

## Review Comments: Passage of Juvenile and Adult Salmonids at Columbia and Snake River Dams

### A. General:

1. Suggestions for minor editorial changes were not made. We expect that they will be corrected during redrafting.
2. We are aware and generally support comments already provided by the other Action Agencies. Our specific comments are not intended to duplicate those other efforts.
3. We suggest restructuring this paper to address all aspects of passage at particular projects rather than sections summarizing individual passage routes. The document would be more useable and readable if organized differently. Much of the information is dam-specific and would be better presented dam by dam rather than passage route by passage route. One important lesson learned from recent passage research is that manipulation of one passage route can affect fish survival, distribution, and behavior at other routes at the dam. For example, increasing spill duration at John Day Dam increases the proportion of fish passing the spillway, but decreases the proportion that pass the bypass system, resulting in no turbine passage reduction. Increasing spill percentage also increases the proportion of juveniles passing the spillway, but affects tailrace egress and survival for juveniles passing through the juvenile bypass. The document does not mention these relationships, and as organized, it would be awkward to do so.
4. The document needs to be updated with more recent research results. There are relevant and important final reports that are not used. There are many more draft reports available as well. Most of the recent final reports are available on Portland and Walla Walla Districts' Web sites. Draft reports have been distributed to the Science Center for review, and are also available by request through each District (Marvin Shuttles and Rock Peters).
5. The document needs to be updated on the status of various actions that will be carried out at Corps dams. For example, the surface bypass section of the report says we will make a decision on surface collection at Bonneville Powerhouse 1 in 2000, test turbine intake occlusions at The Dalles Dam in 2001, and test an RSW at John Day in 2002. The Corps and Region has made decisions on all of these actions, and the status stated in this document is no longer accurate.
7. The paper would benefit from a conclusions/recommendations section that would provide a sense of where programs (e.g., by project) should be directed in the long-term to provide the greatest benefit to salmon populations.

### B. Specific:

<u>Page</u>	<u>Para</u>	<u>Line</u>	<u>Comment</u>
3	1	10	Although spill may be the safest passage route at any one dam, a spilled fish must pass through the next downstream project (including the dam and reservoir). Therefore spill survival should also include reservoir survival at the upstream reservoir for making management decisions. Further, as later discussions should support, spill must be managed to specific volumes and patterns to provide the expected safe routes.
3	2	6	This statement is only partially true, the Snake River dams were authorized for navigation, power production, recreation, irrigation, and fish and wildlife, not just power production.
4	2	4	After the second sentence suggest adding "The Corps coordinated and prepared a Juvenile Fish Passage Plan each year, as called for in the NPPC Fish & Wildlife Programs, then implemented the spill levels and project operations in the Plan."

5	4		The paragraph should state that spill is now provided at levels which produce up to 120% TDG in the tailraces and 115% TDG at the forebay of the next project downstream, whichever is less, according to state water quality standard variances.
6	3+		Suggest using one definition for the terms "spill efficiency" and "spill effectiveness" throughout the document. Suggest using <i>spill efficiency</i> for the proportion of fish passing via the spillway. That way, it is consistent with <i>fish guidance efficiency</i> and <i>fish passage efficiency</i> .
7	2	1	...all other <u>FCRPS</u> dams,... Rocky Reach is nearly a mirror image of The Dalles Dam
7	2		For more recent spill efficiency and effectiveness relationships at The Dalles Dam, use <i>Synthesis of radio telemetry, hydroacoustic, and survival studies at The Dalles Dam</i> (Ploskey et al. 2001).
8	3		Hydroacoustic passage estimates at John Day Dam spillway are highly suspect for lower spill volumes prior to 2002. For example, Moursund <i>et al.</i> reported that 60% of summer migrants passed the spillway under adult attraction spill. In 1998, Biosonics noted that more fish were passing the spillway under 30% spill. It was confirmed that fish were being counted multiple times under the lower spill discharge. In 2002, the spillway and turbine intake transducers placement was studied and modified. Hydroacoustic passage distribution results had better agreement with the radio telemetry data following the new placement.
8	3		The discussion for John Day 24-hour spill should describe the effect of spill on FPE (e.g. changes in spill redistribute the proportion of fish passing non-turbine routes and do not increase FPE). This section needs updating: draft reports for passage distribution, egress, and survival are available through 2003.
9	3	6-8	The sentence states that no spill after 31 August is a problem. This is inconsistent with statements made by NOAA Fisheries representatives at TMT who have said that late season (September and later) outmigrants have relatively high SARs.
11	1		Spill percentage may have more of an effect on tailrace egress at some projects than volume. Total river Q and tailwater elevation are also important variables.
13 – 14			Spill Survival – This section needs to include recent radio telemetry survival results from USGS (Counihan et al.). There should also be some discussion on direct effects of spillway passage on fish injury and mortality: historical reviews by Bell and Delacy, and Ruggles and Murray, Balloon-tag studies, PNNL shear studies.
14	2		This statement needs to be updated to reflect the work done by USGS over the last number of years.
15-16	Table 1.		This information must be updated to incorporate the USGS, Heise, etcetera data that has been collected over the last number of years
17-18	Table 2.		See above statement
20	Table 3		The table uses 1999 data on spill caps. More current data can be obtained from the Corps' Reservoir Control Center, Portland, OR.
27	2	7	Suggest changing "key" with <u>all</u> bypass systems. They all have juvenile fish monitoring.
27	3	3	The most current Corps Fish Passage Plan will be February 2004.
28	1		There is also a substantial amount of hydroacoustic data on FGE.
32	Table 5		Suggest including averages in this table also.
34			Orifice Passage Efficiency – Some discussion on the relevance of orifice passage efficiency to fish condition and survival should be added here. It may be that the amount of time fish spend in the gatewell is more important than how many are left after 20 hours. Part of this discussion should include lessons learned at John Day in 1999.
34-35			Although these estimates of OPE are what was measured during OPE tests, Axel

