

*Exxon Valdez* Oil Spill  
Restoration Project Annual Report

Chenega Chinook Release Program

Restoration Project 94272  
Annual Report

This annual report has been prepared for peer review as part of the *Exxon Valdez* Oil Spill Trustee Council restoration program for the purpose of assessing project progress. Peer review comments have not been addressed in this annual report.

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## Chenega Chinook Release Program

### Restoration Project 94272 Annual Report

**Study History:** The project effort was initiated as part of the detailed study plan in 1993 under 93016 (Chenega Chinook and Coho Salmon Release Program). The first release was to occur in 1993, but timing requirements for planning and permitting caused the proposed release to be delayed until 1994. The project effort in 1994, under Restoration Project 94272 (Chenega Chinook Release Program), is the subject of this report.

**Abstract:** The release of chinook salmon *Oncorhynchus tshawytscha* smolts at Crab Bay adjacent to the community of Chenega on Evans Island, Prince William Sound (PWS) was proposed to replace lost and injured subsistence resources resulting from the *Exxon Valdez* oil spill with adult chinook salmon for local harvesting. Prince William Sound Aquaculture Corporation (PWSAC) operates four salmon restoration and enhancement facilities in PWS and produces chinook salmon smolts at its Wally Noerenberg facility. PWSAC provided contracted services to collect brood stock, incubate eggs, rear fry to smolt stage and transport 50,000 smolts to Crab Bay for net pen rearing, imprinting and release. The release group was marked and coded wire tagged (CWT) for later survival evaluation. Residents of Chenega were contracted to care for the fish. After training, they cared for and monitored the fish during imprinting and rearing phases. The fish were released after four days of rearing rather than the planned two weeks due to an outbreak of a common salmonid pathogen, bacterial kidney disease (BKD). Adult chinook salmon will begin to return to the location in 1996.

**Key Words:** Chenega, chinook salmon, coded wire tags, *Exxon Valdez* oil spill, *Oncorhynchus tshawytscha*, Prince William Sound, rearing, smolts.

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## EXECUTIVE SUMMARY

The release of chinook salmon *Oncorhynchus tshawytscha* smolts at Crab Bay adjacent to the community of Chenega on Evans Island, Prince William Sound (PWS) was proposed to replace lost and injured resources resulting from the *Exxon Valdez* oil spill with adult chinook salmon for local harvesting.

Prince William Sound Aquaculture Corporation (PWSAC) operates four salmon restoration and enhancement facilities in PWS and produces chinook salmon smolts at its Wally Noerenberg facility. PWSAC provided contracted services to collect brood stock, incubate eggs, rear fry to smolt stage and transport 50,000 smolts to Crab Bay for net pen rearing, imprinting and release. The release group was marked and coded wire tagged (CWT) for later survival evaluation. Residents of Chenega were contracted to care for the fish. After training, they cared for and monitored the fish during imprinting and rearing phases. The fish were released after four days of rearing rather than the planned two weeks due to an outbreak of a common salmonid pathogen, bacterial kidney disease (BKD). Adult chinook salmon will begin to return to the location in 1996.

## INTRODUCTION

In 1992, the Alaska Department of Fish and Game (ADF&G), in cooperation with the residents of the village of Chenega Bay, proposed to the *Exxon Valdez* Oil Spill (EVOS) Trustee Council that local salmon runs be established at Crab Bay (Evans Island, PWS), near the Chenega village to replace damaged subsistence resources resulting from the *Exxon Valdez* oil spill in 1989. PWSAC, which operates four salmon hatcheries in Prince William Sound, was asked to participate in project 94272 to produce chinook salmon smolts at the Wally Noerenberg Hatchery (WNH) on Esther Island, PWS, and release 50,000 of these smolts at Crab Bay. The first project and continued annual releases are estimated to produce a return of 2,000 adult chinook salmon of different age classes beginning in 1998, with smaller numbers of adults returning in 1996, and 1997. At an average weight of 20 pounds per fish, 40,000 pounds of salmon are expected to be harvested annually. Fish released to the marine waters are common property and therefore may also be harvested by recreational fishers and other users.

Due to the complex and lengthy permitting process to undertake such a restoration program, EVOS funding was withheld in 1993; project funding and releases of chinook first occurred in Spring, 1994.

## OBJECTIVES

Objectives of this project are:

A. Rear and release 50,000 chinook salmon smolt in Crab Bay near the Chenega village on Evans Island incubated at WNH beginning in Spring, 1994.

