Dam by improving estuary conditions, creating a larger Columbia River plume, and increasing turbidity to reduce predation.

The statement on page xi that "...it is not clear that releasing cool water from Dworshak effectively alters the thermal structure of most of the Lower Snake River" is inaccurate. Karr et al. (1998) have clearly shown by empirical evaluations that, under various ambient temperature regimes and Dworshak storage releases, water temperatures can be reduced by 4.4° to 5.5° F at Ice Harbor Dam throughout the lower reaches of the Lower Snake River. Both the Corps and the U.S. Environmental Protection Agency (Yearsley 2000) performed extensive modeling analyses to evaluate the effect Brownlee and Dworshak operations had on lower Snake River temperatures. These studies were made at the request of the Technical Management Team (TMT) in the year 2000, and the study results are posted on the Corps' TMT website. These study results indicate Dworshak water releases can affect temperature throughout the lower Snake River similar to the ranges reported by Karr (1998).

Transportation

Page 14. The statement that a smolt-to-adult return rate (SAR) of 2% is the base threshold level that PATH identified as necessary to ensure a high probability of recovery for Snake River spring/summer chinook is incorrect and should be put in context. First, the 2% is the low end of 2-6% preliminary estimates (1996) that PATH generated for guidance prior to development of the PATH life-cycle model. Second, these SARs were based on methods from Raymond (1988) which appear to be higher than estimates based on PIT-tag detections. Third, these estimates assumed that SARs during the 1960s estimated by Raymond (1988), approximately 2-4% to Ice Harbor Dam, are necessary for a high probability of survival and <u>moderate to high</u> likelihood of recovery.

Page 15 - 16. The observation by Marsh (2000) that SAR estimates for transported fish changed markedly from April to May was observed in both 1995 and 1998. This was reported in the Marsh (2001) report. The discussion on this matter should specify both years this trend was observed.

Page 25. A more in-depth discussion as to what information was used to draw the conclusion that the benefits of transporting fish from Lower Monumental and McNary dams is equivocal would be helpful. Does sufficient information on this matter exist, or is this conclusion based on very limited and incomplete data? The data set for McNary transport studies is limited to only a single year - 1994. The data set for Lower Monumental transport is more extensive, but is based on very few adult returns.

Page 25. The fact that a Snake River fall chinook transportation study is planned to commence this year should be stated sooner in the report. It is stated later in the document (page 26), but the reader should be advised that the problem alluded to on page 25 is being addressed sooner, rather than later.

Page 26. The document could benefit from a discussion of the relative merits of tagging wild fish at traps vs. Lower Granite Dam. There is an ongoing discussion about this issue in the region on the studies being conducted by Columbia Basin Fish and Wildlife Authority (CBFWA) and NMFS. CBFWA collects and marks wild fish in traps. NMFS does not believe that the number of wild fish that can be tagged in this way is sufficient to derive a statistically valid estimate of transport vs. in-river survival. Therefore, NMFS believes a discussion of the relative merits of the two approaches would be informative.

Page 27. Direct Mortality: There is no discussion in this section or elsewhere in the document that raises the issue that all bypass facilities may not be created equally and may be a contributing factor to juvenile fish mortality. The document should acknowledge that individual bypass facility design and/or operations may be contributing to lower survivals at certain transport facilities.

Page 27. The last paragraph of the transportation section provides a qualification about the information that was discussed up to this point. This qualification should be moved toward the front of the transportation section. Much of the earlier transport information is based on very small numbers of adult returns. The reader should be made aware of this fact early on.

Page 27. Improving on estimates of direct survival in barges does not seem worth the effort. PATH used 98%, but most observations and anecdotal information suggest that it is 98-99+%.

Spill

Page 33. Model analyses of direct effects on juvenile fish survival do not account for potential indirect effects of hydropower system passage, referred to and estimated as extra mortality.

Page 35. The report's definition of "spillway passage efficiency" is misleading. In the NMFS White Paper on Dam Passage (NMFS 2000b), *spill effectiveness* is defined as the proportion of fish approaching a project that pass via the spillway. *Spill efficiency* is spill effectiveness divided by the proportion of total river flow passing over the spillway at the same time. Why did the report not obtain and present available hydroacoustic and radiotelemetry estimates of spill efficiency for each dam from the Corps? With the number of years of these types of studies, these data are readily available and should have been reported.

