MIDDLE FORK AND UPPER SALMON RIVER HABITAT IMPROVEMENT

IMPLEMENTATION PLAN

FY 1988 - 1992

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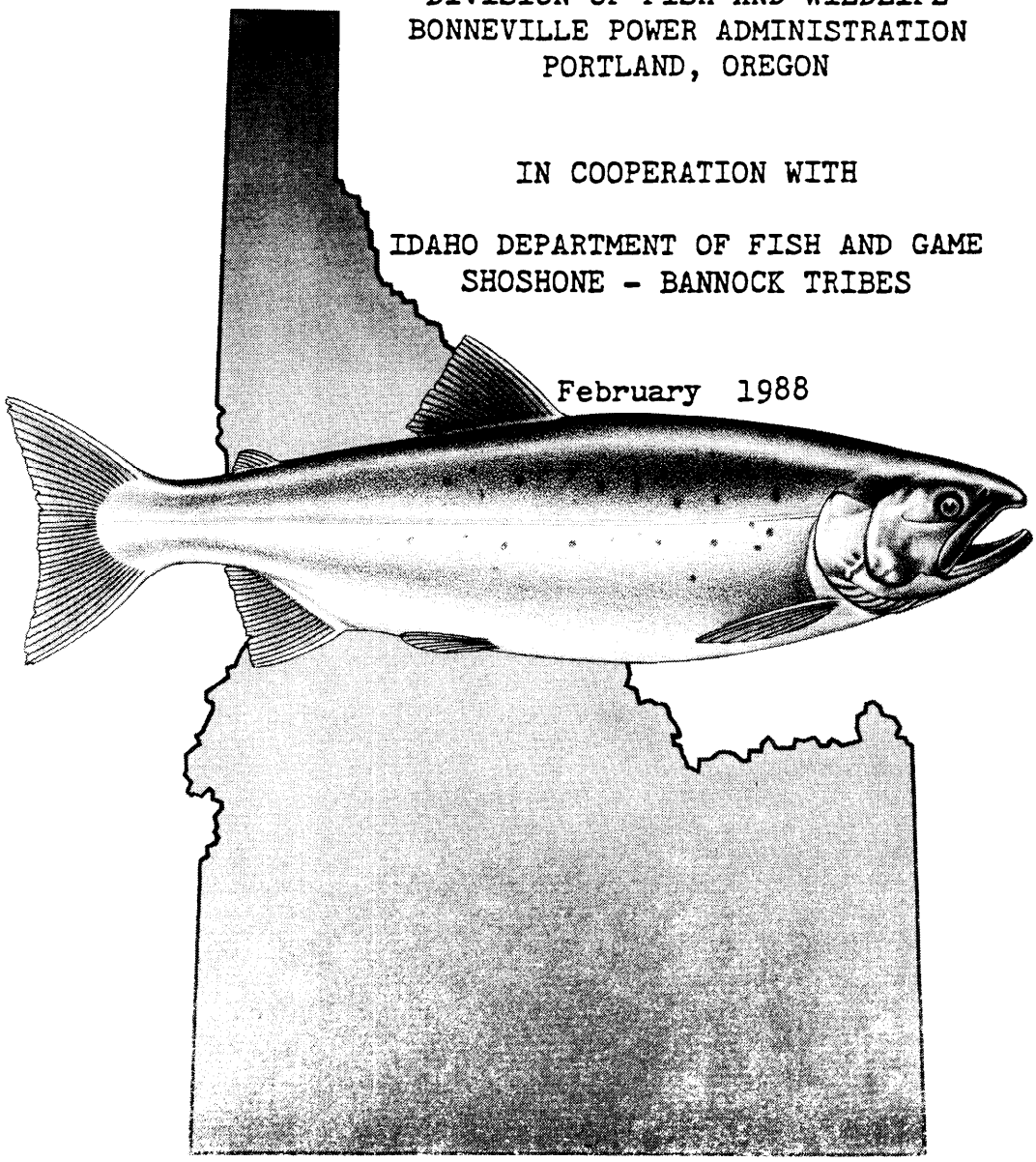
BONNEVILLE POWER ADMINISTRATION
PORTLAND, OREGON

IN COOPERATION WITH

IDAHO DEPARTMENT OF FISH AND GAME
SHOSHONE - BANNOCK TRIBES



February 1988

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PROJECT TITLE: Middle Fork and Upper Salmon River Habitat Improvement. (Reference: BPA, Project 84-24, #DE-AI79-84BP17579)

PROGRAM MEASURE: Section 703 (c) (1) and Appendix A Table: Planning, Inventory of Enhancement Projects in the Columbia River Basin Fish and Wildlife Program

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PROJECT DURATION: MAY 1, 1984 to MARCH 31, 1992

Agency and Tribal Coordination

This work statement has been developed by the Forest Service in cooperation with the Shoshone-Bannock Tribes and the Idaho Department of Fish and Game.

NEPA Compliance

NEPA documents for the following subprojects will be prepared by BPA from information supplied by the Forests. The Forests will be responsible for scoping and alternative preparations.

(WP-PJSP-4269N)

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ABSTRACT

This document presents an implementation plan for completing the Phase II portion of the Middle Fork and Upper Salmon River Habitat Improvement Agreement. Underseeding of spawning adult salmon and steelhead, high instream sediment levels, a lack of habitat diversity in the form of overhanging riparian vegetation and edge, and barriers to both adult and juvenile anadromous fish migration were identified as the principal factors limiting anadromous fish production in the project area. Underseeding is being addressed in other projects sponsored and funded by the Bonneville Power Administration while this implementation plan lays out a schedule for resolving the other identified limiting factors.

The primary goal of this program is to increase the quality and quantity of anadromous fish habitat (spring.chinook and summer steelhead) with an emphasis on the survival of the wild stocks. This goal will be achieved by reducing the impact of sediment loading, improving riparian vegetation, eliminating passage barriers, and increasing habitat diversity. Meeting the above goal will provide off-site mitigation under the mandate of the Pacific Northwest Electric Power Planning and Conservation Act of 1980. Project implementation will follow measures in the Northwest Power Council's Columbia River Fish and Wildlife Program.

The estimated annual increase in potential smolt production as the result of this project is 669,000 spring chinook and 75,000 summer steelhead for a total of 744,000 smolts.

Physical monitoring of the project will be accomplished by the Forest Service in consultation with the Idaho Department of Fish and Game (IDFG) and the Shoshone-Bannock Indian Tribes. This consists of two parts: 1) a check of the project area after spring runoff to ascertain maintenance needs, and 2) a complete physical survey of the habitat before and after project implementation to document changes in anadromous fish habitat production capability. Results of this physical monitoring will be coordinated with the Idaho Department of Fish and Game and the Shoshone-Bannock Indian Tribes fish population monitoring to produce a comprehensive annual report for all the projects.

I. INTRODUCTION

As a result of "The Pacific Northwest Electric Power Planning and Conservation Act of 1980", the Bonneville Power Administration (BPA) was given the authority to use its legal and financial resources to protect, mitigate, and enhance fish and wildlife affected by the development of hydroelectric projects of the Columbia River and its tributaries. The BPA, therefore, funded the "Anadromous Fish Habitat Improvement for the Middle Fork and Upper Salmon River" project. The goal of the project is to provide increased steelhead (strain A and B) and chinook salmon (spring and summer) smolt production as off-site mitigation for losses occurring downstream in the Columbia River hydroelectric system.

This implementation plan was developed by the Forest Service in consultation with the Idaho Department of Fish and Game, and the Shoshone-Bannock Tribes who will be consulted throughout the design, implementation, and monitoring phases. The project will be conducted in two phases: Phase I, Inventory and Design; and Phase II, Project Implementation.

Phase I, initiated in FY 1984, has consisted of habitat inventories, fisheries habitat problem identification, and recommendations for future project implementation (See FY 1986 84-24 contract and work statement for Phase I background and specifics). This phase was essentially completed with the publishing of the Inventory Reports for the Middle Fork and Upper Salmon Rivers in February 1987. The final design component of Phase I has been incorporated in the individual site-specific habitat improvement projects in Phase II. The bulk of Phase II, Project Implementation, is scheduled for 1987-1991. There may be changes in the proposed scheduled completion dates but the Forest Service will work closely with the BPA project manager in instituting any changes.

Phase II includes implementation of habitat improvement, enhancement, and passage restoration projects on specific stream reaches of those streams identified in Phase I. Improvement methods to be employed in affecting habitat restoration would include structural (bank and instream structures, fencing, fishways, erosion control, etc.) and nonstructural (riparian revegetation, instream flows, land management changes, etc.). Implementation will follow recommendations in the Northwest Power Council's Columbia River Fish and Wildlife Program, Section 703 (c) (1) and Appendix A Table: Planning Inventory of Projects for the Salmon River Subbasin: Marsh Creek, Elk Creek, Bear Valley Creek, Valley Creek and Upper Salmon River. These areas include portions of the Boise, Challis, Salmon, and Sawtooth National Forests.

II. DESCRIPTION OF THE SALMON RIVER SUBBASIN

The Salmon River is a major subbasin in the Columbia River. The Salmon River Subbasin is divided into three general areas: The Lower Salmon River below Riggins the Middle Salmon River between Riggins and the mouth of the Middle Fork Salmon River, and the Upper Salmon River above the mouth of the Middle Fork Salmon River. This plan does not address anadromous fish habitat improvement in the Camas Creek, Panther Creek, Yankee Fork, East Fork Salmon River, or Lemhi River drainages which will have their own individual implementation plans.

