

MANCHESTER SPRING CHINOOK BROODSTOCK PROJECT

9606700

SHORT DESCRIPTION:

Incubate and rear Snake River spring/summer chinook salmon captive broodstocks from Idaho's Salmon River sub-basin and Oregon's Grande Ronde River sub-basin. Provide pre-spawning adults, eyed eggs, and juveniles to aid recovery of these ESA-listed stocks in Idaho and Oregon.

SPONSOR/CONTRACTOR: NMFS

National Marine Fisheries Service
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SUB-CONTRACTORS:

N/A

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GOALS

GENERAL:

Supports a healthy Columbia basin, Maintains biological diversity, Maintains genetic integrity, Increases run sizes or populations

ANADROMOUS FISH:

Production

NPPC PROGRAM MEASURE:

7.5A

RELATION TO MEASURE:

The Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program (Section 7.5A) addresses specific actions to assist weak salmonid stocks such as the Snake River spring/summer chinook salmon. This project assists with the protection and rebuilding of Snake River spring/summer chinook through such activities as maintaining several lines of captive broodstocks, providing prespawning adults and progeny for release into streams of parental origin, and monitoring and evaluating captive broodstock production technologies.

OTHER PLANNING DOCUMENTS:

Proposed Recovery Plan for Snake River Salmon; 4.1.b.; 4.1.c

TARGET STOCK

Chinook, Grande Ronde River sub-basin (OR);
three stocks--Lostine River, Catherine Creek,
Upper Grande River

LIFE STAGE

Egg-to-adult

MGMT CODE (see below)

S, L, W

Chinook, Salmon River sub-basin (ID); three
stocks--Lemhi River, E. Fork Salmon, W. Fork
Yankee Fork

Egg-to-adult

S, L, W

BACKGROUND

Stream name:

Salmon River, Grande Ronde River

Subbasin:

Upper Salmon River Basin (ID); Grande Ronde River Basin (OR)

HISTORY:

The Coastal Zone and Estuarine Studies Division, National Marine Fisheries Service (NMFS), in collaboration with Idaho Department of Fish and Game, the Oregon Department of Fish and Wildlife, and the U.S. Fish and Wildlife Service Lower Snake River Compensation Plan Office (LSRCP) has been conducting research to prevent extinction of Snake River spring/summer chinook salmon. NMFS listed the Snake River spring/summer chinook salmon as threatened under the U.S. Endangered Species Act (ESA) in 1991. NMFS' recovery efforts for this stock partially rely on captive broodstocks for production of prespawning adults and progeny for supplementation. Implementation and refinement of captive broodstocks for recovery of Snake River

spring/summer chinook salmon are identified as a priorities (4.1.b; 4.1.c) in the proposed Recovery Plan for Snake River salmon. Spring/summer chinook salmon captive broodstocks from Idaho's upper Salmon River sub-basin and Oregon's Grande Ronde River sub-basin are being maintained in captivity throughout their life. Prespawning adults and their offspring will be released to supplement the wild population. Each year class will be maintained for only a limited number of generations to help ensure that adaptability to native habitats is preserved. Mating strategies for fish reared in captivity have been established to maintain and enhance genetic diversity.

Theoretically, the relatively high fecundity of anadromous Pacific salmon, coupled with potentially high survival in protective culture, should allow captive broodstocks to produce large numbers of juveniles in a single generation to help "jumpstart" the population. Supplementation with prespawning adults should allow cohort replacement. Supplementation with juveniles from captive broodstocks should result in substantial returns of adult fish and should lead to rebuilding of the natural run and delisting.