We noted in several sections of the report that data were presented without the associated error bounds. This was particularly evident in the section on spill. For example, the differences in survival rates reported for high, medium, and low spill rates on page 40 and the values reported for deflector and non-deflector spillway survival on page 38 should be qualified with error bounds. In a number of cases, these point estimates are not significantly different. Specifically, some point estimates for juvenile mortality in spillbays with deflectors are higher than those for spillbays without deflectors, but the survival differences are not significant. Thus, the conclusion on page 38 that "flow deflectors depress survival" is invalid. Moreover, spillway deflectors reduce TDG by 10-20% for a given level of spill and allow higher volumes of spill at a given TDG concentration, improving juvenile fish passage survival at the dam. Deflectors also reduce fish mortality during high involuntary spills by reducing TDG. Early research documented large losses of smolts to elevated dissolved gas concentrations. Those losses were much higher than the small differences in potential direct losses with and without spillway deflectors.

Page 46. The statement that spill was 13% of total discharge is incorrect. Spill was 26% of total discharge for 12 hours; 13% is the daily average spill level at John Day Dam.

Page 47. It is important to consider that we do not fully understand the mechanisms associated with the survival benefits of spill. Route-specific studies evaluate only specific areas of spillway passage, depending on where treatment and reference groups are released. These types of studies limit our understanding of spillway survival mechanisms. Given the weakness in our understanding, the statement made at the end of the first paragraph appears too strongly stated. Under poor in-river passage conditions, such as in 2001, the large increase in survival reported for summer/fall chinook due to spill may not be that unlikely.

Flow Augmentation

The assertion of the report that increased water velocity (and the concurrent increase in smolt migration speed) is the sole factor as the basis for flow augmentation is too narrowly focused. Other survival benefits are anticipated to accrue with higher mainstem flows, e.g., improved conditions in the estuary, a larger Columbia River plume, and increased turbidity to reduce predation. Keep in mind that while small amounts of flow augmentation from storage reservoirs have been used in recent years to fill in low flow periods during the spring, the primary mechanism to improve spring flows is to have storage reservoirs at or near the upper (flood control) rule curve elevations so that the reservoirs identified in the NMFS 2000 FCRPS Biological Opinion (NMFS 2000a) pass through more of the spring freshet.

Several summaries have not been included in the review. Examples include Connor (2001) and Marmorek (1998). These papers provide evidence that suggests increased flow and reduced water temperature are beneficial for juvenile salmonid survival and should have been included in the subject report. Further, there is no discussion of smolt-to-adult vs. flow relationships as provided in the NMFS White Paper on flow augmentation (NMFS 2000c), which also suggests increased survival benefits are possible from higher flow levels.

The comment that "there is little evidence supporting a flow/survival relationship across the water years experienced from 1993-2000" followed by a discussion of the negative survival impacts of low flows in 2001 stops short of the next step, and is thus incomplete, potentially leaving the reader with the impression that it has been demonstrated there is no flow/survival relationship. There was only one low flow year in the 1993-2000 period. Now, with 1994 and 2001 providing two low flow years, additional analysis can and is being conducted.

Page 62. Some of the information discussed here about potential hydropower experiences and the uncertainty of extra mortality should also be included in the two previous sections to assure that the casual reader knows that this effect exists.

Page 63. In early years, higher flow also had associated higher spill (sometimes substantially so when not all turbines were in place) which likely provided decreased passage delay at dams.

Page 65. See Smith et al. (2002), in Press, (due out in the May issue of the *North American Journal of Fisheries Management*) for a comprehensive analysis related to travel time and river conditions for spring migrants.

Pages 80 bottom/81 top. There is a need to acknowledge the potential impacts of smolt timing to the estuary. In-river juvenile fish migrate approximately one-third as fast through the impounded hydrosystem as through a free-flowing river, arriving at the estuary much later than historically. Higher flows decrease travel times of migrants, delivering them to the estuary closer to their historic arrival time.

Page 81, bottom. Juvenile fish that migrate past Lower Granite Dam in September and October, while fewer in numbers than earlier migrating fish, have much higher SARs (sometimes 2-4 times higher) than fish migrating in the summer.

Thank you for the opportunity to comment. Should you have any questions about our comments, please contact Chris Ross at 503-230-5416 or Paul Wagner at 503-231-2316 of my staff.

Sincerely,

Brian J. Brown

Brian J. Brown
Assistant Regional Administrator
Hydro Program

References

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