

Cowlitz Fish Technical Committee  
Decision Documentation

<b>Project Name</b>	Prototype Weir Box Operations 2015 – 2017
<b>Date Proposal Submitted</b>	9/12/2014
<b>Date of Requested Decision</b>	10/24/2014
<b>Completed By</b>	Matt Bleich

**FTC Decision and Justification**

The FTC decided to move forward based on the background provided below. The Prototype Weir Box will not be installed and operated in 2015-2017 but will be considered for re-installation following the first year of operation of the Cowlitz Falls North Shore Collector (2017).

**Proposed Decision or Consideration**

The Prototype Weir Box will not be installed and operated in 2015-2017, and will be considered for re-installation following the first year of operation of the Cowlitz Falls North Shore Collector (2017).

**Background**

The prototype weir box was not tested as expected in 2012 due to debris occluding much of the trash rack on the intake of the host turbine. This changed intake flow, which in turn negatively affected the weir box and created an unsafe dam operating environment in certain conditions. As a result, the tests were terminated. Provisions were made to remove most of the debris and weir box prototype tests resumed in 2013 during the steelhead and coho season (April 16-June 26, 2013). The box was removed on June 27 in order to resume base operating conditions during LCPUD turbine Chinook survival tests.

Overall, recapture distribution at Spillway Flume No. 3 (Weir) was less successful (12.5%) than Spillway Flume No. 2 (existing (49.8%)); however, a significant increase in FCE was identified at the weir flume in coho release groups 8 and 9 after the removal of the weir box. Further analysis to address behavioral response in radio tagged fish was commissioned by Tacoma Power and completed by the United States Geological Survey (USGS). The study confirmed that smolts were selective to project discharge rates and collection flumes. While technical challenges with the radio telemetry system did not provide accurate estimates of Discovery and Entrance Efficiency, there was evidence that several fish exited the prototype weir box after entering, indicating that Retention Efficiency is a potential problem area in the current configuration.

Based on these results and the lack of information on the potential effectiveness of the weir box on Chinook salmon FCE, Tacoma Power recommended, and the Fish Technical Committee (FTC) concurred, that studies conducted in 2014 should focus on releases of PIT-tagged juvenile Chinook salmon during summer 2014.

Analysis of PIT-tag data using a multi-state mark-recapture model and results of radio-telemetry studies indicated that during summer 2014, estimated FCE for Chinook salmon was quite low (averaged 0.23 based on radio telemetry; 0.21 or less for three PIT-tag release groups).

Preliminary radio telemetry results showed that of the 190 tagged fish that were released, 85% (161 fish) were detected in the forebay of CFD. Median survival of released fish to CFD among the seven release groups was 80.0%. Of the 161 fish detected at CFD, 55% (88 fish) were detected in the discovery zone near the weir box or collection flume entrances. Median discovery efficiency and entrance efficiency among the seven release groups was 51.7% and 33.3%, respectively. Average retention efficiency was 22.6%.

#### **Coordination Need**

The FTC will revisit the decision to use implement the prototype weir box following the first season of the Cowlitz Falls North Shore operation (2017).

#### **Summary of Potential Impacts**

The 2014 preliminary results for Chinook were are similar to the 2013 results examining steelhead and coho. While the weir box shows some potential for improvement if retention efficiency and entrance efficiency are improved, these improvements still may not result in improvements over the existing flumes entrances at the CFFF. Tacoma recommends removing the weir box until the CFNSC has been installed and tested for at least one season in order to observe fish distribution and modified hydraulic patterns as these may result in a new strategy for adjustments in collecting fish at the flume entrances. Additionally, preliminary results from 2014 have illustrated a higher probability for steelhead and coho to be collected in spillway 2 flumes than in spillway 3. Evaluating this trend without the weir box in place in 2015 will allow the FTC to determine if the weir box is disadvantaged with installation in the south spillway bay.