

Juvenile Salmon Acoustic Telemetry System Use to Collect Reach Specific Mortality Information in the lower Columbia River

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The passage experience through the Federal Columbia River Power System (FCRPS) for juvenile salmonids on the seaward migration may affect their survival in the final 235 km of the Columbia River. In an effort to increase the understanding of juvenile salmon mortality in this lower portion of the Columbia River we evaluated survival for acoustically-tagged run-of-the-river yearling and subyearling Chinook salmon from the tailrace of Bonneville Dam through the lower Columbia River and estuary between 2005 and 2007 using the CJS single-release survival model. Test fish were anesthetized, surgically implanted with micro-acoustic transmitters (0.6 g in air) and passive integrated transponder (PIT) tags, and held for at least 12 h on river water to recover prior to release in the tailrace of Bonneville Dam. In both 2005 and 2006 four groups (n=161 to 245 per group) of yearling Chinook salmon were released. In 2005 five groups of subyearling Chinook salmon were released (n= 238 to 245 per group). In 2006, eight groups (n= 243 to 245 per group) of subyearling Chinook salmon were released. A total of 1,787 yearling and 2,790 subyearling Chinook salmon were released in the Bonneville Dam tailrace in 2007, respectively. Survival estimates of yearling Chinook salmon from 2005 and 2006 indicated a mean loss of 31.3 and 32.6% in this 235-km long reach, respectively. Estimated mean loss of subyearling Chinook salmon over the same reach was 49.6% in 2005 and 35.8% in 2006. In 2007 we increased the number of detection arrays to increase the spatial resolution of the mortality estimates. Tagged fish were detected on 10 autonomous acoustic receiver arrays on the seaward migration to partition loss over shorter reaches of this 235 km-long reach. Survival estimates from 2007 from these additional arrays showed most of the loss occurred in the lower 58 km the Columbia River where the river transitions into a broad, tidally-influenced estuary.