General Features

The project area is located in Central Idaho in what is commonly known as the Idaho Batholith (Figure 1). The geology of the area primarily consists of underlying cretaceous granitic rock with tertiary intrusive and extrusive igneous rocks associated with the Challis volcanics making up the remaining bedrock lithologies.

Average annual precipitation ranges from 10 inches at Stanley to **48** inches in Bear Valley with higher elevations receiving more precipitation mainly in the form of snow. Stream hydrology is dominated by high spring runoff from snowmelt in the mountains.

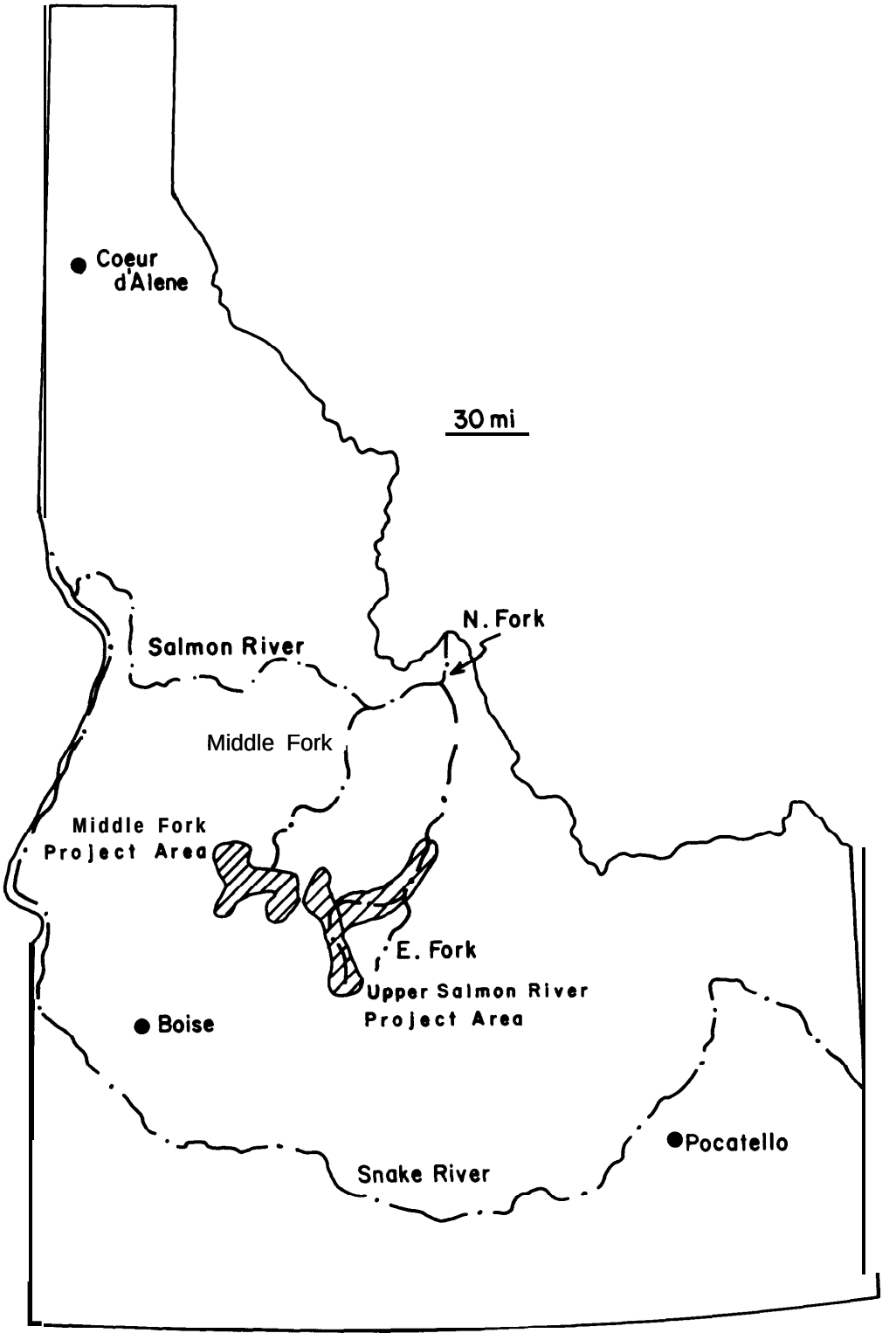
Land Management Activities

The multiple-use activities influencing the characteristics of the Salmon River Basin include: recreation, mining, irrigation diversions, road construction and maintenance, and livestock grazing and trailing.

The ownership of the Middle Fork Salmon Subbasin is primarily National Forest System Lands with little private inholdings. The land management emphasis for the Boise National Forest Bear Valley portion of the Middle Fork Salmon Subbasin is on anadromous fish and T and E species (wolves) and the Challis National Forest assigns an anadromous fish and dispersed recreation land management emphasis to the Marsh Creek portion of the Middle Fork Salmon Subbasin.

Upper Salmon River Subbasin has a majority of Federal ownership (mostly National Forest Lands with some Bureau of Land Management holdings) with a much larger amount of private land than the Middle Fork Salmon Subbasin. The land management direction for the Upper Salmon River Subbasin is much more complex than that for the Middle Fork Salmon Subbasin. The Sawtooth Valley and Stanley Basin are located in the Sawtooth National Recreation Area which is managed primarily for anadromous fish and recreation. The Challis National Forest administers the area commonly called the Upper Salmon River Front located along the main stem Salmon River from Stanley downstream to Morgan Creek. The management direction for the Upper Salmon River Front is divided into several areas Basin and Squaw Creeks are managed primarily for anadromous fish production, the Thompson Creek management direction emphasizes water quality protection from the Cyprus Mine, and the Morgan Creek management direction emphasizes timber and range while protection water quality. The Salmon district of the Bureau Land Management land use direction, in all situations, calls for an anadromous fish emphasis in riparian areas along streams inhabited by these fish; however, the BLM management prescription calls for livestock grazing in the upland areas of the Morgan Creek drainage and water quality protection from mining activity in the Thompson Creek and Squaw Creek drainages.

Figure I. Location of Project Area.



III. FISHERY RESOURCE

The 1985-1990 Idaho Anadromous Fisheries Management Plan states "The Salmon River is the most important tributary in the Snake and Columbia River drainages for anadromous fish production. There are nearly 3,000 miles of rivers and streams in the Salmon River drainage which are accessible to anadromous fish.... The Upper Salmon River historically produced 39 percent of the spring chinook and 45 percent of the summer chinook salmon in the Columbia Basin.... The Middle Fork is the largest tributary of the Salmon River and is the most important producer of anadromous fish....Both chinook and steelhead indigenous to the Middle Fork are unique. The chinook population includes a high proportion of large, 5 year-old fish. No hatchery produced chinook have ever been stocked into the Middle Fork, leaving the indigenous gene pool intact. Unlike the smaller one-ocean fish which make up most of the Salmon River run, Middle Fork steelhead are predominantly large fish which spend 2 or 3 years in the ocean.... Both the chinook and steelhead of the Middle Fork are uniquely adapted to the habitat conditions and long migrations distances....Preservation of the indigenous gene pools is a high priority....The highest priority for anadromous fish production in the Salmon River drainage is to restore adequate spawning escapements into natural production areas." The management plan identifies the restoration of migration routes and enhancement natural production habitat throughout the basin as a major feature of the anadromous fishery management program for the Salmon River Basin.

Marsh and Bear Valley Creeks combine to form the Middle Fork Salmon River in T. 13 N, R. 10 E. (Figure 2). Presently, the spring chinook escapements in the Middle Fork Salmon drainage are at a extremely low population level. Without help in instream sediment reduction and habitat improvement, significant portions of these runs won't be able to continue as viable wild populations. The Idaho Department of Fish and Game plans to manage the Middle Fork Salmon drainage for strictly natural production of wild indigenous stocks of salmon and steelhead (1985-1990 Idaho Anadromous Fisheries Management Plan).

The area above Sawtooth National Fish Hatchery is expected to be heavily seeded with adult spring chinook within several years. Other streams in the upper Salmon drainage will be extensively outplanted with eggs, fry, and fingerling as well as adult spring chinook and summer steelhead. This program has already begun. It is the intent of this project to restore and enhance the spawning and rearing habitat in the streams of the upper Salmon River Basin (Figures 3 and 4) in a cost effective manner to take advantage of this extensive seeding program.

Current potential smolt production capacity of the project portion of the Middle Fork and Upper Salmon Rivers is estimated at 5,206,000 spring chinook and 614,000 summer steelhead for a total of 5,820,000 smolts (Tables 1 and 2 and Figures 5 and 6). The estimated annual increase in potential smolt production as the result of this project is 669,000 spring chinook and 75,000 summer steelhead.

Historically it is estimated that there were 384.2 miles of summer steelhead habitat and 364.8 miles of spring chinook salmon rearing habitat in the Salmon River Basin. Surveys completed in 1987 indicated that usable spring chinook habitat has been reduced to 336.0 miles while suitable summer steelhead habitat has remained essentially the same.

Figure 2. The Middle Fork Salmon River (Boise and Challis National Forests).