			had some measurement of OPE at McNary using RT fish (although it was not reported as such). In addition, we suggest looking at OPE with PIT studies to determine, on a shorter time basis, how many fish are leaving the gatewells and at what time period, to assess the real impacts of long gatewell residence times. In addition, without PIT detections and operations data for the turbine, we have no idea of how many fish actually may have escaped out of the gatewell.
36	2	6	please include ...large animals <i>and large debris</i> are carried...
36-45			Suggest too much information is provided here relative to the rest of the document.
38	1	6	This is now in place at Lower Monumental and is working well. Please include in this document.
44	Figure caption		It is not clear why high velocity and McNary-style separators were put on the same graph.
45 – 62			Diel Passage and Timing – This section is very difficult to follow. It is not just about bypass systems (which it is a subheading under), and inconsistently discusses various forebay behaviors as well as diel passage. It seems as though the authors recognize that diel passage is not a bypass-specific problem but rather a dam-specific problem and affected by changing project operation and configuration.
45 - 62			Diel Passage and Timing – Radio telemetry is not the proper tool for evaluating diel passage. As the authors point out, passage timing of radio-tagged fish is dependent on release timing and location of tagged fish. This is not representative of the population at large.
48	All		Assuming that fish passage from gatewell to JFF is not a great amount of time, could diel passage be determined through the counting tunnels at the JFF?
51	1		Results from G Axel work should be included.
51	2+		These paragraphs need updating. Hydroacoustic data from Moursund et al. 2002 should be used for project-wide and route-specific diel passage rates. Prior to that study, the only reliable 24-hour passage data has been for the JBS through the smolt monitoring program. As stated earlier, radio telemetry data do not provide estimates of diel passage. It should also be stated that Counihan et al. (2002) found no relationship between survival and forebay residence times at John Day Dam in 2000. Survival rates from the release at Rock Creek to the dam were very high for yearling Chinook and steelhead.
51	4	1-5	Why is this even reported with a sample size of 2?
55	2-3		Use of daylight and night hours is questionable considering that summer hours are light until 9:30 pm, and 7:00 pm is used as the cutoff for daylight hours.
55	3	5	Please cite these recent HA studies.
55	3	7	Ploskey showed with the Didson in 2002 that the use of hydroacoustics at The Dalles Dam sluiceway was not valid due to fishes behavior of going in and out in front of the sluiceway entrance.
58	3		This paragraph needs to be updated, and the spillway is not “unattached”. There are 3 passage routes at each powerhouse: turbine, ice and trash sluice or chute, and juvenile bypass system.
62	2	1	Is this an RT study? If so, it should be noted as such.
63	2	2	please replace “can” with <i>regularly</i>
63	2-3		Suggest a mention of North powerhouse loading and forebay temperature differential.
62	4		Water Temperature Effects – This section blends system-wide and bypass-specific (McNary) temperature related problems. It is not always clear which the author is talking about. Since this section is under bypass systems, it would make more sense to discuss McNary only here, and save the river temperature effects for a separate section on system-wide effects. Extra mortality would fit better under a system-wide heading as well.
65	4		This paragraph suggests that perhaps the Corps should not be running the JFF at

Ice Harbor because the data is not useful. However, because the information is used to determine if there are problems within the bypass system, we believe that it is worthwhile continuing.

67 1 6-7 This could be said for any passage route at the dam including spill, so it is not clear why it is highlighted here and not elsewhere.

