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To: David Clugston

From: Chris Peery

RE: Fish ladder passage times

As you and FPOM requested, we have assembled passage times for fish ladders and some available information for count windows.

Attached you will find a spreadsheet that details ladder passage times by month for The Dalles and John Day dams. We have provided median, mean, and 10 and 90 percentiles for both ladders and individual ladders. Ladder passage times are defined from the point they last leave the transition pool area until their last record at the top of the ladder (exiting to the forebay).

At The Dalles median passage times generally range 2 to 3 hours for all groups. There does not appear to be much variation between ladders. Longest ravel times for some chinook salmon occur in April coinciding with lower water temperatures. At John Day Dam, median ladder passage times from about 2.5 to 5 hours. Steelhead tend to have slightly longer passage times and extreme times are seen during early winter. Times in the North ladder appear to be slightly higher than for the south ladder for this dataset. There are more fish, Chinook and steelhead, with longer travel times (10-12 h, see 90 percentiles) at John Day than The Dalles Dam.

We have specific count window data (antennas were located just upstream and downstream from count windows during some portion of the migration season) at the following locations and years;

Dam	Year	Ladder	Status
Bonneville	2001-2002	Both ladders	Draft report; presented at 2003 AFEP (see below)
The Dalles	2000	East Ladder?	Level of monitoring unclear
John Day	1997-1998	North Ladder	Some summary already complete (see below)
McNary	2003	Both ladders	Final coding of sp-su CK data underway
Ice Harbor	2003	North Ladder	Final coding of sp-su CK data underway

We are in the process of completing a report on count window information at Bonneville Dam during 2000-2001. Summary tables from that report were also provided in the attached spreadsheet. We see that the data is variable. For example, median times to pass the Bradford Island count window (traverse between up- and downstream antennas) were in the range of 6 to 15 minutes, with means of 1 to 2 h and standard deviations on the order of 7 to 15 h. Values for the Washington-shore ladder appear to be slightly lower. This is an indication that some fish are delayed at the window. It must be noted that the ladder transitions to vertical slot weirs just upstream from count windows at Bonneville Dam, and the combination of both conditions may cause some

fish to hesitate in their passage. We do see few fish that turn around at count windows and descend ladders, one of the criteria we used when assessing passage conditions at dams.

As noted above, some information was available for John Day North ladder, as summarized by Matt Keefer.

> We only had 74 steelhead pass the north ladder site in 1997 while antennas were operating. Median passage time was 0.24 h; 8.1% took > 24 h to pass EJD and 13.5% took > 8 h; 12% backed down at least as far as the transition pool. Most of the fish at both ladders with passage times > 8 h were recorded on the upper antenna or even the top-of-ladder antenna before backing down. A handful of others spent the night before passing the site. My overall conclusion is that the counting window is not a problem at all for chinook, but may be a minor problem for steelhead. Even with steelhead, though, most of the fish with 'delays' were recorded at the antennas upstream from the windows. Could be something other than the window is causing turnarounds.

In my opinion (C. Peery), 12% of the fish backing down the ladder indicates a problem exists in the ladder, but, as Matt indicated, conditions upstream from the count window may be contributing to the effect.

Additional information on monthly ladder passage times at other dams can be assembled if desired. Further analysis of available count window data will be made.