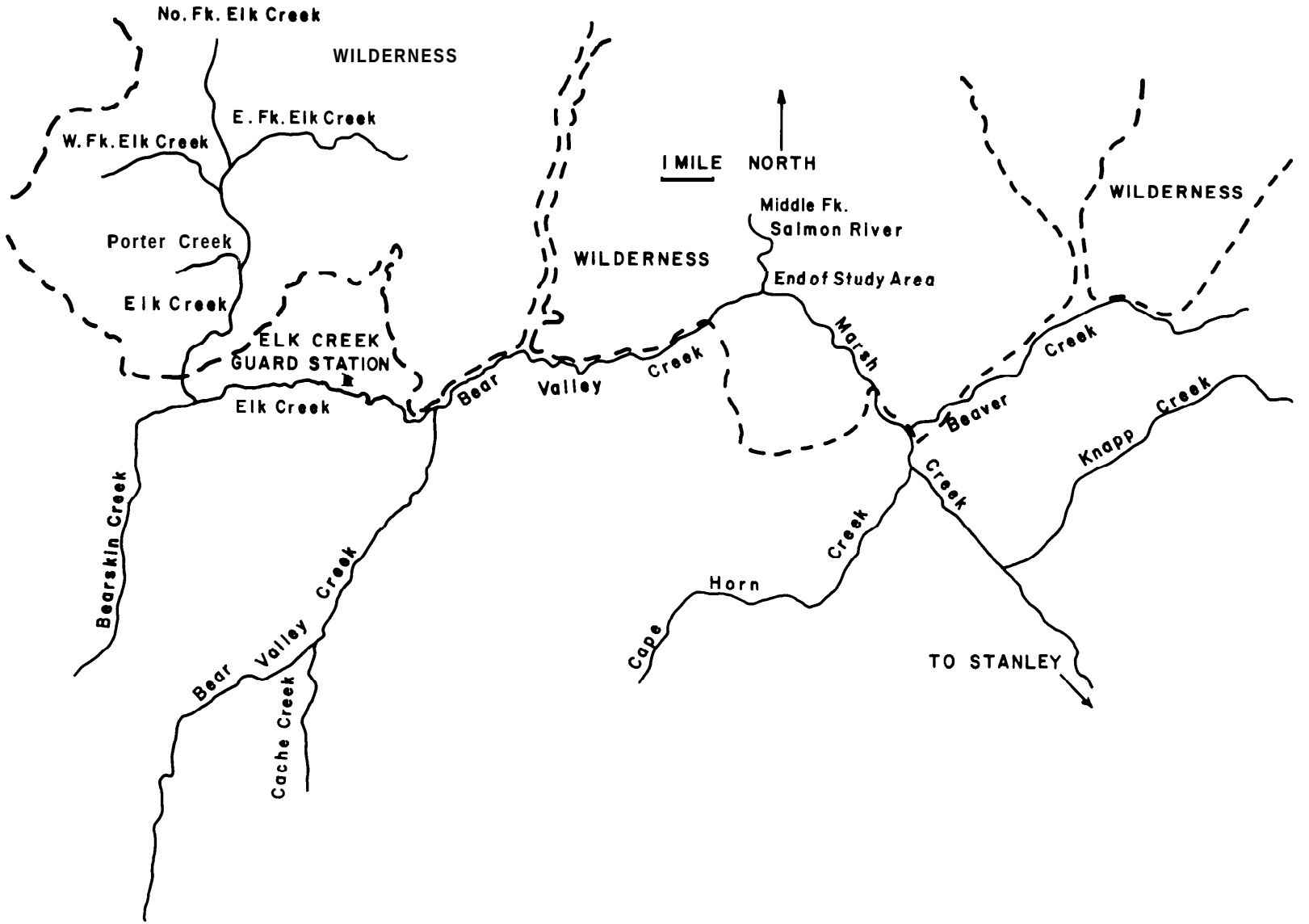


Figure 3. Upper portion of the Salmon River and its tributaries. (Sawtooth National Recreation Area)

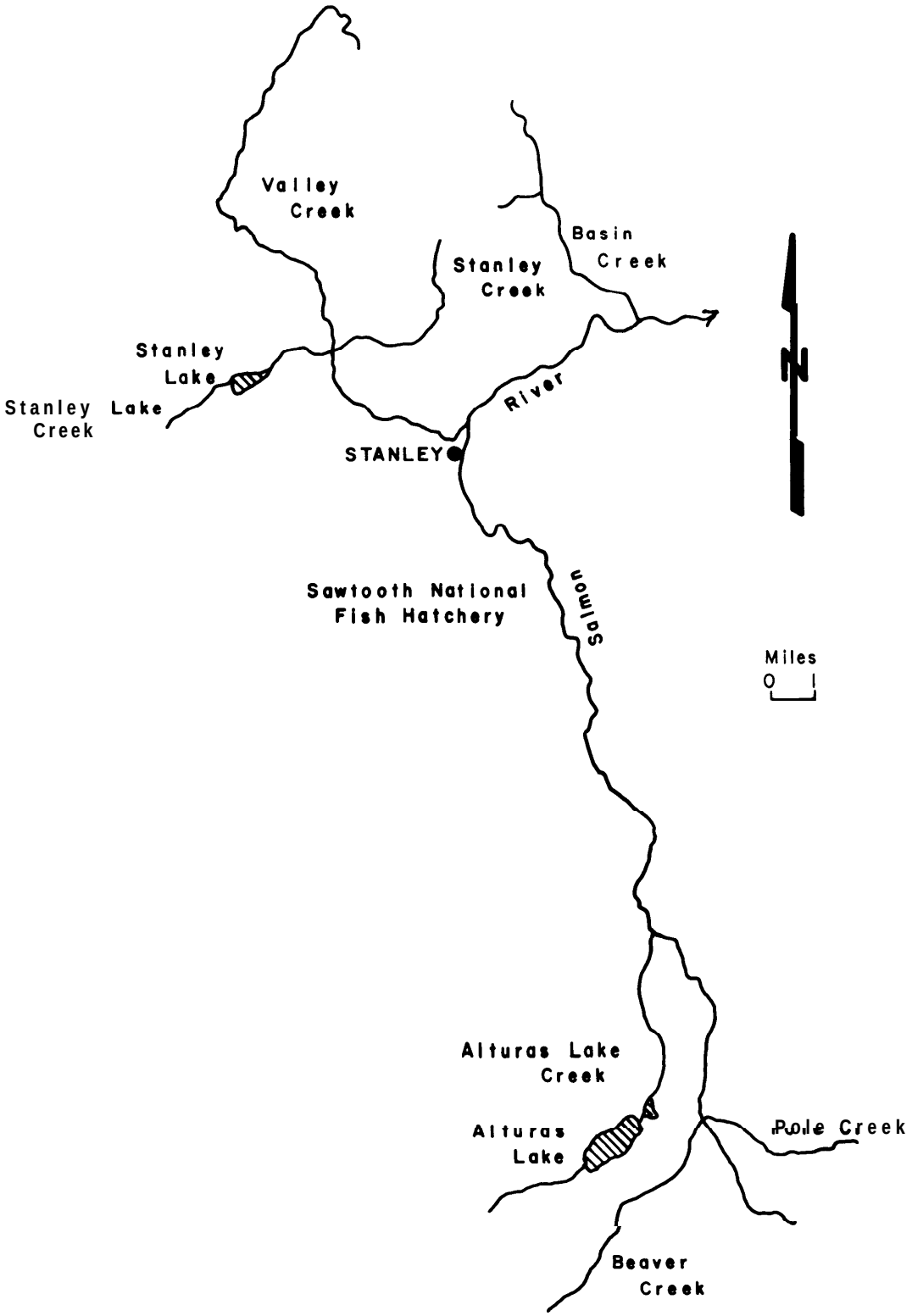
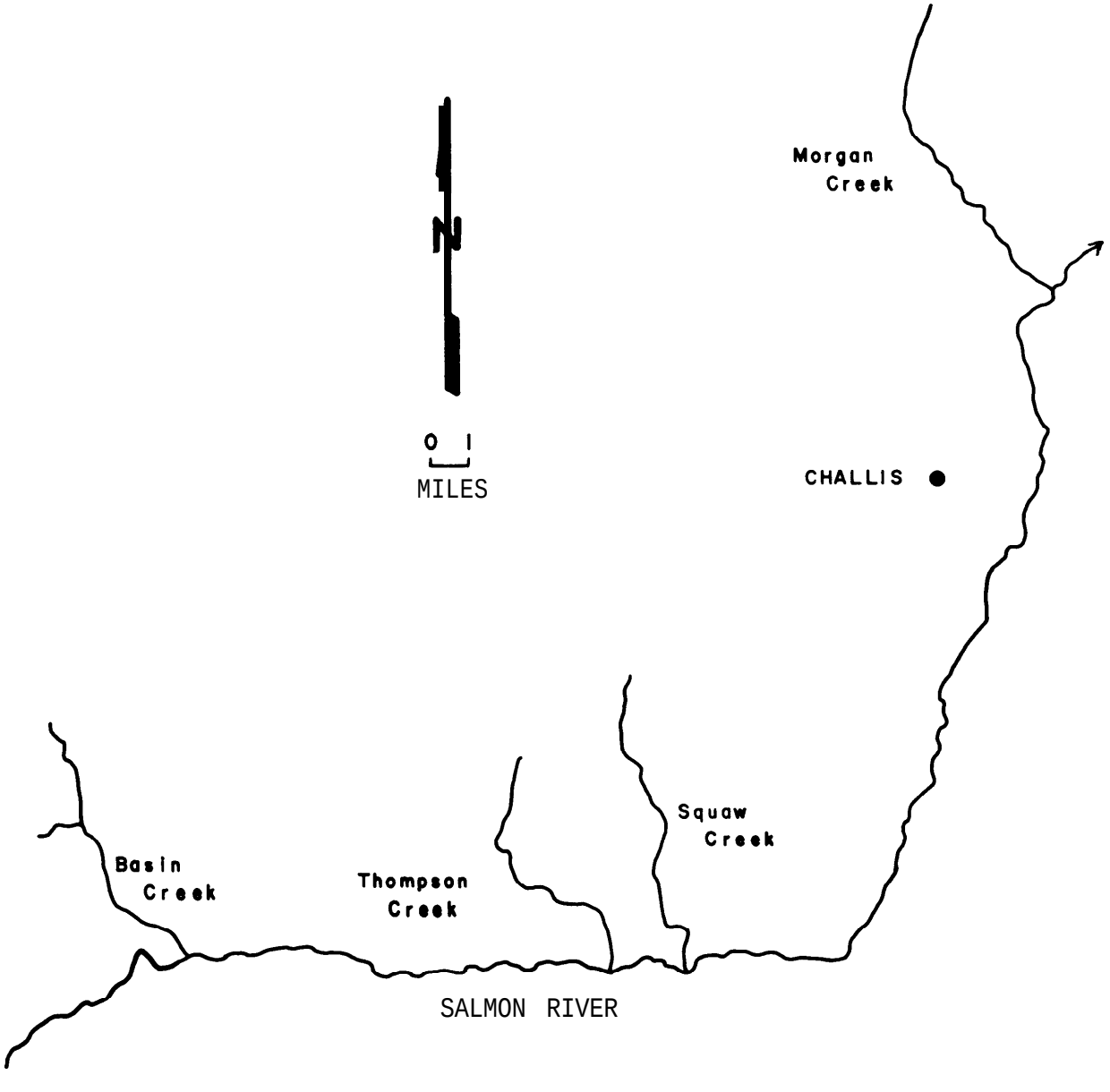


