



FISH PASSAGE CENTER

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MEMORANDUM

TO: Tom Lorz (CRITFC)

FROM: Michele DeHart

DATE: January 29, 2009

RE: Adult travel times through Bonneville Dam, before and after the operation of Powerhouse 1.

In response to your request on November 14, 2008, the FPC staff has analyzed adult PIT-tag detections at Bonneville Dam (BON) to determine any differences in adult travel times through the project before and after the initiation of Powerhouse 1 (PH1) operations in 2008. According to section 2.1.2 of the Fish Passage Plan, when adult salmonid counts equal or exceed 25,000 fish per day after August 31, BON will operate two priority turbines at PH1 in an attempt to balance adult passage between both powerhouses. This operation is to continue until adult salmonid counts at the project fall below 20,000 per day.

In 2008, spill was curtailed on August 31st, with corner collector spill continuing until September 3rd. Total adult salmonid counts at BON exceeded the 25,000 per day criterion on September 3rd, at which time PH1 operations began. Furthermore, the criterion to curtail PH1 operations was met on September 9th. However, PH1 continued operating well beyond this time. Given this, there is only a 2 day window of time where no spill was provided from the BON spillway and PH1 was not operating. This makes it impossible to compare adult travel times before and after the operation of PH1. Therefore, the following memo provides summarized data on adult salmonid passage and adult travel times through BON from August 15 to September 29, 2008.

Adult Passage Distribution:

It appears that once spill was eliminated on September 1, 2008, the proportion of salmonid adults passing on the Washington shore increased, when compared to those estimated during spill operations (Figure 1). However, once PH1 operations resumed on September 3rd, the proportion of adults passing on the Washington shore seemed to decrease, at least initially. It appears that the operation of PH1 is not always enough to spread the adult passage evenly between the Oregon and Washington shores. However, it appears that the operation of PH1 is effective when it accounts for 40-50% of the overall flow through BON. For example, in periods of no spill when PH1 flows accounted for over 40% of the overall flow through BON, the average proportion of adults passing on the Washington side was 0.55. However, in periods of no spill when PH1 flows accounted for less than 40% of the overall flow through BON, the average proportion of adults passing on the Washington side was 0.67.

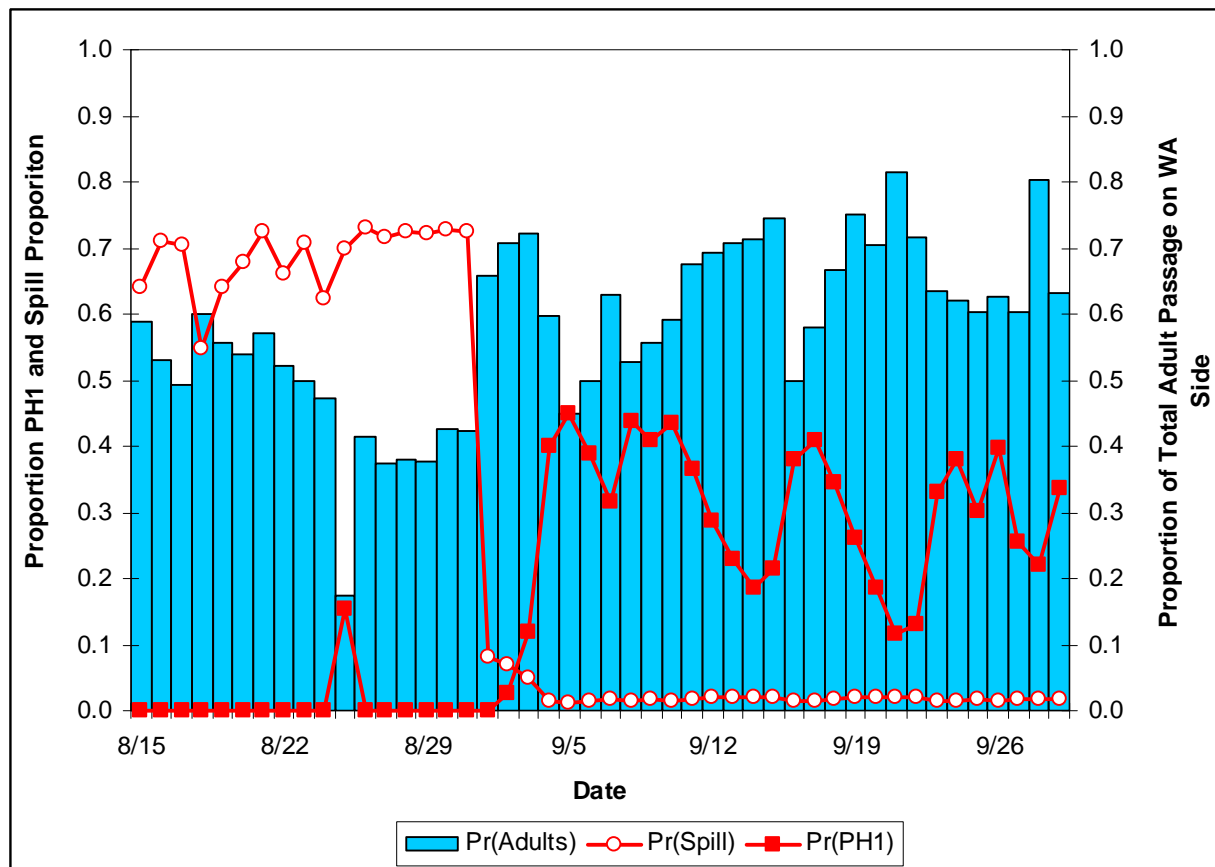


Figure 1. Proportion of overall flow at Bonneville passing through the spillway (red circles) and powerhouse 1 (red squares) and proportion of the total adult salmonid count passing by the Washington shore counting station (blue bars).

