

## **Inriver Abundance, Spawning Distribution and Run Timing of Copper River Chinook Salmon, 2002–2004.**

From 2002–2004, radiotelemetry methods were used to estimate spawning distribution, run timing, and inriver abundance of Chinook salmon *Oncorhynchus tshawytscha* in the Copper River, Alaska. Chinook salmon were captured in fish wheels in the lower Copper River near Baird Canyon, and approximately 500 fish each year were fitted with radio transmitters. Radio-tagged fish were tracked to upriver destinations using a combination of ground-based receiving stations and aerial tracking techniques. Chinook salmon in the Copper River spawned in six major tributaries, and their spawning distribution varied considerably during the study for the Gulkana, Tonsina, and Chitina stocks, while the Klutina, Tazlina, and East Fork Chistochina stocks remained relatively constant. The estimated spawning proportions by major tributary were 0.10 (2002), 0.11 (2003) and 0.12 (2004) for the Klutina River; 0.08, 0.10 and 0.19 for the Tonsina River; 0.27, 0.17 and 0.20 for the Gulkana River; 0.29, 0.34 and 0.22 for the Chitina River; 0.04, 0.05 and 0.02 for the Tazlina River; and, 0.05, 0.05 and 0.06 for the East Fork Chistochina River. The estimated proportions of Chinook salmon located in the nine aerial index streams accounted for 0.46 (2002), 0.34 (2003), and 0.35 (2004) of Chinook salmon total escapement.

Run-timing patterns varied among the major spawning stocks but the same general pattern existed over time, where upriver stocks migrated past the capture site earlier than downriver stocks. The mean date of passage ranged from as early as 26 May for Chinook salmon bound for the upper Copper River in 2003 to as late as 24 June for the 2002 Klutina River mainstem spawners. In addition, over all 3 years of the study, the run timing of Chinook salmon bound for the tributaries of the Tonsina and Klutina rivers was earlier than their mainstem counterparts.

Two-event mark-recapture techniques were used to estimate inriver abundance at the lower boundary of the Chitina subdistrict dip net (CSDN) fishery. In the first event, Chinook salmon were radio-tagged downriver of the CSDN fishery. The total estimated harvest in the CSDN fishery comprised all fish examined for marks in the second event, and those fish harvested with radio tags comprised recaptured fish from the first event. Total abundance was estimated to be 32,873 (SE=8,863) in 2002, 33,488 (SE=8,389) in 2003, and 33,793 (SE=11,038) in 2004 for Chinook salmon  $\geq 620$  mm mideye-to-fork (MEF). However, based on information regarding catchability of Chinook salmon during the early portion of the run from a concurrent spaghetti tagging mark-recapture study that utilized fish wheels and not the CSDN fishery as the recapture event, the estimates of abundance from this study which expand the mark-recapture estimate to account for the early portion of the run not sampled are likely biased low.

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