B. Develop a return of 2,000 adult chinook beginning in 1998. At an average of 20 pounds per returning chinook, Chenega residents may expect to harvest 40,000 pounds of salmon annually. This projection of 4% marine survival is based on current fish culture criteria.

## **METHODS**

Annually between July and August approximately 820,000 chinook salmon eggs are taken at WHN. Broodstock are harvested as adult chinook salmon returning to the facility. Adult fish are loosely confined within marine waters adjacent to the hatchery. As maturity approaches the fish volitionally move into the fresh water broodstock pond. When indicated by sampling for gamete development, eggs are taken by hatchery staff and fertilized on a 1:1 female to male ratio. The eggs are placed in the incubation facility in NOPAD incubators at a density of 84,000 eggs per tray.

Following initial stages of development, chinook alevins move into incubator substrate and remain there until they emerge as fry. Fry outmigrate volitionally from the incubators and enter raceways where they are held for one year when they will have reached the smolt stage of development.

A component of the 50,000 smolts for the Chenega release were marked by adipose fin removal followed by CWT. Marking and tagging aids later marine survival and harvest pattern analysis when the fish return as adults. The chinook smolts were then prepared for transfer to Crab Bay by allowing their gastro-intestinal tract to empty, loaded directly into fresh water, oxygenated transfer tanks, and barged to the Crab Bay site for rearing, imprinting and release. At no time prior to being released at Crab Bay were the fish subjected to salt water which could affect their imprinting. At Crab Bay the fish were gravity flushed into an anchored net pen 12 m x 12 x 1.5 m deep (220 m<sup>3</sup>) for locational imprinting. Under contract, residents of Chenega were trained to monitor and feed the young fish during the imprinting and rearing phase.

Smolts were released from net pens by disconnecting the nets from their float attachments allowing the fish to swim freely into marine environs.

## **RESULTS**

A total of 50,138 chinook salmon smolts were transported to Crab Bay and transferred to the anchored net pen for short term rearing and imprinting on May 23, 1994. Of these, 2,524 smolts were coded wire tagged at WNH prior to being transported.

Although scheduled for a two week rearing phase, smolt were released after four days (on May 27) due to a clinical expression of BKD. During the net pen rearing and imprinting phase, 200 smolts died, a 0.4% net pen mortality.

During the course of the project PWSAC staff obtained:

1. WNH permit alteration and fry transport permit required to modify the WNH production and release program to accommodate the Chenega release;
2. Department of Natural Resources "Tidelands Lease Permit" for anchoring the net pen at Crab Bay;
3. Department of Army, Corps of Engineers permit for anchoring vessels or objects in navigable waterways for extended periods;
4. completed Alaska Coastal Zone consistency review through the Alaska Office of Governmental Coordination;
5. letter of non-objection from the adjacent upland property owner to conduct the release program;
6. necessary bonds and submitted required permit application handling fees and lease fees;
7. U.S. Coast Guard permission and notification procedures for anchoring and marking the net pen;
8. environmental assessment (EA) through direct action by ADF&G staff as part of NEPA compliance for project funding under the *Exxon Valdez* oil spill settlement.

## DISCUSSION

The incubation and transportation phases of the project remained on schedule. Mortality at early life stages was low and within PWSAC fish culture specifications (Little, 1990).

The net pen rearing phase of the project was, however, shortened from two weeks to four days (May 23 to May 27, 1994) due to mortalities stemming from a ubiquitous pathogen. Mortalities were well below a rate considered to be deemed an epizootic.

Salmon farmers, who hold fish closely for their entire life cycles, typically do not begin treating a BKD outbreak until mortalities reach 1%/day (Kerns, C.L., PWSAC, personal communication). Stress attributed to transportation as well as testing of osmocompetence with first exposure to salt water are thought to have caused the outbreak. ADF&G pathology staff recommended release of the fish to reduce densities and thereby any additional stress which rearing may cause. The effect upon homing accuracy of such a short imprinting period will await adult returns.

## **CONCLUSIONS**

While evaluation of the final conclusions await the return of adult fish and the local residents' capture efforts, the necessary milestones were accomplished on schedule. The action to release the chinook after four days may have reduced BKD related mortality. Adult salmon resulting from this release should begin returning to Crab Bay in 1996 and begin to fulfill the objective of replacing lost and injured resources for people of the region.

## **LITERATURE CITED**

Little, Rand. 1990. Wally Noerenberg Hatchery: Fish Culture and Harvest Procedures, Volume 1. Prince William Sound Aquaculture Corporation, Cordova, Alaska.