Figure 4. Lower portion of the Salmon River and its tributaries. (Challis National Forest)



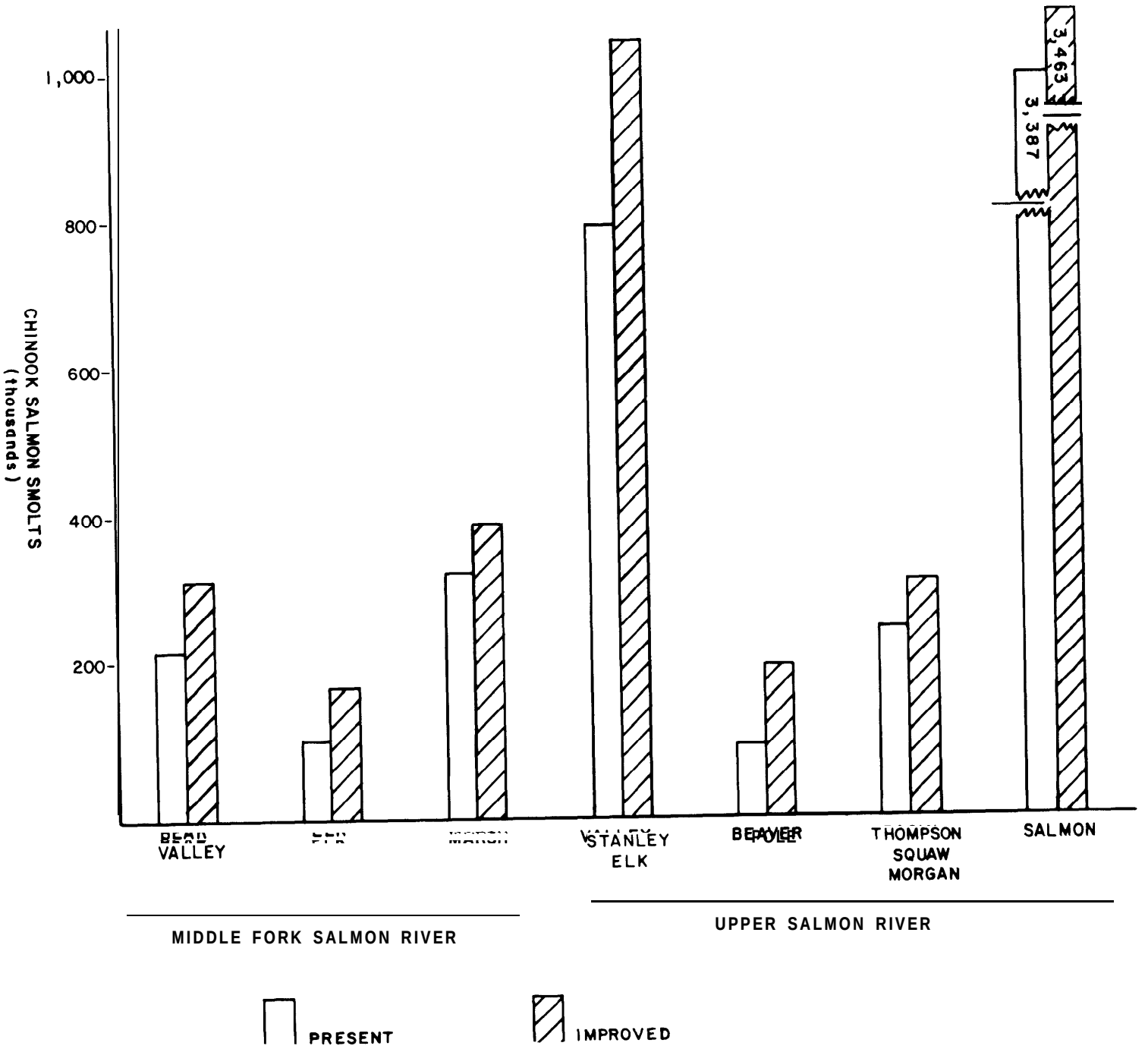


Figure 5. Present potential and improved potential for Chinook Salmon production.

Figure 6. PRESENT POTENTIAL AND IMPROVED POTENTIAL FOR STEELHEAD TROUT PRODUCTION.

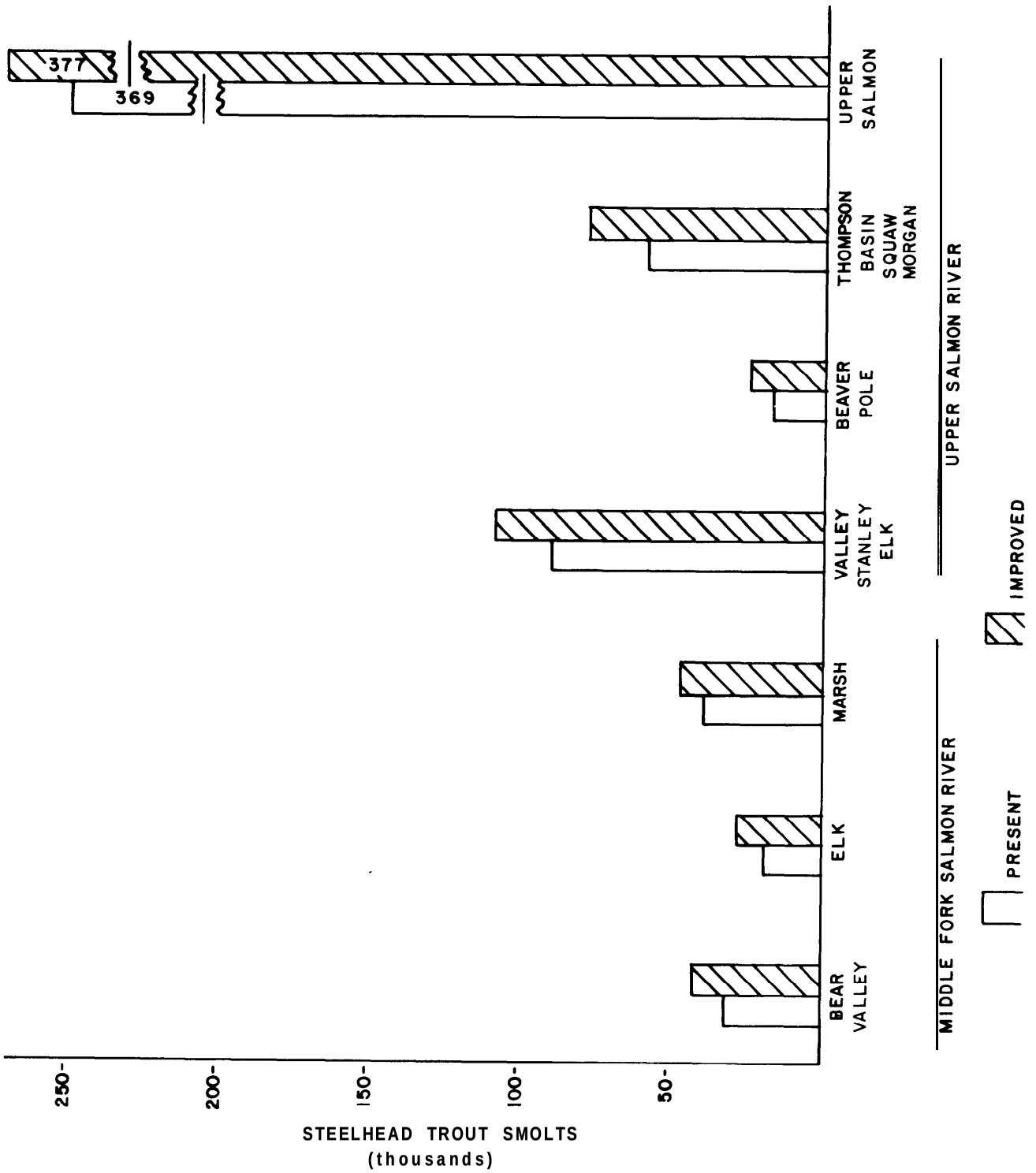


Table 1. Spring and Summer Chinook Annual Smolt Production Potential in the Project Area Based on Low Flow Rearing Area (Source: See footnote 1).

