

***Evaluation of False Attraction of Fish to the  
Project Powerhouse Outfall:  
Final 2003 Study Plan  
Cooper Lake Project (FERC No. 2170)***

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## Introduction

The Cooper Lake Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) Project No. 2170, is owned and operated by Chugach Electric Association, Inc. (Chugach). The Project was originally licensed by FERC in May 1957, and the current license term expires at the end of April 2007. Chugach is conducting studies to develop information needed to determine the effects of the Project on environmental resources. Information from the resource studies will be used to help identify appropriate protection, mitigation, and enhancement measures that will be proposed in Chugach's final application to relicense the Project, which must be filed with FERC no later than April 30, 2005.

This study plan addresses the question of possible effects on migrating fish due to outflow from the Project powerhouse into Kenai Lake.

## Background and Study Purpose

The Project diverts all outflow from Cooper Lake through the tunnel/penstock to the powerhouse on Kenai Lake. The water exits the powerhouse through either or both of two turbine/generators. The powerhouse operates 10 to 12 hours per day on average. Maximum powerhouse discharge at any time is 380 cfs, and the minimum discharge is 0 cfs. Average outflow through the powerhouse is approximately 100 cfs (72,500 acre-feet/year).

In comments and study requests for the relicensing, agencies have raised the question of whether fish resources are being affected as a result of the powerhouse outflow into Kenai Lake, and have requested that Chugach conduct a study to evaluate potential "false attraction" of migrating salmon to outflow from the powerhouse. The concern is that for migrating fish that spawn soon after arriving at spawning areas, any delay in migration can significantly reduce the chance for spawning success.

## Methods

The risk of adverse effects due to possible attraction of migrating fish to the Project powerhouse will be evaluated using a combination of field measurements and analysis of powerhouse operations. To define the extent of the zone of potential influence of the outflow, water velocity profiles will be measured in Kenai Lake at the outfall area at a time when the hydroelectric plant is operating at full capacity. Measurements will be conducted using a boat-mounted Acoustic Doppler Current Profiler (ADCP). The instrument to be used will be the RD Instruments "Rio Grande," which provides a velocity resolution of 1 mm/second. Velocity measurements from surface to bottom will be made along a series of transects in front of the powerhouse, beginning at the concrete face of the discharge sump and moving outward until velocities become negligible. Complete sets of velocity measurements will be made at two plant operation levels – maximum flow (380 cfs) and approximate average flow (100 cfs). The end product will be a three dimensional velocity "contour map" for the outfall area.

In addition to the field measurements, a description of typical powerhouse operations (daily, monthly, annual) will be developed for use in evaluating the timing of discharge effects relative to timing of migration of Kenai River salmon.

## **Schedule and Deliverables**

Velocity measurements will be conducted in early summer 2003. The report for this study will summarize the results of the velocity measurements and describe powerhouse operations, and will present conclusions regarding the potential zone of influence of the powerhouse outfall. The draft report will be completed by mid-January 2004.