



# FISH PASSAGE CENTER

847 NE 19<sup>th</sup> Avenue, #250, Portland, OR 97232

Phone: (503) 833-3900 Fax: (503) 232-1259

[www.fpc.org/](http://www.fpc.org/)

e-mail us at [fpcstaff@fpc.org](mailto:fpcstaff@fpc.org)

## MEMORANDUM

TO: Michele DeHart

FROM: Erin Cooper

DATE: January 30, 2015

RE: Conversion Rates of Adults between Bonneville and McNary Dams

At your request, we have reviewed the statements made in “Researchers explore Chinook losses in lower Columbia”, from the January 2, 2015, newsletter *Clearing Up*, regarding adult conversion rates between Bonneville and McNary dams. These statements were based on a presentation titled “Conversion of radio-tagged adult salmon and steelhead through the lower FCRPS: 2013–2014,” made by Keefer et al. at the Anadromous Fish Evaluation Program (AFEP) 2014 Annual Review on December 10–11, 2014.

We were present at the AFEP Annual Review, and have re-reviewed the presentation that was given on that day. Our review indicates that the summary provided in *Clearing Up* does not accurately reflect the results provided by Keefer et al. 2014, or the best available data on conversion rates. Listed below are some of our concerns:

- The juvenile migration history is unknown for the fish used in this study. A growing body of scientific analysis shows that juvenile migration history, specifically whether or not a juvenile fish was transported, has extended effects throughout the life cycle, including adult migration success.
- The geographic origin of fish used in this study is unknown. The unmarked fish originating from the Upper Columbia, Snake River, and all tributaries are indistinguishable and, therefore, are combined into a single group for this study. This eliminates the possibility of detecting any potential differences in migration timing, conversion rates, and straying among stocks. This is made clear in the presentation by Keefer et al. 2014, when they state, “samples not fully representative.”

- Straying fish cannot be identified. Although there are detection arrays in “most major tributaries,” strays cannot be identified because fish origins are unknown. Fish that migrate into tributaries lacking detection arrays will be indistinguishable from mortalities.
- The conversion rates from Keefer et al. 2014 cannot be compared to the conversion rates included in the Biological Opinion. Data in the Biological Opinion are divided by Snake River and Upper Columbia stocks, which is not possible with the adults tagged at Bonneville Dam for this study.
- The data from telemetry studies require considerable post-hoc processing before they can be used for analyses. A public database for raw and processed data, when available with detailed descriptions of post-hoc inclusion and rejection of data, would make outside evaluation of these data more straightforward.

### **Adult collections at Bonneville Dam do not incorporate juvenile history**

The juvenile history is not known for untagged adults collected at Bonneville Dam. Only untagged adults were available for inclusion in this study, so juvenile migration type (transportation vs. in-river) is not included as a potential factor. Evidence suggests that migration type affects adult success rates, in addition to a number of other life cycles stages such as reach survival, travel times, and first year ocean survival (Peven et al. 2011, FPC Memo April 24, 2012). A study to determine the factors affecting adult conversion rates should include the effects of the transportation of juveniles.

### **Samples used in Keefer et al. 2014 are not representative of the population**

The origins of untagged adults collected at Bonneville are unknown. For this study, fish from the Snake River, Upper Columbia, and all tributaries are combined into larger groups by species. Differences among stocks can include migration timing, proportion transported, jacking rates, straying rates, and adult conversion rates. Grouping all stocks together creates a data set which cannot be used to determine if low adult conversion rates can be attributed to particular stocks, rearing practices, or migration types. With these factors excluded from the study, the data cannot provide a complete synthesis of the reasons that adult conversion rates do not meet the standards laid out in the 2008 Biological Opinion.

### **Study cannot distinguish between migration, strays, and mortality**

The design of this study results in the inability to identify straying adults. Straying adults will negatively impact conversion rates measured by other studies that can identify fish origins, but will not affect conversion rates estimated by Keefer et al. 2014. Therefore, the results presented by Keefer et al. 2014 may overestimate conversion rates when compared to other methodologies.

Although there are detection arrays in most major tributaries, any migration into minor tributaries will be indistinguishable from mortalities in the study design used by Keefer et al. 2014. Both natural migration and straying will be misattributed as a conversion loss in the results.

## **Results from Keefer et al. cannot be compared to the Biological Opinion**

In the newsletter *Clearing Up*, the results from Keefer et al. 2014 are compared with the Biological Opinion conversion rate standard of 91%. However, these numbers are not comparable. The Biological Opinion conversion rates are broken down by stocks, while the results from Keefer et al. 2014 are combined by species. Only studies involving specific fish origins can be used to determine if the standards determined by the Biological Opinion are being met.

In conclusion, the *Clearing Up* article “Researchers explore Chinook losses in lower Columbia” does not adequately address the limitations involved in a study that uses adults collected at Bonneville to study adult conversion rates and adult losses between Bonneville and McNary Dams. Results from Keefer et al. 2014 do not incorporate a number of critical factors for determining adult conversion rates, and should be interpreted carefully with regard to the potential losses of adults above Bonneville Dam.

## **References**

- Keefer M, Caudill C, Jepson M, Clabough T, Johnson E, Lee S, Burke B, Frick K. 2014. Conversion of radio-tagged adult salmon and steelhead through the lower FCRPS: 2013–2014. Presented at Anadromous Fish Evaluation Program 2014 Annual Review, December 10–11, 2014 in Portland, OR. Available at: [http://www.nwd-wc.usace.army.mil/tmt/documents/FPOM/2010/2014\\_AFEP/2014\\_AFEP.html](http://www.nwd-wc.usace.army.mil/tmt/documents/FPOM/2010/2014_AFEP/2014_AFEP.html)
- Peven C, Paulsen C, Miller M, Stevenson J, Truscott K. 2011. Adult Upper Columbia River and Snake River Spring Chinook Salmon and Steelhead Survival through the Federal Columbia River Power System Hydroelectric Projects.
- FPC (Fish Passage Center). April 24, 2012. FPC Memorandum *Review of “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.* [www.fpc.org/documents/memos/50-12.pdf](http://www.fpc.org/documents/memos/50-12.pdf).