BIOLOGICAL RESULTS ACHIEVED:

The NMFS captive broodstock program for Snake River spring/summer chinook salmon focuses on stocks from Idaho's upper Salmon River sub-basin and Oregon's Grande Ronde River sub-basin. Juveniles were captured by IDFG and ODFW and held to yearling smolt stage. In spring 1996, 1994-brood juveniles collected from Idaho's Lemhi River, East Fork Salmon River, and West Fork Yankee Fork Salmon River and Oregon's Lostine River and Catherine Creek were transferred to Manchester. Fish are reared from smolt to adult in tanks supplied with pumped, filtered, and UV-sterilized seawater. Survival of the 1994-brood fish at Manchester has exceeded 90% for all groups. The 1994-brood is expected to mature between fall 1997-1999. Pre-spawning adults and eyed eggs will be returned to Idaho and Oregon to aid recovery efforts for Snake River spring/summer chinook salmon. Similar groups of fish from streams within the sub-basins will be transferred to Manchester on a yearly basis.

PROJECT REPORTS AND PAPERS:

Flagg, T. A., M. R. Wastel, and W. C. McAuley. 1996. Manchester spring chinook broodstock project, progress report - August 1996-November 1996. Quarterly report to Bonneville Power Administration, Contract 96-BI-96441.9 p. (Available from Northwest Fisheries Science Center, 2725 Montlake Boulevard East, Seattle, WA 98112.)

ADAPTIVE MANAGEMENT IMPLICATIONS:

Maintaining geographically separate captive brood populations (at the IDFG Eagle Hatchery, ODFW Lookingglass and Bonneville Hatchery, and NMFS Manchester Marine Experimental Station) will help reduce the risk of catastrophic loss of gene pools from mechanical failure, human error, or disease. In upcoming years, the captive broodstock programs should provide hundreds of adults and hundreds of thousands of eggs for use in recovery efforts.

PURPOSE AND METHODS

SPECIFIC MEASUREABLE OBJECTIVES:

Rear endangered groups of Snake River spring/summer chinook salmon captive broodstocks to maturity. Make prespawning adults and progeny (e.g., eggs) available to Idaho and Oregon for use in recovery efforts for ESA-listed stocks.

CRITICAL UNCERTAINTIES:

Whether Snake River spring/summer chinook salmon captive broodstocks will produce prespawning adults and gametes in sufficient numbers and of sufficient quality to aid recovery efforts.

BIOLOGICAL NEED:

Captive broodstocks are identified as priorities [4.1.b] to aid recovery in the Proposed Recovery Plan for Snake River Salmon. Stocks of fish are at critically low levels in Idaho's Salmon River sub-basin and Oregon's Grande Ronde River sub-basin. Captive broodstocks offer a mechanism to maintain the species while habitat improvements are underway. Maintaining geographically separate captive brood populations (at the IDFG Eagle Hatchery, ODFW Lookingglass and Bonneville Hatchery, and NMFS Manchester Marine Experimental Station) will help reduce the risk of catastrophic loss of gene pools from mechanical failure, human error, or disease. The relatively high fecundity of anadromous Pacific salmon, coupled with potentially high survival in protective culture, should allow captive broodstocks to produce large numbers of fish in a single generation to help "jumpstart" the population. In upcoming years, the captive broodstock programs should provide hundreds of adults and hundreds of thousands of eggs for use in recovery efforts. Supplementation with prespawning adults should allow cohort replacement. Supplementation with juveniles from captive broodstocks should result in substantial returns of adult fish and should lead to

rebuilding of the natural run and delisting.

HYPOTHESIS TO BE TESTED:

Snake River spring/summer chinook salmon captive broodstocks will produce prespawning adults and gametes in sufficient numbers and of sufficient quality to aid recovery efforts. Ho: no prespawning adults or eggs produced.

H1: prespawning adults and eggs will be produced in sufficient numbers and quality.

H2: prespawning adults and eggs will be produced, but in insufficient numbers and quality.

ALTERNATIVE APPROACHES:

The alternate approach to captive broodstock intervention for Snake River spring/summer chinook salmon may be extinction of these ESA-listed stocks.

JUSTIFICATION FOR PLANNING:

N/A

METHODS:

1. Groups of Snake River spring/summer chinook salmon will be reared to maturity in 4.1-m to 6.1-m diameter circular fiberglass tanks supplied with filtered and sterilized seawater. Fish will be house in a protective rearing building equipped with electronic security.

