

Feasibility of using fishwheels for long-term monitoring of chinook salmon escapement on the Copper River

Abstract: The Copper River supports one of the largest chinook salmon (*Oncorhynchus tshawytscha*) subsistence fisheries in Alaska. Many stakeholders believe that escapement indices generated by traditional methods (aerial surveys and weirs on selected systems) have not adequately assessed the abundance of Copper River chinook salmon stocks. A recent three-year radio-telemetry study provided the first system-wide escapement estimates to the Copper River. Plans to end the telemetry study in 2001 created a need to develop a cost-effective, long-term program that could provide system-wide chinook salmon escapement estimates to the Copper River.

The objective of this study was to assess the feasibility of using fishwheels, as both the capture-tag and the recapture phases of a mark-recapture study, for long-term monitoring of chinook salmon escapement on the Copper River. In early 2001, the U.S. Fish and Wildlife Service (USFWS), through the Office of Subsistence Management, funded the Native Village of Eyak (NVE) to undertake this three-year study. Overall objectives for this study were to:

1. Evaluate the ability of fishwheels to capture chinook salmon on the Copper River and estimate the precision of mark-recapture escapement estimates;
2. Generate system-wide escapement estimates for chinook salmon returning to the Copper River; and
3. Develop a long-term program operated by NVE to estimate Chinook salmon escapement to the Copper River.

Specific objectives for 2001 were to:

1. Evaluate the efficacy of installing and operating fishwheels in Baird Canyon;
2. Estimate the ability of fishwheels to capture chinook salmon throughout the entire run; and
3. Evaluate and compare potential fishwheel sites in Baird Canyon.

In May 2001, two large aluminum live-capture fishwheels were assembled on the Banks of the Copper River near Chitina, Alaska, and floated 100 km downstream to Baird Canyon. Environmental variables were monitored at seven potential fishwheel sites in and near Baird Canyon from late May until mid-July. Two fishwheels were operated for a total of 986 hours from 29 May to 11 July 2001. One fishwheel was operated for 9 days and the other for 38 days.

Catches included 914 chinook salmon, 23,230 sockeye salmon (*O. nerka*), 146 Dolly Varden (*Salvelinus malma*), 68 Pacific lamprey (*Lampetra tridentata*), 3 whitefish (*Coregonus spp.*), 84 salmon smolts, 7 suckers (*Catostomus sp.*), 1 burbot (*Lota lota*), and 1 Arctic grayling (*Thymallus arcticus*). Peak catches for chinook salmon occurred on 17 June (64 fish), and for sockeye salmon on 9 July (2,110 fish). The average length (mid-eye-to-fork) of 333 chinook salmon measured was 82 cm. A total of 370 chinook salmon were marked by placing a single hole punch in the left operculum. Of these

marked fish, ten were subsequently recaptured in the project fishwheels or upstream in subsistence fishwheels.

The proportion of the 2001 chinook salmon run captured by the fishwheels could not be estimated based on escapement estimates from an upstream telemetry project because these data were not available at the time of writing. However, given that the 2001 return was similar to that of recent years, past escapement numbers were used to estimate that the fishwheels caught between 1.5% and 2.75% of the estimated run. Considering the level of fishing effort achieved in 2001, two fishwheels should capture a sufficient portion of the chinook salmon run in the Copper River for the capture-tag phase of a mark-recapture study. The 2002 season will include further development of fishwheel sites in Baird Canyon and the development of upstream recovery effort using catch sampling and one or two fishwheels.

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