FISH PASSAGE EVALUATIONS 9204100

SHORT DESCRIPTION:

Assess the success of adult salmon and steelhead passage at the four dams and reservoirs in the lower Columbia River and into its tributaries and through the dams and reservoirs in the lower Snake River and into its tributaries; evaluate specific flow and spill conditions on adult fish migration, and the various measures under taken to improve adult fish passage in the lower Columbia River.

SPONSOR/CONTRACTOR: USACE
U.S. Army Corps of Engineers
Bob Dach, Fishery Biologist
CENPP-PE-E P.O. Box 2946, Portland, OR 97208-2946
robert.l.dach@npp01.usace.army.mil

SUB-CONTRACTORS:
University of Idaho, National Marine Fisheries Service

GOALS

GENERAL:

Supports a healthy Columbia basin, Maintains biological diversity, Maintains genetic integrity, Increases run sizes or populations, Adaptive management (research or M&E)

ANADROMOUS FISH:

Hydro ops, mainstem passage, construction

NPPC PROGRAM MEASURE:

6.1A.2, 6.1A.3, 6.1A.4, 6.1B1, 6.1B.8, 6.1D.7, 6.1E.1, 6.1F.1

RELATION TO MEASURE:

This study will respond directly to program requirements listed for the COE, and is being conducted in conjunction with other evaluations undertaken by various public and private organizations. The data collected will provide adult fish passage information at Columbia River basin hydroelectric projects. Results of the studies will assist in operation of the hydropower system and will provide needed information to regional managers. Deficiencies identified in adult passage throughout the program will be more closely evaluated and system modifications will be recommended.

BIOLOGICAL OPINION ID:

Conservation Recommendation #2; Incidental Take Statement # 11

OTHER PLANNING DOCUMENTS:

3.3.d

TARGET STOCK	LIFE STAGE	MGMT CODE (see below)
Steelhead	Adult	P
Pacific Lamprey	Adult	W
Spring/Summer, Fall Chinook	Adult	L,W

BACKGROUND

STREAM AREA AFFECTED

Stream name:
Columbia

Subbasin:
Columbia River Basin

Stream miles affected:
900+

Hydro project mitigated:
Bonneville, The Dalles, John Day Dams

Habitat types:

Migratory corridor

HISTORY:
The BPA and COE are cost sharing throughout this five year program. Costs incurred in 1995 for program planning were approximately $255,000. Efforts included finalization of the study design; the determination, purchase, and installation of necessary equipment; and preliminary trapping and tag implantation evaluations. Physiological evaluations of adult lamprey tagging procedures were also conducted. In 1996, BPA and COE contributions totaled $350,000, and approximately $1,000,000 respectively. Program implementation, data collection, and analysis began in 1996. In 1997, data collection and analysis continued although BPA support was reduced to $200,000. BPA support is currently estimated at $200,000 for 1998.

PROJECT REPORTS AND PAPERS:
Technical reports defining the activities and results of 1995 efforts (in particular the tagging and trapping procedures for adult salmon and lamprey, and status report of computer generated data analysis activities) will be provided in April, 1996. Annual reports for 1996, 1997, 1999, and 2000 will also be prepared.

ADAPTIVE MANAGEMENT IMPLICATIONS:
These studies enable a more complete understanding of 1) the use of fishway entrances and passage through fishways, 2) the effects of spill and powerhouse discharge patterns on the entry of fish into fishways and on passage rates, 3) the effect of the new Bonneville navigation lock on fish passage at the dam and movement into the hatchery, 4) the rate of fallback over the dams with various flow conditions, and 5) the distribution, migration rates, and survival of fish after they are tagged and released at Bonneville Dam. This information will enhance operation of the Federal Columbia River Power System.

PURPOSE AND METHODS

SPECIFIC MEASUREABLE OBJECTIVES:
1) Determine the proportion of fish passing Bonneville Dam that ultimately pass the upstream dams, enter tributaries, enter hatcheries, are taken in fisheries, and are "losses" between dams. 2) Assess the time for fish to pass each dam and migrate through the reservoirs between dams. 3) Evaluate entrance use and passage through the fishways. 4) Evaluate the effects of various spill volumes and patterns on fish passage at selected dams. 5) Evaluate the effects of the Bonneville navigation lock on passage past the dam or into the hatchery. 6) Assessing fallback at each dam.

BIOLOGICAL NEED:
This project will provide critical information to ensure that passage conditions at dams are adequate for safe and timely passage of adult fishes. It will also identify potential interdam losses of adults, and factors that may contribute to such.

HYPOTHESIS TO BE TESTED:
The null hypothesis associated with each measurable objective are all testable as described in the study proposal.

