ABSTRACT

Sockeye salmon (*Oncorhynchus nerka*) returns to Kook Lake have long been an important subsistence resource for Tlingit families living in the Angoon area. This report summarizes the sockeye stock assessment findings for years 2005 to 2007 of a cooperative Angoon Community Association, Alaska Department of Fish and Game, and USDA Forest Service study. This project used a weir and mark-recapture methods to estimate the sockeye escapement into Kook Lake. Age, sex, and length data, limnology data, stream temperature, and spawning distribution (radio tagging) data were also collected to help assess the status of Kook Lake sockeye salmon. This project also included testing of a floating wall tent camp, testing of an adjustable weir bipod, testing of a lake "net weir", and testing of a mini-digital video recorder fish counting system.

The escapement of sockeye salmon into Kook Lake was estimated to be 1,994 fish in 2005, 10,165 in 2006, and 2,958 in 2007. Weir to spawning ground mark-recapture studies validated the accuracy of the weir counts. The 2006 escapement estimate was based on mark-recapture since the weir was damaged by an extreme high water event in early-September. Sockeye passed into the lake from late-June through mid-September. There were distinct populations of earlier-running inlet stream spawners and later-running beach spawners. Spawning was observed in the main inlet stream between late-July and early-September and along lake beaches in September and October. In 2005, half of the sockeye salmon entered the lake after August 25 and there were few inlet stream spawners. Only two of the twenty-one sockeye salmon that were radio tagged at the weir in 2005 spawned in the main inlet stream and these fish were tagged in the first 26% of the run. In 2006, there appeared to be a healthy distribution and abundance of both inlet stream and beach spawners. Both populations were present at modest levels in 2007. Age-1. fish dominated the escapements with an equal number of age-1.2 and age-1.3 fish in 2005, 80% age-1.2 fish in 2006, and 92% age-1.3 fish in 2007. *Bosmina* were the dominant zooplankton in an August 9, 2005 sample. Sockeye production from the Kook Lake system appears to be escapement limited.

Key Words: Sockeye salmon, *Oncorhynchus nerka*, Kook Lake, Basket Bay, escapement, mark-recapture, age composition, limnology, net weir, video counting.

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