EVALUATION OF THE COUGAR DAM PORTABLE FLOATING FISH COLLECTOR BASED ON ACOUSTIC-TAGGED JUVENILE CHINOOK SALMON

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The fish collection performance of the Portable Floating Fish Collector (PFFC) at Cougar Dam was studied using tagged juvenile Chinook salmon from May 2014 to January 2015. The study animals included yearling-sized fish implanted with acoustic transmitters and full-duplex PIT tags (N = 435 total released in April, May, and June) and yearling-size fish implanted with only full-duplex PIT tags (N = 496 released in June; N = 1,010 released in October). Presence and positions of tagged fish were determined using several hydrophones in the reservoir proper, a large series of hydrophones in the cul-de-sac, a PIT tag antenna within the PFFC, the trap hopper, and any tag detections downstream from the dam.

Few tagged fish were detected within the PFFC. Four fish tagged as part of this study were detected by the PIT antenna within the PFFC and one of them was collected in the trap hopper. The detection probability of the PIT antenna within the PFFC, assessed using floating drogues and automated signals, was over 90 percent. These sparse data indicate both low collection efficiency and an ability of fish to reject the trap after entering, results consistent with those from concurrent studies. A low number of tagged fish passed the dam via the temperature control tower during the same period.

The low capture rate of the PFFC was likely due to inadequate PFFC inflow velocities and poor location. Incoming water velocities were low due to the unexpectedly deep floating depth of the PFFC and associated change in the volume of water sampled. The PFFC location was a compromise between desired and achievable locations due to conditions during the installation of anchors. Actions are underway by the US Army Corps of Engineers to address both issues prior to PFFC operation in 2015.

Given the low capture rate, analyses are focused on determining locations and behaviors of the acoustic-tagged fish near the entrance to the PFFC and in the in cul-de-sac area of the reservoir. The goal of these analyses is to describe behaviors of fish near the PFFC entrance and help inform decisions about where the PFFC should be placed prior to resuming operation. Fish densities in the monitored area are being summarized from position data using the Dynamic Brownian Bridge Movement model to calculate probabilities of fish presence (Utilization Densities; UDs) and their behaviors near the PFFC entrance are additionally described using circular statistics. Results to date indicate the UDs near the PFFC fishing depth were often low

near the PFFC entrance and high between the PFFC and temperature control tower and fish movements near the PFFC were rarely directed towards the entrance.