ALTERNATIVE APPROACHES:
N/A. This methodology has been in use on the Columbia River for the last two decades. Recent advancements in tag life and data collection made it the most appropriate technology to evaluate adult passage.

JUSTIFICATION FOR PLANNING:
N/A. Although the first two years of the program have been designed to assess existing and planned conditions at the dams, the remaining two years of data collection will evaluate operational and structural improvements that resulted from the first two years of data collection.

METHODS:
Tracking fish outfitted with radio transmitters will be the primary method of data collection. Fixed-site receivers will be installed at the mouths of major tributaries, in the tailraces and forebays of dams, and in the entrances and exits to fishways. Fish will be captured at the Bonneville Dam north ladder collection facility, outfitted with transmitters and tags, released downstream from Bonneville Dam, and then monitored as they migrate upstream through the drainages. Approximately 45 receivers (SRX, SRX-

S, SRX-DSP, SRX-DSP-S) will be required to monitor the selected locations, and mobile tracking will be conducted along the mainstem rivers between the dams and in the tributaries. Fish handling, tagging, and transporting procedures will be similar to those used successfully in recent years for the lower Snake River adult passage study (Bjornn et al. 1992; 1994). Statistical analysis requires that 700 summer chinook, 700 steelhead (or fall chinook), and 100 lamprey be tagged and monitored throughout the study area.

PLANNED ACTIVITIES

SCHEDULE:

Planning Phase **Start** 10/97 **End** 9/98 **Subcontractor** University of Idaho, National Marine Fisheries Service

Task 1997 tasks will continue the evaluations undertaken in 1996. 1998 will be used to analyze field data collected in 1996 and 1997, and prepare for continuing pertinent evaluations (based on 96/97 data) in 1999 and 2000.

Implementation Phase **Start** 10/97 **End** 9/98 **Subcontractor** University of Idaho, National Marine Fisheries Service

Task Data analysis

PROJECT COMPLETION DATE:

2001

OUTCOMES, MONITORING AND EVALUATION

SUMMARY OF EXPECTED OUTCOMES

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

Results of this data should provide needed information to the operation of fish facilities and dams relative to adult passage.

Present utilization and convservation potential of target population or area:

Once the relationships between the migratory habits of adult salmonids and river and dam operations are better understood, information will be available to assess this potential. The objectives of this study are to monitor and evaluate impacts to adult migration. That information is vital for continuing management efforts basin wide.

Assumed historic status of utilization and conservation potential:

Historically, the area in question has had a variety of anadromous fish runs. This study will evaluate the impact of existing operations on migrating salmonids, and assess potential improvements. Results will define modifications that will potentially assist in the restoration of northwest salmonids.

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

The long term plan is to utilize the information collected under this program to more efficiently operate the Columbia River power system. Improvements will benefit listed stocks of anadromous fish.

Indirect biological or environmental changes:

Powerhouse and spillway operations, fishladder operations and improvements, and river operational modifications could all result from an analysis of the data collected under this program. Important drawdown information and spawning information may also be obtained.

Physical products:

Over 2,000 fish will be tagged in 1997. In 1998 the information from those tagged fish, and from the 1,800 fish tagged in 1996 will be evaluated. In addition, a web site and data base are being created to better compile and distribute the information to interested parties.

Environmental attributes affected by the project:
Flow may be affected as part of the studies designed to investigate specific operations. But those impacts will only be short term, unless significant benefit to the species has been identified, and regional managers request modification to standard operations.

Changes assumed or expected for affected environmental attributes:
Near term changes to project operations have been requested in conjunction with other studies, and will be evaluated by this program. Any long term modifications will be requested based on an analysis of the data collected throughout the study.

Measure of attribute changes:
NA

Assessment of effects on project outcomes of critical uncertainty:
Information collected over several years will assist in reducing the bias associated with a given flow year. Specific evaluations will have both modified and control groups, and the differences in the two treatments will be measured to determine impacts created by the specific modifications. Treatment groups and sample sizes have been designed specifically to address statistical significance when evaluating the objectives.

Information products:
Yearly reports will be provided that address each of the specific objectives under the study. The reports will identify significant results, and recommend possible alternative operations and/or suggest structural modifications. The information will be used to assess fish passage conditions through the lower Columbia River.

Coordination outcomes:
FY 1995 and beyond: Continue to provide joint funding with Corps to evaluate adult fish passage in the FCRPS.