68 This section needs to be updated to reflect the B2 corner collector  
70 USGS had performed a great deal of this type of work as well. Suggest referencing it as well.

78 1 Suggest also considering the work by John Nestler.

79 1 This paragraph needs updating

80 3 This paragraph is less appropriate to the “Powerhouse Surface Flow Attraction Channel” section of the report, than to category 3, Surface bypass Spill/Sluice.

81 5 This entire paragraph needs to be updated.

83 1-2 These 2 paragraphs need to be updated.

84 3 This entire needs to be updated. The facility is built and operating.

85 1 This entire paragraph needs to be updated.

85 2 This entire paragraph needs to be updated.

85 3 This entire paragraph needs to be updated.

86 1 This entire paragraph needs to be updated.

86 4 This entire paragraph needs to be updated.

88 Juvenile Passage Through Turbines – This section was well written and current.

89 4 Subyearling chinook survival through John Day turbines ranges from 71.9 to 72.2%.

89 5 We have seen differences between PIT and radio telemetry survival estimates go both directions. The main point here should not be the trends observed but whether the differences between the two techniques were significant and whether differences were large.

91 3 2 This needs a citation.

92 1 More information is needed to ascertain what the conditions were, such as when this was done, time of year, and what were the debris loading conditions.

96 6 We disagree that the physical properties (shear, stress, turbulence) are less through turbines than spillways as suggested.

98 Conclusions This is a good wrap up of this section. Something similar needs to be provided in every section.

101 5 Key Uncertainties, Juvenile Lamprey – This section could be improved by including information from the PNNL lab and field studies. These studies assessed the effects of pressure changes, shear, and screens on lamprey condition and survival. Also point out that while most lamprey are collected deeper in turbine intakes, substantial numbers are captured in the bypass systems through the Smolt Monitoring Program. These data provide some estimates of seasonal run timing.

102 As for Lamprey, there was PIT tag information gathered by Fyke nets by Monk at Bonneville, as well as a study of lamprey PIT tagged and run through the McNary Juvenile Bypass system.

102 Moser et al, Ocker et al, Vella et al discuss adult passage, yet it is not mentioned here.

103 Adult Passage - Most of the adult info is somewhat dated (2001 and before). Only the kelt summary is up to date. Although many of the reports are not yet finalized, the data summaries should be updated to include the more recent results. So many issues have been focused and clarified in the last couple of years and little of that is included here (fallback at BON with regards to delay and spill including clarifying important parameters such as use of near fallback %, and the need for PH2 priority with shift of fish to WA ladder, improvements to JDA south ladder that basically eliminated jumping and reduced passage times, the accounting of most of the unaccounted loss between dams with more effort and CART tags, the ability to get estimates for stock groups for system

			survival with the increase in # of PIT tagged adults etc).
104	2 & 3		These paragraphs need to be updated.
104	4	6	The paper states that there is no evidence that radio-tagging affects chinook passage rates, but does not mention the escapement differences observed between radio and PIT-tagged fish.
105	2	8	This occurred during spill and there is no mention of that here.
107	2		This entire paragraph needs to be updated.
107	3		Similar to Snake River dams , TDD and B1 are now closing orifice gates as there was no improvement to passage with them open and the water can be better used elsewhere.
109	2	10-12	This is not what EPA has determined. This needs to be verified.
113	4		This was documented at the mouth of the Okanogan River prior to many of the dams being in. This is a natural behavior, not just a phenomenon related to the dams.
114	4		There is no mention of the evaluation of how cold water releases from Dworshak actually increase the differences in temperature differences in the ladder at Lower Granite and likely exacerbate the corresponding problem of ladder fallout and passage delay found there.
115	1	5	A better citation than a personal communication here would be the Hells Canyon TMDL put out by EPA recently.
116	1	5	Depth distribution has found consistently that nearly all salmonids in reservoirs swim below the compensation depth and seek out cooler river temperatures when available.
117	2		This entire paragraph needs to be updated.
121	1		Regarding the statement "A large amount of information has been gathered, and the data from these studies are reported in this document" most of the 2001-03 data is not included.
121	2	2	Not sure that estuary passage by adults is a key uncertainty (should be in the estuary white paper instead?).
124	1	2	This should be cited as Ocker et al 2000.
124	4		Why the focus on Deschutes river? This issue is more broad than that and the last 3 years of known source fish has helped illuminate the scale of straying and wandering in different stocks, differences in species, and some of the factors that may be affecting these behaviors (river temperature, transport, etc).
125	1	3	This paragraph is outdated and numbers should be updated

**References:** This section needs to be proofed and all of the citations reconciled with the text.