

STOCK ASSESSMENT AND RESTORATION OF THE AFOGNAK LAKE SOCKEYE SALMON RUN, 2008

Abstract: Beginning in 2001 the Afognak Lake sockeye salmon *Oncorhynchus nerka* runs substantially declined. Concerns expressed by local subsistence users to the Alaska Department of Fish and Game and the US Fish and Wildlife Service Office of Subsistence Management prompted an investigation of the lake's rearing environment in 2003 followed by subsequent annual studies. This report provides the 2008 fishery and limnology results from the Afognak Lake system and fulfills annual reporting requirements to the US Fish and Wildlife Service Office of Subsistence Management, the funding agent for this project (project 07-401).

During 2008, 12,698 sockeye salmon smolt were captured using a Canadian fan trap operated from 16 May to 3 July. An additional 10,766 smolt were estimated to have been captured when the trap was not fishing during a five day flood event. Using mark-recapture techniques, we estimated that 196,941 sockeye salmon smolt (95% CI 148,046 – 245,835) emigrated from Afognak Lake. The population was estimated to be composed of 92,018 age-1. and 104,923 age-2. smolt. Age-1. smolt had a mean weight of 3.4 g, a mean length of 75.9 mm, and a mean condition factor of 0.76. Age-2. smolt had a mean weight of 4.0 g, a mean length of 81.7 mm, and a mean condition factor of 0.73.

Five limnology surveys were conducted in Afognak Lake from May to September, 2008. Seasonal physical parameters and water chemistry values were generally consistent with historical data collected from Afognak Lake; however, phosphorus concentrations in 2008 were below historically low phosphorus levels. Zooplankton levels in 2008 also approached historical lows with a seasonal density of 108,462 animals m⁻² and the biomass 110.9 mg m⁻³ with cladocerans comprising 59.6% of the sampled zooplankton. The cladoceran *Bosmina* was the most abundant zooplankter, while *Epischura* was the most abundant copepod.

Citation: Baer, R. T., S. T. Schrof, B. M. Foster, and S. G. Honnold. 2009. Stock assessment and restoration of the Afognak Lake sockeye salmon run, 2008. Alaska Department of Fish and Game, Fishery Data Series No. 09-37, Anchorage.

Key words: Afognak Lake, Litnik, age, emigration, escapement, Kodiak Island, *Oncorhynchus nerka*, smolt, sockeye salmon, subsistence harvest, trap, zooplankton.