2. Between 100-200 fish of each stock and brood year of Snake River spring/summer chinook salmon will be reared in protective culture.

3. Pre-spawning adults, eyed eggs, and/or juveniles will be returned to Idaho and Oregon for use in recovery efforts for these ESA-listed stocks.

4. Appropriate statistical analysis will be conducted to compare growth, survival, and reproductive success of stocks of fish from the Salmon and Grande Ronde River sub-basins.

PLANNED ACTIVITIES

SCHEDULE:

Planning Phase **Start** 1996 **End** ongoing **Subcontractor**

Task 1. Participate in the USFWS LSRCP Conservation Oversight Team and other forums to coordinate recovery efforts for Snake River spring/summer chinook salmon.

Implementation Phase **Start** 1996 **End** ongoing **Subcontractor**

Task FY 1998; Participate in recovery efforts for ESA-listed Snake River spring/summer chinook. Rear 1994- and 1995-broods from Idaho's Salmon River sub-basin and Oregon's Grande Ronde River sub-basin from smolt to adult in tanks supplied with pumped, filtered, and UV sterilized seawater at Manchester, including: 1. 1994-brood - fish from Idaho's Lemhi River, East Fork Salmon River, and West Fork Yankee Fork Salmon River and Oregon's Lostine River and Catherine Creek. 2. 1995-brood - fish from Idaho's Lemhi River and Oregon's Lostine River and Catherine Creek. 3. Fall 1997 - provide prespawning 3-year-old (jacks and jenny) fish from 1994-broods to Idaho and Oregon for use in recovery efforts. 4. Summer-Fall 1998 - provide prespawning 4-year-old (jacks and jenny)fish from 1994-broods to Idaho and Oregon for use in recovery efforts. 5. Write reports and scientific papers. Similar project activities are expected in 1999-2002.

CONSTRAINTS OR FACTORS THAT MAY CAUSE SCHEDULE OR BUDGET CHANGES:

No known critical risks are associated with captive broodstock rearing for Snake River spring/summer chinook salmon. In fact, as described above, the alternate approach to captive broodstock intervention for Snake River spring/summer chinook salmon may be extinction of these ESA-listed stocks.

OUTCOMES, MONITORING AND EVALUATION

SUMMARY OF EXPECTED OUTCOMES

Expected performance of target population or quality change in land area affected:

Maintaining geographically separate captive brood populations will help reduce the risk of catastrophic loss of the Snake River spring/summer chinook salmon gene pools. In upcoming years, these captive broodstocks should provide hundreds of prespawning adults and hundreds of thousands of eggs for use in recovery efforts.

Present utilization and conservation potential of target population or area:

No utilization; Snake River spring/summer chinook salmon listed as threatened under ESA.

Assumed historic status of utilization and conservation potential:

Tens of thousands of Snake River spring/summer chinook salmon returned to the Snake River prior to the 1950s.

Long term expected utilization and conservation potential for target population or habitat:

Recovery to delisting under ESA.

Contribution toward long-term goal:

Snake River spring/summer chinook salmon

Indirect biological or environmental changes:

Recovery and ESA delisting for Snake River spring/summer chinook salmon

Physical products:

N/A

Environmental attributes affected by the project:

N/A

Changes assumed or expected for affected environmental attributes:

N/A

Measure of attribute changes:

N/A

Assessment of effects on project outcomes of critical uncertainty:

Statistical analysis.

Information products:

Knowledge and refinement of captive broodstock technology for application to depleted stocks of salmonids.

Coordination outcomes:

The project is being coordinated with states and tribes through the USFWSLSRCP Conservation Oversight Team

MONITORING APPROACH

1. Ensure that groups of ESA-listed Snake River spring/summer chinook salmon will be reared to maturity in 4.1- to 6.1-m diameter circular fiberglass tanks supplied with filtered and sterilized seawater.
2. Ensure that between 100-200 fish of each brood year and brood type will be reared in protective culture.
3. Ensure that pre-spawning adults, eyed eggs, and juveniles will be returned to Idaho and Oregon for use in recovery efforts for ESA-listed Snake River spring/summer chinook salmon.
4. Ensure that appropriate statistical analysis will be conducted to compare growth, survival, and reproductive success of captive broodstock fish from Idaho's Salmon River sub-basin and Oregon's Grande Ronde sub-basin.