DRAINAGE	STREAM MILES	REARING AREA (M^2)	REARING QUALITY	PRESENT DENSITY (SMOLTS PER M^2)	PRESENT POTENTIAL REARING CAPACITY	ESTIMATED POTENTIAL REARING WITH IMPROVEMENTS	ESTIMATED SMOLT INCREASE
Middle Fork Drainage							
Bear Valley	15.7	227,000	Good	0.64	143,000	175,000	32,000
	17.0	231,000	Fair	0.37	85,000	148,000	63,000
	0.6	6,000	Poor	0.10	1,000	2,000	1,000
Elk Creek	9.8	89,000	Good	0.64	57,000	69,000	12,000
	17.4	132,000	Fair	0.37	49,000	84,000	35,000
	5.9	47,000	Poor	0.10	5,000	13,000	12,000
Marsh Creek	4.5	66,000	Excellent	0.90	60,000	60,000	0
	65.3	428,000	Good	0.64	274,000	330,000	56,000
Subtotals	136.2	1,226,000			674,000	881,000	211,000
Upper Salmon Drainage							
Upper Salmon R.	16.5	493,000	Excellent	0.90	444,000	444,000	0
	52.7	3,903,000	Good	0.64	2,498,000	2,556,000	58,000
	31.1	2,929,000	Fair	0.15 2/	439,000	439,000	0
	4.4	65,000	Poor	0.10	6,000	24,000	18,000
Valley Cr.	22.9	938,000	Good	0.64	600,000	722,000	122,000
Stanley Cr.	5.0	48,000	Fair	0.37	18,000	31,000	13,000
Elk Cr.	11.6	280,000	Good	0.64	179,000	216,000	37,000
Pole Cr.	9.0	232,000	Fair	0.37	86,000	148,000	62,000
Beaver Cr.	4.0	129,000	Poor	0.10	13,000	48,000	35,000
Basin Cr.	6.8	163,000	Good	0.64	105,000	126,000	21,000
	5.5	134,000	Fair	0.37	49,000	86,000	37,000
Thompson Cr.	7.5	97,000	Good	0.64	62,000	74,000	12,000
	5.0	64,000	Fair	0.37	24,000	41,000	17,000
Squaw Cr.	2.0	15,000	Fair	0.37	5,000	10,000	5,000
	5.8	43,000	Poor	0.10	4,000	16,000	12,000
Morgan Cr.	10.0	85,000	Poor	0.0	0	9,000	9,000
Subtotals	199.8	9,618,000			4,532,000	4,990,000	458,000
Totals	336.0	10,844,000			5,206,000	5,871,000	669,000

1/ Source of data for tables 1, 2, and 3:
Annual Report, 1987; Idaho Fish Management Plan, 1986-1990;
Columbia Basin System Planning Data Standardization Report,
Developed by System Planning Group and Monitoring and Evaluation
Group, September 1987;
Anadromous Species Presence/Absence Files for the Salmon Basin,
NW Power Planning Council, Oct. 1987.
Personal Communications from T. Holubetz (IDFG), C. Petrosky
(IDFG), D. Newberry (FS), and W. Somes (FS), 1987.

Forest Service physical monitoring and IDFG fish production monitoring will verify the data in these tables which currently are estimates based on System Planning data.

2/ Rearing area only.

Table 2. Summer Steelhead Annual Smolt Production Potential in the Project Area Based on Low Flow Rearing Area (See footnote 1 at the bottom of Table 1).

DRAINAGE	STREAM MILES	REARING AREA (M^2)	REARING QUALITY	PRESENT DENSITY (SMOLTS PER M^2)	PRESENT POTENTIAL REARING CAPACITY	ESTIMATED POTENTIAL REARING WITH IMPROVEMENTS	ESTIMATED SMOLT INCREASE
Middle Fork Drainage							
Bear Valley	29.8	275,000	Good	0.07	19,000	23,000	4,000
	8.1	62,000	Fair	0.05	3,000	4,000	1,000
	15.3	261,000	Poor	0.03	8,000	13,000	5,000
Elk Creek	8.7	78,000	Good	0.07	5,000	7,000	2,000
	25.7	186,000	Fair	0.05	9,000	14,000	5,000
	7.7	57,000	Poor	0.03	2,000	3,000	1,000
Marsh Creek	4.5	66,000	Excellent	0.10	7,000	7,000	0
	65.3	428,000	Good	0.07	30,000	36,000	6,000
Subtotals	165.1	1,413,000			83,000	107,000	24,000
Upper Salmon Drainage							
Upper Salmon R.	69.2	4,396,000	Good	0.07	308,000	315,000	7,000
	31.1	2,929,000	Fair	0.02 2/	59,000	59,000	0
	4.4	65,000	Poor	0.03	2,000	3,000	1,000
Valley Cr.	22.9	938,000	Good	0.07	66,000	80,000	14,000
Stanley Cr.	5.0	48,000	Fair	0.05	2,000	3,000	1,000
Elk Cr.	11.6	280,000	Good	0.07	20,000	24,000	4,000
Pole Cr.	9.0	232,000	Fair	0.05	12,000	16,000	4,000
Beaver Cr.	4.0	129,000	Poor	0.03	4,000	6,000	2,000
Basin Cr.	6.8	190,000	Good	0.07	13,000	16,000	3,000
	5.5	106,000	Fair	0.05	5,000	7,000	2,000
Thompson Cr.	7.5	101,000	Good	0.07	7,000	9,000	2,000
	5.0	60,000	Fair	0.05	3,000	4,000	1,000
Squaw Cr.	9.8	219,000	Good	0.07	15,000	19,000	4,000
	6.6	108,000	Fair	0.05	5,000	8,000	3,000
Morgan Cr.	10.35	88,000	Good	0.07	6,000	7,000	1,000
	10.35	88,000	Fair	0.05	4,000	6,000	2,000
Subtotals	219.1	9,977,000			531,000	582,000	51,000
Totals	384.2	11,390,000			614,000	689,000	75,000

2/ Rearing area only.

Table 3. Combined Spring Chinook and Summer Steelhead Annual Smolt Production.

DRAINAGE	PRESENT POTENTIAL REARING CAPACITY	ESTIMATED POTENTIAL REARING WITH IMPROVEMENTS	ESTIMATED SMOLT INCREASE
Middle Fork Drainage	757,000	992,000	235,000
Upper Salmon Drainage	5,063,000	5,572,000	509,000
Grand Total Project Area	5,820,000	6,564,000	744,000

IV. LIMITINGFACTORANALYSIS

The 1985-1990 Idaho Anadromous Fisheries Management Plan states "Anadromous salmon and steelhead produced in Idaho are exposed to a complex array of natural and man-made conditions which limit return of adult fish to Idaho and which must be mitigated in order to achieve the long-term spawning and harvest objectives proposed in this plan." Before implementation of any measure to increase the population of anadromous fish towards the carrying capacity of a habitat, the particular problems affecting fish production must be defined. This is the limiting factor analysis which will determine what measures would be productive in accomplishing the increased production of a given anadromous species.

It is commonly understood that underseeding of spawning adult anadromous fish is the principal factor limiting anadromous fish production in Idaho and that the eight hydroelectric dams located downstream on the Columbia and Snake Rivers are a major contributor to this underseeding. The problem of underseeding is beyond the scope of this plan and will not be addressed further. The following factors were detected and defined as limiting:

Sediment loading

Landuse and natural processes have increased granitic fines and silt concentrations in the substrate to a detrimental level. Such sediments reduces fish production by covering and/or cementing, filling the gravel interstices, spawning gravel. This smothers incubating eggs and fry, reduces production of aquatic insects which provide most of the food for rearing juvenile fish, and eliminates the spaces between rocks and fills in pools which are important rearing habitats for juvenile salmonids. Some of these sediment sources are being removed or reduced by land management practice changes; however, many sources, especially the natural ones, will require on-the-ground treatment.

Lack of Riparian Vegetation

Most of the streams included in the project area have a lack of overhanging vegetation which supplies cover and terrestrial insects to rearing juvenile salmonids. Riparian grasses and shrubs also contribute to fish production needs. Most of the increase in the amount of riparian vegetation is expected to result from improved grazing management practices.

