

Hetta Lake sockeye salmon (*Oncorhynchus nerka*) stock assessment project

Abstract: Direct interviews were used to census subsistence sockeye harvest around the outlet of Hetta Lake, and mark-recapture studies and visual surveys on spawning grounds were used to estimate sockeye escapement into Hetta Lake. To better understand the dynamics of this sockeye system, we also estimated sockeye fry and zooplankton populations in Hetta Lake. Total subsistence harvest in 2003 was 5,770 sockeye salmon, a six-fold increase from 950 sockeye salmon in 2002 and a 30% increase from 4,400 fish in 2001. We estimated 780 sockeye spawners in Hetta Creek in 2003, an increase from 330 spawners in 2002, but fewer than 2,400 spawners in 2001. In all three years, the stream spawning population in Hetta Creek represented 40–60% of the spawners counted in the lake and its tributaries. In 2003, we also estimated 510 sockeye salmon in a designated study area around the mouth of Old Hatchery Creek, representing about 22% of the later beach-spawning portion of the escapement. Numbers of beach spawners had not peaked by the end of October 2003. The estimated sockeye fry population was 324,000 in 2003, substantially less than the estimated 1.0 million in 2002 and 2.9 million in 2001. In contrast, the population of three spine sticklebacks in Hetta Lake increased from 170,000 to 250,000 to 419,000 in 2001–2003. Hetta Lake zooplankton species assemblage is very simple and dominated by the small cladoceran *Bosmina*; the larger *Daphnia*, preferred by sockeye fry, contributed only 1% to total seasonal mean biomass in 2003, 4% in 2002, and a negligible fraction in 2001. We recommend installing a weir in the outlet stream of Hetta Lake in 2005 because of the difficulties in estimating the adult spawning population with mark-recapture methods and the late timing of the beach spawners.

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