FISH PASSAGE CENTER

1827 NE 44th Ave., Suite 240, Portland, OR 97213
Phone: (503) 230-4099 Fax: (503) 230-7559
http://www.fpc.org/
e-mail us at fpcstaff@fpc.org

MEMORANDUM

TO: Rob Lothrop, CRITFC

FROM: Michele DeHart

DATE: April 26, 2012

RE: Review comments on the NOAA paper entitled, "Changing rates of upstream survival in Snake River Spring-Summer Chinook Salmon during the migration season as indicated by short interval PIT tag estimates of survival"

In response to your request the FPC staff reviewed the subject report. We offer the following comments for your consideration. This analysis only addressed spring/summer Chinook originating from the Snake River, returning as adults in 2007-2011. The FPC previously submitted comments on a similar analysis of upstream migration success entitled, "Adult Upper Columbia River and Snake River Spring Chinook Salmon and Steelhead Survival through the Federal Columbia River Power System Hydroelectric Projects" Final Phase I Report June 29, 2011 by Peven et al. (FPC memorandum, April 24, 2012). The comments on that analysis also apply to this NOAA analysis of upstream migration success of Snake River spring/summer Chinook. The NOAA paper is composed of many graphic representations of data with very little actual analyses of variables or interactions. The NOAA paper and graphic data representations are provided without any overall context so it is difficult to ascertain the point of the paper. **The paper is fundamentally interpretations of patterns illustrated in graphs, which are based upon judgment, and contributes little to the understanding of upstream migration success of Snake River spring/summer Chinook.** It is obvious and we agree that harvest reduces escapement, we would add that harvest is intended to reduce escapement.

Although the authors recognize the fundamental limitation of using PIT-tags in the methods discussion, they generate conclusions without discussing the impact of these limitations on their conclusions. Specifically the authors state "*since the fish used in this analyses were PIT tagged for other purposes, there is always the risk that there may be unknown sources of bias related to the original purpose of the tagging. Additionally, not all populations of fish are PIT*

tagged in equal proportions it is likely that a relatively small number of stocks dominate the fish used for survival estimation".

- All of the conclusions from these analyses are affected by the above stated limitation of this approach.

- One known source of bias in their methods is the disproportionate tagging of hatchery spring/summer Chinook from the Snake River and the mark-selective sports harvest. The author does not discuss the potential effect of mark select sport fisheries for hatchery fish in the Bonneville to McNary reach.

- The authors have overlooked the impact of juvenile migration history on upstream migration success. In Peven et al. a logistic modeling analysis indicated that smolt transportation, hatchery/wild origin and age class all affected upstream migration success. This finding is consistent with other study results such as the Comparative Survival Study. This is particularly important because smolt transportation is a management program for Snake River spring/summer Chinook and studies indicate that transported smolts have lower upstream migration success and higher stray rates.

- The NOAA analyses conclude that stray rates and harvest affect calculated upstream success rate or escapement. This is true, is expected, and is intended.

- The NOAA analyses are provided without context. In Table 2, the authors present data indicating that BON-MCN survivals for Snake River spring/summer Chinook adults have ranged from 85.8% to 94.1% and MCN-LGR survivals have been in the 93.1 to 96.7% range over the past four years, based on analyses of PIT-tags. Spring Chinook tribal and Idaho fisheries have taken place above Lower Granite Dam in 2007-2011, the years of the NOAA analyses. This is an indication that upstream migration success (i.e., escapement) was adequate in these years for Snake River spring/summer Chinook.

- The NOAA analyses appear to be a "graphical analysis" that uses visual comparisons to draw conclusions about the patterns in survival and travel time in adult fish. Conclusions appear to be based on judgment of patterns observed by the authors. This is troubling since it is impossible to review and the patterns described often do not match the graphics. There are no statistical quantitative analyses.

- There are numerous unidentified assumptions buried within this non-statistical analysis that make it difficult to meaningfully review. This analysis does not provide any meaningful explanation of adult survival. There is no explanation of how the graphical analysis account for differing confidence intervals on survival estimates throughout the season.

- The analyses does not account for variable travel time for fish, nor do the authors describe how the graphical display of data can account for that variability. Variability in quartiles may relate more to sample size than any environmental or population effect.

- In most graphs presented, survival appears to approach zero late in the migration season. This may be because of low sample size but it is impossible to determine from the data representation.

- Similarly, early season low survivals may also be related to small sample sizes. A table of data would have been helpful to determine which sample sizes were used for survivals, but generally wide confidence intervals suggest those estimates were based on small numbers of fish. Periods of low survival also appear to be periods with high uncertainty (i.e. low sample sizes).

- Early season harvest does not seem to affect survival of PIT tagged fish. The authors do not investigate or illuminate on this pattern in their data. Nor do they discuss the late season survival declining pattern in both reaches in their graphical representations.

- The authors conclude that the available PIT-tagged adults reasonably represent the run-at-large timing. However, they have only displayed return timing of tag groups against ladder counts in 2 of the 5 years analyzed. We would not expect Bonneville ladder counts which include returns from many ESUs, the upper Columbia and the Middle Columbia to represent the Snake River spring/summer Chinook ESU.

- The NOAA analyses do not support the conclusions. The document concludes that survival is low in April in the BON to MCN reach. It appears based on Table 3a that may be true in 3 of the 5 years but a review of graphical patterns is not particularly helpful since the adequacy of sample size was not reviewed. The conclusions regarding travel time are not supportable by the data. We agree with the authors when they state; *"A more statistically rigorous analysis of the duration and magnitude of this period may also help to clarify the situation."* This statement could be applied to the entire document since no statistical analyses were applied to the data.

- Authors concluded that average travel times reflected slow migration rate of the slowest 25% of fish. It is unclear if average travel time was appropriate measure for capturing population travel times. Often medians are used to reduce the influence of outliers that tend to skew average calculations particularly with travel time data.

- The authors also state that a significant number of slow fish are fallbacks but that PIT-tags only record travel times. This is not true, since re-ascending PIT-tagged fish would be recorded and could have been analyzed to answer this question.

- The authors state that there "appears to be a relationship between increased travel time and reduced survival" during the period in 2011 when spill at LGS was near 100%. This statement is based on MCN-LGR adult survivals and travel times. However, they present no statistical analyses to support this notion. The NOAA conclusion is not supportable by the data. A Fish Passage Center analysis (Dec. 9, 2011) found that spill levels of greater than 30% (the prescribed spill at LGS) had no effect on the travel times or conversion rates (ICH-LGR) of adult Chinook in 2011. Conversion rates (ICH-LGR) remained high during the periods when LGS spilled in excess of 30% and even when spill at LGS was in

excess of 70%. This analysis revealed slight increases in travel times when spill at LGS exceeded 40%, but this level of spill only occurs when flows are above hydraulic capacity and are generally above the current gas caps at LGS.