Upstream and Downstream Migration Barriers

Adult steelhead, chinook, and sockeye are prevented, hindered, or delayed in migrating upstream by beaver dams, cascades, and water diversion dams thus denying the fish to many miles of good quality habitat. Barriers currently identified are: The Busterback diversions on the Salmon River and Alturas Lake Creeks, the g-foot high cascading falls at mile four on Morgan Creek, the channel at the water diversion on Valley Creek, the rough fish barrier on the outlet of Stanley Lake, the dry streambed in Beaver Creek, and the dry streambed in lower Squaw Creek. Even a delay in the migration of the adults which have already been debilitated by a long arduous journey and juvenile which possess a high sensitivity to stress can result in mortalities.

Lack of Habitat Diversity

Many of the streams in the project area lack edge. Edge is as important to aquatic organisms asit is to big game animals. Edge can be introduced to the

stream environment by adding boulders and large woody material such as logs and root wads. This will increase the number of feeding sites and the mount of hiding area for rearing juveniles salmon and steelhead as well as increase the habitat for aquatic insects.

The streams in the project area are pool-dominated. The pool-riffle ratio in existing suitable rearing habitat is approximately 70:30, but in streams dammed by beaver or logs may reach 94:6, and a ratio of 90:10 is not uncommon. No actions to reduce the pool percentage is recommended at this time.

Other factors were found not to be limiting the production of anadromous fish:

Temperature

Most of the stream runs are denuded of shade, but, even at summer solstice, water temperatures are within the tolerable range of the chinook and steelhead. High instream temperatures are found in the downstream areas, such as the main stem Salmon River in the vicinity of the mouth of the Lemhi River, during August, and care should be taken to not move these areas of high temperatures upstream.

Predators

River otters are present as predators, but not in excess numbers.

Water Quality

No water quality problems were identified.

V. GOAL AND OBJECTIVES

The primary goal of this program is to increase the quality and quantity of anadromous fish (spring chinook and summer steelhead) with an emphasis on the survival of the wild stocks. This goal will be achieved by protecting and improving the habitat of the wild stocks which will increase the present fish production.

The objectives for the projects are to modify the limiting factors such as reduce sediment loading, improve riparian vegetation, eliminate migration barriers, and provide habitat diversity. These objectives should result in increased juvenile rearing densities and smolt production of spring and summer chinook and summer steelhead. Meeting the above goal and the following objectives will provide off-site mitigation under the mandate of the Pacific Northwest Electric Power Planning and Conservation Act of 1980:

Reduce Sediment Loading

Minimize the delivery of sediment from upland sources and streambanks to the stream channel. Reduction of silt laden gravel will be used as the measurable objective. Meeting the next objective, provide optimum riparian vegetation, will also contribute to meeting the sediment loading objective.

Provide Optimum Riparian Vegetation

Optimum riparian vegetation is necessary for optimum fish habitat. Overhanging shrubs and trees provide shade, hiding cover, and food. Degraded areas will be restored by planting large clumps, cuttings, seeds, and rooted stock native to

the area and elevation that is predicted to do well in a given community type.

Eliminate Passage Barriers

Provide unobstructed passage for migrations of adults and juveniles to achieve full seeding and utilization of suitable spawning and rearing habitat. Possible methods of correcting obstructed passageways include: blasting, debris cleaning of the stream and constructing side channels, rock sills, and fish ladders.

Increase Habitat Diversity

Additional diversity will be provided by meeting riparian vegetation restoration objectives, and increasing habitat complexity while treating sediment sources.

The following criteria were considered in selecting specific habitat improvement activities to address limiting factors for anadromous fish production within the Middle Fork and Upper Salmon drainages:

Cost/benefit.

Based on several years of implementation experience, habitat improvement activities selected will include those that provide the most immediate and long lasting benefit to fish production capability in the most cost-effective manner available.

Location within basins.

Activities that produce sediment will generally be initiated in the upper stream reaches and proceed downstream to keep sediment produced during improvement activities downstream from treated areas.

Logistic constraints.

The availability of on-site materials or the access to bring in materials has been an important consideration in selecting techniques for habitat improvement.

V. FOREST SERVICE COST SHARING

Forest Service Cost Sharing with BPA Project No. 84-24 during 1987: Boise, Challis, and Sawtooth National Forest employees assisted the project leader with implementation planning ($5,200); 3.75 miles of fence were constructed on Stanley, Trap, and Elk Creeks ($18,500); riparian vegetation was planted on the FY 1987 BPA fish projects ($1,000); blasting crew's salaries and the explosives for the Pine Creek barrier removal project were paid ($2,000); a partial barrier on the Yankee Fork Salmon River was modified to enhance fish passage ($1,000); and the Valley Creek Diversion was modified to partially pass fish ($500). The Sawtooth National Forest coordinated with private landowners in the Sawtooth NRA. These landowners had erosion control projects planned by hydraulic engineers, built several miles of fence, repaired damaged stream banks, and modified their irrigation systems to benefit anadromous fish at their own expense. The Forest Service has an ongoing process for improving the management of livestock grazing and road maintenance. Bonneville Power Administration expenditures for these projects are not substitutions for this Forest Service responsibility.

VI. MIDDLE FORK SALMON RIVER PROJECTS

Background

The 1985-1990 Idaho Anadromous Fisheries Management Plan states "The Salmon River is the most important tributary in the Snake and Columbia River drainages for anadromous fish production....The Middle Fork is the largest tributary of the Salmon River and is the most important producer of anadromous fish....Both chinook and steelhead indigenous to the Middle Fork are unique. The chinook population includes a high proportion of large, 5 year-old fish. No hatchery produced chinook have ever been stocked into the Middle Fork, leaving the indigenous gene pool intact. Unlike the smaller one-ocean fish which make up most of the Salmon River run, Middle Fork steelhead are predominantly large fish which spend 2 or 3 years in the ocean....Both the chinook and steelhead of the Middle Fork are uniquely adapted to the habitat conditions and long migrations distances. . . ..Preservation of the indigenous gene pools is a high priority.

Sub-Project Ia - Bear Valley Creek (Excluding Elk Creek)

Drainage:	Middle Fork of the Salmon River
Location:	T. 12 N., R. 12 E.
Start Date:	April 1, 1988
End Date:	March 31, 1991

Introduction

The Shoshone-Bannock Tribes presently are conducting a sediment abatement project (Project 83-359) located in T. 11 N., R. 8 E., sec. 10, 15, 22 on Bear Valley Creek. This 3-mile section of Bear Valley Creek is privately owned. This plan shall provide for the implementation on Forest Service controlled portion of Bear Valley Creek which will compliment the Shoshone-Bannock Tribes project.

Grazing Use of the Area

OEA reach 1 and part of 2 are located in the Poker Meadows-Ayer Meadow Unit of the Elk Creek Cattle and Horse Allotment in which a three-pasture rest rotation system is utilized. The Unit was rested in 1983 and 1984 with cattle utilization occurring in 1986. The remaining OEA reaches are in the Bear Valley Cattle and Horse Allotment. This allotment is under a three-pasture rest rotation system. Currently, range studies are being conducted to determine whether future management changes are needed. Allotment management reviews to incorporate improved riparian management strategies in the allotment management plans are underway on both the Elk Creek Cattle and Horse Allotment and the Bear Valley Creek Cattle and Horse Allotment.

Goal and Objectives

The project goal is to increase the production of spring chinook salmon and steelhead in the Bear Valley drainage. This will be accomplished by meeting the following objectives:

1. Bank stabilization to reduce sediment sources.

2. Design erosion control structures to move sand and fines out of the treatment area.

3. Riparian re-vegetation to abate sediment sources.

4. Develop instream sediment removal alternatives.

Project Implementation

The project in Bear Valley Creek will include sediment removal, bank stabilization, channel rehabilitation, protective fencing, and riparian revegetation.

Instream sediment removal alternatives will be developed such as mechanical removal or sediment traps. Sediment traps will be installed adjacent to the major sediment carrying tributaries of Bear Valley Creek. These sediment traps will require periodic cleanout. The areas around nonstructural projects such as riparian re-vegetation will be fenced until the vegetation becomes reestablished. Fencing would be used to protect instream investments.

Headcuts and degraded stream banks will be treated by using riprap (rock, log, or tree boughs) to prevent further sediment transport to the stream channel. Rock weirs and rock deflectors will be used to reduce stream velocity flow which will control erosion.

Final design and physical monitoring will be completed by FY 1989. The site-specific projects will begin by controlling upstream sediment sources and finish with channel rehabilitation in the lower end of the project area during FY 1989-91.

A graphic representation of project implementation scheduling is shown in Figure 7.

Production Capability

The area that would be treated contains approximately 598,000 square meters of spawning and rearing habitat. This area has historically supported a potential annual production capacity of 229,000 spring chinook and 30,000 summer steelhead smolts for a total of 259,000 smolts. Projects, including side channels and reduction of sediment will increase and improve habitat for an annual increase of 96,000 spring chinook smolts and 10,000 steelhead smolts for a total increase of 106,000 smolts.