Adult Travel Time:

FPC staff utilized PIT-Tag data to estimate travel time of adult salmonids passing through Bonneville Dam during the period discussed above (Aug. 15 – Sept. 29, 2008). The vast majority of PIT-tagged adults detected at BON were fall Chinook and steelhead, so FPC staff focused on these two species. Because the initial focus was to determine whether the operation of PH1 had an effect on adult travel time through BON, by reducing crowding in the Washington shore ladders, FPC focused on PIT-tagged adult fall Chinook and steelhead entering the Cascade Island Fish Ladder (BO2) and exiting through the Washington Shore Ladder Vertical Slots (BO4). FPC staff could not use fish entering through the Washington Shore Fish Ladder (BO3) because the picketed leads for the Adult Fish Facility (AFF) were in operation during this time and adult travel time through this pathway would have been effected by the operation of the picketed leads.

Specifically, FPC staff only used adults that were first detected at weir 45 of BO2 and last detected at vertical slot 11 of BO4. Only those fish whose passage through these routes was successful were used in this analysis. For example, if a PIT-tagged adult was first detected at BO2 (weir 45) but then dropped back into BO3, that fish was not included in this analysis. Detections at detection arrays between weir 45 (BO3) and vertical slot 11 (BO4) were used to determine successful passage.

In all, there were 439 successful passages of PIT-tagged adult fall Chinook from BO2 (weir 45) to BO4 (vertical slot 11) during this period. The median travel time for these successful passages was 3.1 hours (Range: 1.2-43.3 hours). There were 269 successful passages of PIT-tagged adult steelhead through this same route. The median travel time for these successful passages was 2.9 hours (Range: 1.2-74.2 hours).

As mentioned above, there is only a 2 day window of time where no spill was provided from the BON spillway and PH1 was not operating. This makes it impossible to formally compare adult travel times through the ladders before and after the operation of PH1. However, FPC staff have summarized the median travel times of PIT-tagged adult fall Chinook and steelhead, based on the date of entry at BO2. Figure 2 illustrates these medial travel times, along with associated PH1 and spill levels (expressed as proportions of the total flow through BON).

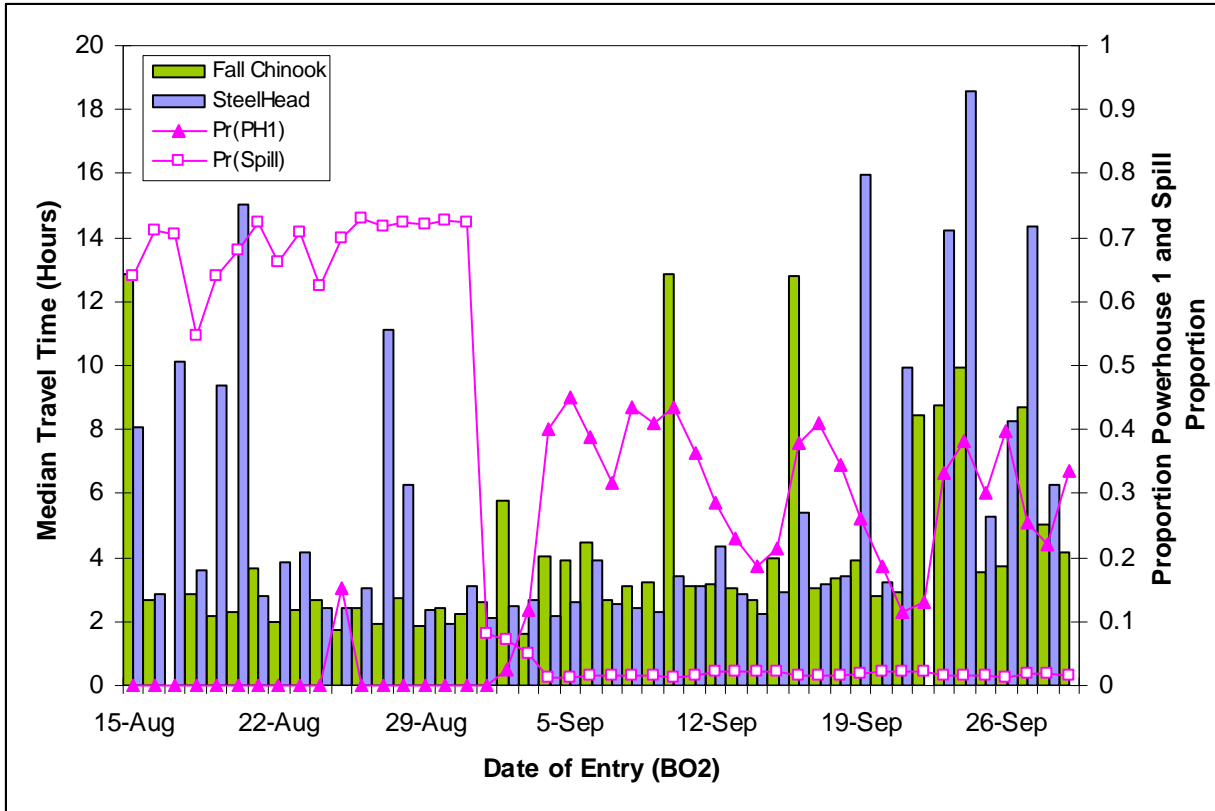


Figure 2. Median travel times (hours) of PIT-tagged adult fall Chinook and steelhead successfully passing from BO2 to BO4 (green and blue bars, successively) and powerhouse 1 and spill proportions (pink triangles and pink squares, successively) from Aug. 15 to Sept. 29, 2008.