KUTLAKU LAKE SUBSISTENCE SOCKEYE SALMON PROJECT: 2006 ANNUAL AND FINAL REPORT

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Abstract

Kutlaku Lake is a small lake on Kuiu Island in Southeast Alaska with a productive sockeye salmon (*Oncorhychus nerka*) run and, in recent years, minimal fishing pressure in the marine terminal area. Due to recent changes in fishing regulations for this system, better information about the size and health of its sockeye population was needed. In 2002–2005 the sockeye spawning population was estimated using mark-recapture studies in the lake and inlet stream. A weir was used in 2006 to count sockeye salmon entering the lake and provide a more reliable estimate of escapement and a benchmark for comparison with previous years' estimates. The count at the weir was 10,579 sockeye salmon and a Petersen mark-recapture estimate was 17,000 fish (95% confidence interval 11,000–26,000), compared with spawning grounds mark-recapture estimates in 2002–2005 of 8,500 to 12,000 sockeye salmon. To improve mark-recapture estimates over all four years, we used a hierarchical Bayesian model with common underlying parameters to estimate the number of spawners in the main inlet stream. We then expanded the inlet stream estimates to whole lake population estimates by the proportion of fish in the study area each year, determined by visual surveys with an area-under-the-curve method. The resulting spawning population estimate for 2006 was about 14,600 sockeye salmon, and adjusted estimates for the previous years ranged from about 10,000 to about 18,000 sockeye salmon. We concluded that the 2006 sockeye escapement estimate, aided by the weir, confirmed the magnitude of previous years' estimates, and 10,000 to 20,000 fish is a reasonable range for spawning population size. High levels of zooplankton, in particular *Daphnia*, indicate that Kutlaku Lake can support large rearing fry populations produced by these escapements, and adult age compositions show that most Kutlaku sockeye salmon spend only one year in freshwater.