Implementation Schedule

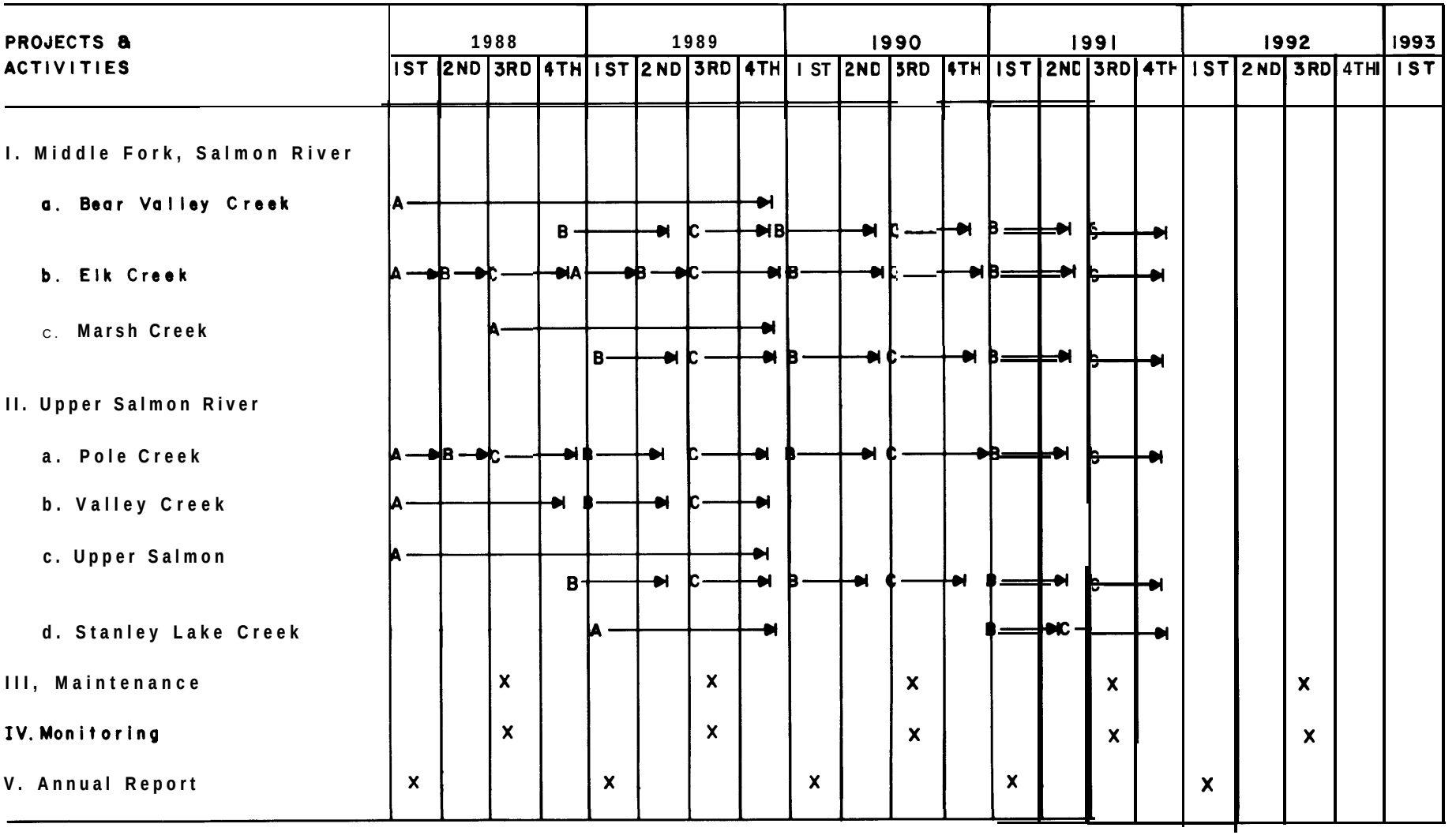
FY 1988: Begin the final design for the Bear Valley Drainage including proposed bank stabilization, channel rehabilitation, riparian revegetation, and protective fencing.

FY 1989: Complete the final design for the Bear Valley Drainage. Begin the sediment source and bank stabilization project on Bear Valley Creek tributaries in OEA reaches 5, 6, 7, and 8. The emphasis will be on constructing sediment traps to stabilize and/or remove sand and fines in intermittent drainages before they move downstream into fish production areas.

FY 1990: Complete the sediment source and bank stabilization treatment of Cache Creek on OEA reaches 1, 2, and 3 and on Bear Valley Creek tributaries in OEA reaches 2, 3, and 4. Initiate riparian revegetation treatment on Bear Valley Creek. Revegetation treatments include planting grass and shrubs in erosion fiber mulch and planting large brush clumps and willow cuttings along the streambank.

FY 1991: Bear Valley and Elk Creek Allotment Management Plan revisions completed. Finish the sediment source and bank stabilization treatments on OEA reaches 5, 6, 7, and 8 on Bear Valley Creek to tie into the Shoshone-Bannock project on private land. Bear Valley Creek implementation completed.

Figure 7. IMPLEMENTATION SCHEDULE FOR MIDDLE FORK & UPPER SALMON RIVER SUBBASINS HABITAT & PASSAGE IMPROVEMENTS PROJECTS.



Sub-project Ib - Elk Creek Anadromous Fish Habitat Improvement Project

Drainage: Middle Fork of the Salmon River
Location: T. 12 N., R. 8 E.
Start Date: April 1, 1988
End Date: March 31, 1992

Elk Creek Drainage 5-Year Plan

Introduction

Elk Creek is a tributary to Bear Valley Creek in the Upper Middle Fork of the Salmon River. The Elk Creek drainage has approximately 29.6 miles of chinook salmon habitat that has supported as many as 500 chinook salmon redds in the past.

The Elk Creek area has been a sediment contributor into the Bear Valley Creek system for many years. The headwater area of the creek is in Wilderness. Wilderness management constraints and lack of access limit the potential for correcting natural sediment sources in the headwaters. Aerial photos and on-the-ground surveys indicate that most of the sediment sources in the drainage are associated with the lower portions of Elk Creek and Bearskin Creek.

Bearskin Creek is a tributary to Elk Creek in the Upper Middle Fork of the Salmon River. Bearskin Creek has approximately 3.5 miles of chinook salmon habitat that has supported as many as 60 chinook salmon redds in the past. The headwater area of the creek has developed natural headcuts over the decades due in part to past grazing use and natural conditions. A large oxbow developed in Bearskin Creek approximately one-half of a mile above the mouth. The oxbow has been in development stages for at least 40 years and is over 200 feet in length. This oxbow was treated utilizing BPA funds in August 1987. Several other bank erosion areas that have not developed to the point of becoming oxbows yet were identified in the OEA report. In addition, an erosion source was identified in the dry portion of Bearskin Meadows. These areas are heavy contributors to the sediment flow moving from the Bearskin drainage into Elk Creek, from there to Bear Valley Creek, and on to the Middle Fork Salmon River. Bearskin Creek has a predominately sand bottom while Elk Creek has a predominately gravel bottom. The benefits of this project would include a cumulative reduction in sediment to the Elk Creek/Bear Valley Creek area resulting in an increase of fish production in the area. This habitat improvement work on natural problems will be accomplished simultaneously with habitat improvement from Forest Service management changes in the grazing allotment and the road maintenance program.

Grazing Use of The Area

The Elk Creek area falls within three allotments, all used for domestic cattle grazing. A portion of the Bearskin Creek headwaters is within the Bear Valley Allotment; Bearskin Meadows where the headcuts are located is within the Deer Creek Allotment; and Elk Creek and lower Bearskin Creek are within the Elk Creek Allotment.

The Deer Creek and Elk Creek Allotments were combined in 1975 and were grazed with a three-pasture, rest rotation system through the 1986 grazing season. Last summer, the allotments have been split apart as they were prior to 1975. These allotments are currently operating under annual management plans until long term allotment management plans are approved. The Deer Creek allotment and the Elk Creek allotments received non-use in 1987. Currently, range studies are being conducted to determine whether future management changes are needed. Allotment management reviews to incorporate improved riparian management strategies in the

three allotment management plans are underway. These reviews are expected to be completed by 1991.

Goal and Objectives

The project goal is to increase the production of spring chinook salmon and summer steelhead in the Elk Creek Drainage. This will be accomplished by meeting the following objectives:

1. Bank stabilization to reduce sediment sources.

2. Design erosion control structures to move sand and fines out of the treatment area.

3. Riparian re-vegetation to abate sediment sources.

4. Develop instream sediment removal alternatives.

Project Implementation

The project in Elk Creek will include alternatives such as: sediment removal, bank stabilization, channel rehabilitation, protective fencing, and riparian revegetation.

Degraded streambanks will be stabilized and headcuts will be treated with checkdams to prevent further sediment transport to the stream channel.

The areas around nonstructural projects such as riparian vegetation restoration will be fenced until the vegetation becomes reestablished. Fencing would be used to help reduce impacts to the improvements from possible grazing use by domestic livestock.

Native species of riparian vegetation will be planted in degraded areas. Brush clumps, cuttings, and seeds from the immediate area will be used.

Production Capability

The area that would be treated contains approximately 321,000 square meters of spawning and rearing habitat. This area has historically supported a potential production capacity of 111,000 spring chinook and 16,000 summer steelhead smolts for a total of 127,000 smolts. Projects will increase and improve fish habitat for an annual increase of 59,000 spring chinook smolts and 8,000 steelhead smolts for a total increase of 67,000 smolts.

