BEHAVIOR, DISTRIBUTION, AND PASSAGE METRICS OF JUVENILE SALMONIDS FOR DETROIT DAM

Toby Kock, John Beeman, Amy Hansen, Jamie Sprando and Hal Hansel

U.S. Geological Survey, Columbia River Research Laboratory
5501A Cook-Underwood Road, Cook, WA 98605
tkock@usgs.gov

A study plan was developed to estimate dam passage survival of juvenile Chinook salmon that passed Detroit Dam during periods of temperature control spill in the summer and fall of 2014. Acoustic-tagged fish from the study were monitored as they moved downstream in the North Fork Santiam River, Santiam River, and Willamette River so the study plan also included secondary objectives. The secondary objectives were to: describe passage distributions through the Bennett Dam complex; and to estimate the proportion of tagged fish that were detected on PIT-tag antennas at Sullivan Dam, near Willamette Falls (hereafter Willamette Falls Dam). The study plan included releasing two groups of tagged fish. The first group served as the treatment and was released near the head of Detroit Reservoir. Treatment fish were released in mid-August and the group was comprised of 997 fish that had been previously tagged with a PIT-tag and a JSATS acoustic transmitter. These fish were released concurrently with 9,036 fish that had been previously tagged with a PIT-tag. The second group served as the control and was released in the tailrace of Minto Dam. Control fish were released in mid-September and the release was comprised of 636 PIT/JSATS fish and 9,324 PIT-only fish.

The number of treatment fish that passed Detroit Dam during the study period was low. We found that 57% of the treatment fish were eventually detected in the Detroit Dam forebay. Few tagged fish arrived in the forebay within 20 days of release and the median travel time from the release site to the forebay was 60.2 days. We found that 24 (2.4%) of the treatment fish were detected at Big Cliff Dam and detection records between Minto Dam and Portland show that about 1% of the treatment fish passed Detroit Dam and migrated downstream through the Willamette River. The low passage rate by treatment fish precluded estimating dam passage survival at Detroit Dam during 2014.

Less than half of the control fish moved downstream and passed Minto Dam while the JSATS transmitters were operating. A total of 242 PIT/JSATS-tagged fish from the control release were detected at Bennett Dam. Many of the fish passed Bennett Dam within 10 days of release. Detections of PIT/JSATS-tagged fish declined with distance downstream in the Willamette River. A total of 257 tagged control fish (40.4%) were detected at Salem, 136 tagged control fish (21.4%) were detected at Wilsonville, and 98 tagged control fish (15.4%) were detected at Portland. Detection patterns between PIT/JSATS-tagged fish and PIT-tagged fish were similar within the study area.

We examined PIT-tag detection records that were collected at Willamette Falls Dam for PIT/JSATS-tagged fish that were detected at Portland to quantify the percent of fish that passed and were detected on PIT-tag arrays at the dam. We found that 44 (45%) of the PIT/JSATS-tagged fish that were detected at Portland were also detected at Willamette Falls Dam as they moved downstream. The percent of a given population that is detected at Willamette Falls Dam

has not been empirically evaluated during previous studies so this finding may be useful for fishery managers in the basin.

Although the JSATS transmitters are no longer functioning, we will continue to collect data for this study on the PIT-tag arrays located at the Bennett Dam complex and Willamette Falls Dam. Based on data from previous studies, we anticipate that tagged fish from our study will continue to pass Willamette Falls Dam as late as July 2015. If this occurs, additional insights into migration patterns and survival should be available from fish that were tagged in this study.