

EVOSTC ANNUAL PROJECT REPORT

Project Number: G-050765

Project Title: Management Applications: Improving Preseason Forecasts of Kenai River Sockeye Salmon Runs through Smolt Monitoring - Technology Development

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Time Period Covered by Report: October 1, 2006 – August 30, 2007

Date of Report: September 7, 2007

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1. **Work Performed:** In early May 2007, we installed an acoustic system and two inclined-plane smolt traps in the Kenai River near its confluence with the Killey River. The acoustic system consisted of echosounders, two uplooking transducers and a side-looking transducer. Smolt traps were constructed after a design described by Todd (1994) scaled up 1.5 times in size. The equipment was operated from early May through late June during which trap efficiency tests were conducted each week when possible. Fish for efficiency tests were captured in the inclined-plane traps and in a fyke net deployed in the Kenai River 1-3 miles upstream of the traps.

Total sockeye salmon smolt catch was 327,901 in 2005, 78,022 in 2006, and 104,546 in 2007. Over all 3 years, trap efficiencies have ranged from 0.008 to 0.025. Although final population estimates have not yet been completed, inclined-plane trap catches indicate that sockeye salmon smolt abundance likely declined after 2005. As in 2006, trap efficiency tests were not conducted during the first two weeks of operation in 2007 due to low trap catches. The acoustic system has continued to provide useful information regarding the cross-channel and vertical distribution of migrating smolt, which has been used to optimize the deployment and operation of smolt traps. Few problems (i.e. inability to hold the traps in the current or large debris) were encountered during trap operations in 2007. Sockeye salmon smolt samples collected during all 3 years of the project have been sent to the University of Victoria for stable isotope analysis, but results are not yet available. We are currently in the process of archiving, editing, and properly documenting the acoustic and fisheries data collected this year.

2. **Future Work:** This is the final year of funding for the field sampling component of this project. We will submit a final report documenting project results by April 15, 2008.

3. **Coordination/Collaboration:** This project is part of ongoing ADF&G investigations into the ecological system supporting production of sockeye salmon in the Kenai River watershed. The ADF&G has continued to annually measure light penetration, temperature, zooplankton species composition and biomass, and juvenile sockeye salmon population size and whole-body energy content in Skilak Lake. These data are being used to develop a bioenergetics model for over-wintering juvenile sockeye salmon in the system. The results of this smolt monitoring project will be used to validate the over-winter bioenergetics model by providing

estimates of overwinter mortality. This project also collected several hundred samples of sockeye salmon smolt and other juvenile salmonids for analysis of their proportion of marine derived elements (C, N, S). Laboratory analyses of these samples will be accomplished through a contract.

4. Community Involvement/TEK & Resource Management Applications: Project results are expected to be used in developing annual sockeye salmon forecasts for the Kenai River, which will be described in any press releases or public communications regarding upper Cook Inlet salmon forecasts. However, since we are currently developing methodologies, it is premature to use any smolt population estimates to forecast adult returns at this time.

5. Information Transfer: The project principal investigator will present a poster at the annual EVOS symposium to be held in Anchorage this winter. The poster will describe our investigations of sockeye salmon production in the Kenai River watershed including this project. We are currently in the process of archiving, editing, and properly documenting the data collected this year.

6. Budget: Expenditures to date and those anticipated through project completion remain within allocated budget.