Provisions to monitor population status or habitat quality:

These uncertainties are being addressed through related projects conducted by IDFG (9700100) and ODFW (9604400).

Data analysis and evaluation:

Statistical analysis.

Information feed back to management decisions:

BPA reports and scientific publications. In addition, information from projects related to recovery efforts for ESA-listed Snake River spring/summer chinook salmon are being coordinated through the USFWS LSRCP Conservation Oversight Team.

Critical uncertainties affecting project's outcomes:

Captive broodstock research has to be carried out to resolve husbandry uncertainties. Captive broodstocks will aid in preventing extinction of ESA-listed Snake River spring/summer chinook salmon. However, captive broodstocks alone will not lead to recovery. Improvements in survival in nursery area, migratory corridor, estuary, and ocean are required for full population recovery.

EVALUATION

Interim measures of success should include: 1) efforts are preventing extinction of Snake River spring/summer chinook salmon ; 2) efforts are resulting in full seeding of select juvenile rearing habitats; 3) monitoring is underway to evaluate smolt outmigration and adult return resulting from releases of fish from captive broodstocks.

Incorporating new information regarding uncertainties:

Through adaptive management and coordination at the USFWS LSRCP Conservation Oversight Team.

Increasing public awareness of F&W activities:

By helping prevent extinction of ESA-listed Snake River spring/summer chinook salmon.

RELATIONSHIPS

RELATED BPA PROJECT

RELATIONSHIP

9604400 Grande Ronde Basin Spring Chinook Captive Broodstock Program Capitol Construction Component

9700100 Captive Rearing Initiative for Salmon River Chinook Salmon

Idaho Department of Fish and Game is also maintaining captive broodstocks for Salmon River sub-basin populations of Snake River spring/summer chinook salmon to avoid catastrophic loss of the gene pool and for rebuilding efforts

OPPORTUNITIES FOR COOPERATION:

NMFS is cooperating with the Idaho Department of Fish and Game, the Oregon Department of Fish and Wildlife, and the U.S. Fish and Wildlife Service Lower Snake River Compensation Plan Office (LSRCP) in using captive broodstocks to aid rebuilding of Snake River spring/summer chinook salmon. Cooperative efforts for restoration of Snake River spring/summer chinook salmon are being coordinated through the USFWS LSRCP Conservation Oversight Team.

COSTS AND FTE

1997 Planned: \$391,000
1997 Planned: \$454,912

FUTURE FUNDING NEEDS:

PAST OBLIGATIONS (incl. 1997 if done):

<u>FY</u>	<u>\$ NEED</u>	<u>% PLAN</u>	<u>% IMPLEMENT</u>	<u>% O AND M</u>	<u>FY</u>	<u>OBLIGATED</u>
1998	\$391,000				1996	\$481,400
1999	\$391,000					
2000	\$391,000				TOTAL:	\$481,400
2001	\$391,000					

Note: Data are past obligations, or amounts committed by year, not amounts billed. Does not include data for related projects.

<u>FY</u>	<u>OTHER FUNDING SOURCE</u>	<u>AMOUNT</u>	<u>IN-KIND VALUE</u>
1998			\$75,000
1999			\$75,000
2000			\$75,000
2001			\$75,000
2002			\$75,000

OTHER NON-FINANCIAL SUPPORTERS:

N/A

LONGER TERM COSTS:

\$400K-500K continued annual costs for implementation of NMFS captive broodstock programs to aid recovery of ESA-listed of Snake River spring/summer chinook salmon.

1997 OVERHEAD PERCENT: 45.6%

HOW DOES PERCENTAGE APPLY TO DIRECT COSTS:

Applies to total direct labor charges only.