Development of a Long-term Monitoring Project to Estimate Abundance of Chinook Salmon in the Copper River, Alaska, 2001-2004

We used fishwheels and 2-event mark-recapture methods to estimate the annual drainage-wide abundance of adult Chinook salmon *Oncorhynchus tshawytscha* returning to the Copper River in Southcentral Alaska. In the first event, fish were captured from May through July using 2 fishwheels operated in Baird Canyon (river km 66) in the lower Copper River. All marked fish received a back-sewn spaghetti tag during each year of study, and up to 500 fish in each of 2002, 2003 and 2004 were also fitted with radio tags. In the second event, marked fish were recaptured in one or 2 additional fishwheels operated on the Copper River near Canyon Creek (river km 157). The Baird Canyon fishwheels were operated from 2001 to 2004, and the Canyon Creek fishwheels were operated from 2002 to 2004. Unbiased system-wide abundance estimates were made in 2003 and 2004. An estimated 44,764 (SE=12,506) Chinook salmon measuring 810 to 1,070 mm fork length (FL) passed through Baird Canyon from 17 May to 1 July 2003. From 22 May to 22 June 2004, an estimated 40,564 (SE=4,650) Chinook salmon (>=600 mm FL) passed through Baird Canyon. Capture probabilities during both events varied over the season in 2003 and 2004 and appeared to be influenced by flow-related changes in fishwheel catchability. We developed vertical-slot "escape panels" to place in the fishwheel live tanks, which allowed the much more abundant sockeye salmon *O. nerka* to easily escape from the live tanks back into the river while retaining Chinook salmon. The project has evolved into a successful long-term monitoring program and has demonstrated that Federal, State and Tribal agencies can work cooperatively to collect valuable data on Copper River salmon stocks.

CITATION: Smith, J. J., M. R. Link, and B. D. Cain, 2005. Development of a Long-term Monitoring Project to Estimate Abundance of Chinook Salmon in the Copper River, Alaska, 2001-2004. Alaska Fishery Research Bulletin 11(2):118-134, 2005. Alaska Department of Fish and Game, Juneau, Alaska.