MONITORING APPROACH
Tracking fish outfitted with radio transmitters will be the primary method of data collection. Fixed-site receivers will be installed at the mouths of major tributaries, in the tailraces and forebays of dams, and in the entrances and exits to fishways. Fish will be captured at the Bonneville Dam north ladder collection facility, outfitted with transmitters and tags, released downstream from Bonneville Dam, and then monitored as they migrate upstream through the drainages. Approximately 45 receivers (SRX, SRX-S, SRX-DSP, SRX-DSP-S) will be required to monitor the selected locations, and mobile tracking will be conducted along the mainstem rivers between the dams and in the tributaries. Fish handling, tagging, and transporting procedures will be similar to those used successfully in recent years for the lower Snake River adult passage study (Bjornn et al. 1992; 1994). Statistical analysis requires that 700 summer chinook, 700 steelhead (or fall chinook), and 100 lamprey be tagged and monitored throughout the study area.

Provisions to monitor population status or habitat quality:
N/A. Radio telemetry will be the primary study methodology, information gathering and monitoring is a direct result of the technique.

Data analysis and evaluation:
All of the data will be analyzed statistically for differences in passage below the dams and through the system. Comparison analyses will occur for specific objectives designed with in season control groups, and relative comparisons of successive year data sets will occur for monitoring activities.

Information feed back to management decisions:
All of the data obtained will provide needed information regarding adult fish passage under a variety of river conditions, and can be used to assess structural and operational changes to the system.

Critical uncertainties affecting project's outcomes:
NA. This is primarily a monitoring and data gathering program designed to assess 'naturally' occurring river conditions. The thi

rd and fourth years evaluations will be designed to accommodate data collected and recommendations made in years one and two of the program.

EVALUATION
Type, quality, and usefulness of the data, and how well that data assists regional fish managers throughout the decision processes. Also on how well any suggested modifications actually improve migration past the dams and through the reservoirs.

Incorporating new information regarding uncertainties:
After the first two years, all of the study designs will be reevaluated and modified as needed to address the most serious issues. Data sets and treatment groups will also be analyzed statistically to ensure the evaluations compliment the study objectives.

Increasing public awareness of F&W activities:
All of the data gathered under this program will be published in reports, and posted on a web site designed to facilitate the assimilation of this information into the region. The COE Public Affairs Specialists will also arrange tours of program activities, arrange photo opportunities and provide study results to the media.

RELATIONSHIPS

RELATED NON-BPA PROJECT	RELATIONSHIP
Mid-Columbia PUD Adult Passage Evaluations	Concurrent Study utilizing fish marked under the COE/BPA program. Information pooled in same data base.
Lower Columbia River Adult Study/Corps of Engineers	Co-sponsor

COSTS AND FTE

FUTURE FUNDING NEEDS:

FY	$ NEED	% PLAN	% IMPLEMENT	% O AND M
1998	$200,000	50%	40%	10%
1999	$375,000	20%	70%	10%
2000	$375,000	20%	70%	10%
2001			0%	0%

PAST OBLIGATIONS (incl. 1997 if done):

FY	OBLIGATED
1992	$319,000
1993	$333,000
1994	$281,893
1995	$257,819
TOTAL:	$1,191,712

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

FY	OTHER FUNDING SOURCE	AMOUNT	IN-KIND VALUE
1998	Corps of Engineers	$900,000	
1999	Corps of Engineers	$900,000	
2000	Corps of Engineers	$900,000	

LONGER TERM COSTS: N/A. At this time, the program is scheduled for completion in 2000 with a final report due 4

1997 OVERHEAD PERCENT: Corps does not charge overhead for BPA funding support.

HOW DOES PERCENTAGE APPLY TO DIRECT COSTS:
This applies to all BPA funding in support of this program to the Corps.

CONTRACTOR FTE:

0. However this program is one of several managed by one FTE in the Corps, Portland District Planning and Engineering Division. It is estimated that approximately 1/10 of one FTE is required to manage the study.

SUBCONTRACTOR FTE:

This is also one of several programs that the subcontracting agencies are involved with. BPA does not fully fund these FTE. However, approximately 10 FTE are required to accomplish the tasks outlined in this program.

SUPPLEMENTAL ANADROMOUS FISH EVALUATION FACTORS:

The information collected under this study will assist fishery managers on a real time basis and provide pertinent fish response to particular river operational characteristics throughout the program. As a result, the river will be operated in a manner more conducive to migrating adult salmonids. The program addresses issues for all stocks of ESA listed Columbia River salmonids, has been designed to provide statistically significant results, and to be focus on specific pertinent issues identified throughout the study. As more information is acquired, the evaluations will also be modified where applicable to address regional priorities. Dam fishways and operations will be evaluated, modified and retested when necessary, and the migratory corridor enhanced for the salmonid migration. In addition, the success of migrating fish reaching the spawning grounds, and additional habitat issues may also be identified. This is the only lower Columbia River study evaluating the entire migratory corridor.