Implementation Schedule

FY 1988: Begin the final design for the total Elk Creek Drainage including proposed bank stabilization, channel rehabilitation, riparian revegetation, and protective fencing. Continue the Bearskin sediment source and bank stabilization project in OEA reaches 1 and 2 and in sediment carrying tributaries.

FY 1989: Complete the final design for the total Elk Creek Drainage. Finish Bearskin Creek and begin the main stem Elk Creek sediment source and bank stabilization project in OEA reach 1. Sediment traps will be constructed to stabilize sand and fines in intermittent drainages before they move downstream into fish production areas.

FY 1990: Finish the main stem Elk Creek sediment source and bank stabilization project in OEA reach 1. Sediment traps will be constructed to stabilize sand and

fines in intermittent drainages before they move downstream into fish production areas.

FY 1991: Elk Creek Allotment Management Plan revision completed. Finish the riparian revegetation for the total Elk Creek Drainage. This revegetation will include grass and low brush plantings in erosion fiber mulch, 150 large brush clump plantings and 2,500 feet of streambank planted with large willow cuttings. Elk Creek implementation completed.

Sub-Project Ic - Marsh Creek Drainage

Drainage:	Middle Fork of the Salmon River
Location:	T. 12 N., R. 12 E.
Start Date:	April 1, 1988
End Date:	March 31, 1992

Marsh Creek Drainage 5-Year Plan

Introduction

The Marsh Creek drainage contains nearly 70 miles of some of the most productive chinook salmon spawning and rearing habitat in the Middle Fork drainage.

Grazing Use of the Area

The Marsh Creek drainage falls within the Stanley Basin Cattle and Horse Allotment and Cape Horn Sheep and Goat Allotment. The Cape Horn Sheep and Goat Allotment was approved for conversion from sheep to cattle but the permittee chose not to make the conversion at this time. OEA reaches 2 (upper), 3, and 6 are in the Cape Horn Sheep and Goat Allotment and were rested from 1984 to 1986 while the conversion was being evaluated. OEA reaches 4 and 5 are located in the Marsh Creek cattle pasture within the Stanley Basin Cattle and Horse Allotment. An allotment review on this allotment picked Alternative Four as the preferred alternative. Alternative Four calls for the elimination of cattle grazing in the Marsh Creek pasture over a 3-year period beginning in 1989.

Goal and Objectives

The project goal is to increase the production potential of spring chinook salmon and steelhead in the Marsh Creek Drainage by meeting the following objectives:

1. Bank stabilization to reduce sediment sources.

2. Design erosion control structures to move sand and fines out of the treatment area.

3. Riparian revegetation to abate sediment sources.

4. Develop and implement instream sediment removal alternatives.

Project Implementation

The project in Marsh Creek will include alternatives such as: sediment removal, bank stabilization, channel rehabilitation, and riparian revegetation.

Headcuts and degraded stream banks will be treated to prevent further sediment transport to the stream channel.

Potential side channels will be constructed to increase spawning and rearing capability.

Riparian fencing costs have been eliminated due to the change in livestock grazing proposed by the Sawtooth National Forest.

Production Capability

The area that would be treated contains approximately 494,000 square meters of spawning and rearing habitat. This area has historically supported a potential production capacity of 334,000 spring chinook and 37,000 summer steelhead smolts for a total of 371,000 smolts. Projects, including side channels and reduction of sediment will increase and improve habitat to provide an annual increase of 56,000 spring chinook smolts and 6,000 steelhead smolts for a total increase of 62,000 smolts.

Implementation Schedule

FY 1988: Begin the final design for the Marsh Creek drainage including proposed bank stabilization and side channel development.

FY 1989: Complete the final design for the Marsh Creek drainage. The Sawtooth National Forest begins implementation of the allotment management alternative that eliminates cattle grazing in OEA reaches 4 and 5 of Marsh Creek. Implementation will be accomplished within 3 years. Construct structures to control erosion and stabilize sand and fines in intermittent and perennial drainages flowing into Marsh Creek before they move downstream into fish production areas.

FY 1990: Continue to construct structures to control erosion and stabilize sand and fines in the Marsh Creek drainage. This includes an eroding streambank area in Knapp Creek adjacent to the Cape Horn Guard Station and the area of Thatcher Creek above State Highway 21 and Flat Creek on both sides of State Highway 21.

FY 1991: Complete riparian revegetation and the sediment source reduction in natural erosion areas of the Marsh Creek drainage. The emphasis will be on OEA reaches 4 and 5 of Marsh Creek. Work was delayed in this area to let the streambanks heal following the removal of cattle grazing. This includes the unstable channels in Thatcher Creek in OEA Reach 5 and the unnamed tributary to Marsh Creek in OEA Reach 4.

VII. UPPER SALMON RIVER PROJECTS

Background

The Upper Salmon River historically has supported large populations of spring chinook salmon and summer steelhead trout in the past. Granitic soils contribute to the fragile nature of streambanks and are very sensitive to certain land uses. Recreation activities, improper use of riprap, mining, irrigation diversions, roads and bridges, and livestock grazing and trailing have been observed to decrease streambank stability in this area (see map figure 3).

Sawtooth National Fish Hatchery Supplementation Plans

The area above Sawtooth National Fish Hatchery is expected to be heavily seeded within several years with spawning adult spring chinook that have returned to the hatchery trap. Other streams in the upper Salmon drainage will be extensively outplanted with eggs, fry, and fingerling as well as adult spring chinook and summer steelhead. This program has already begun. It is the intent of this project to restore and enhance the spawning and rearing habitat in the streams of the upper Salmon River Basin in a cost-effective manner to take advantage of this extensive seeding program.

Sub-project IIa - Pole Creek Anadromous Fish Habitat Improvement Project

Drainage: Salmon River
Location: T. 6-12 N., R. 11-14 E.
Start Date: April 1, 1988
End Date: March 31, 1989

Pole Creek 5-Year Plan

Introduction

Prior to 1978, landowners within the Salmon River Drainage used flood irrigation as the primary method of irrigating farm fields. As a result of the tremendous amount of water needed, the streams began to dry up and spring chinook and steelhead spawning habitat was dramatically decreased. When the flood irrigation system was changed to an overhead pivot system, the stream banks within the private land began to erode, and the stream cut several new channels due to a combination of heavy cattle use of the riparian areas, pivot wheels cutting into and through the stream banks as they crossed the stream meanders, and bank cutting as the result of the increased water flow in Pole Creek. During June, July, and August of 1987, the landowner changed most of the overhead pivot systems so that they no longer cross the Pole Creek channels, rocked the crossings that remained, blocked off the areas where the stream was cutting new channels across the meanders, and fenced the stream.

Grazing Use of the Area

OEA reaches 1 and 2 are located on private land where the pivot system problem and cattle utilization in the riparian areas has occurred and where cattle graze from mid June to late October. The landowner fenced the streambanks along lower Pole Creek during July and August of 1987 to exclude streamside grazing when cattle are in the area. The remaining reaches are looated in the Pole Creek

Sheep and Goat Allotment. Sheep grazing occurs from mid August to mid October. Current sheep grazing is not influencing the streamside vegetation as it did in the past. In OEA reach 3, holding corrals for the sheep were built to close the stream where trampling of the streambanks and surrounding vegetation occurred in the 1920's This area still has not recovered.

Goal and Objectives

The project goal is to increase the production of spring chinook salmon and summer steelhead in Pole Creek. This will be accomplished by meeting the following objectives:

1. Minimize the delivery of sediment to fish production areas with the emphasis on tributary and upland sediment sources.

2. Restore riparian vegetation.

3. Resolution of the Alturas Lake Creek-Upper Salmon River diversion problem.

Project Implementation

In OEA Reaches 1 and 2, bank cutting on meandering banks outside pivot wheel areas will be monitored for the next 2 years to check for riparian recovery as the result of removing cattle from the area. If recovery does not occur, the area may require stabilization.

Two miles of streambanks above the area fenced by the landowner will be fenced, to bring the privately owned riparian area of Pole Creek under total management.

In OEA reach 3, one-half mile of stream has unstable banks. Water sedge plugs will be planted in cracks in the lower banks to prevent erosion. One tree and a washed out bridge will be removed and one rock sill will be installed in a bend of OEA reach 3 to rebuild the eroded streambanks.

Production Capability

The area that would be treated contains approximately 232,000 square meters of spawning and rearing habitat. This area has historically supported a potential annual production capacity of 86,000 spring chinook and 12,000 summer steelhead smolts for a total of 98,000 smolts. Projects will increase and improve habitat to provide an annual increase of 62,000 spring chinook smolts and 4,000 steelhead smolts for a total increase of 66,000 smolts.

Schedule

FY 1988: Complete the final design for the Pole Creek drainage including proposed bank stabilization, channel rehabilitation, riparian revegetation, and protective fencing. Execute the initial sediment source and bank stabilization treatment on Pole Creek.

FY 1989: Finish and maintain final project.

Sub-Project IIb - Vallev Creek

Drainage: Salmon River
Location: T. 10, 11, and 12 N., R. 12 and 13 E.
Start Date: April 1, 1988
End Date: March 31, 1991

Valley Creek Drainage 5-Year Plan

Introduction

Valley Creek is one of the prime producers of spring chinook salmon in the upper Salmon drainage. The OEA report outlined a number of opportunities for increasing anadromous fish production. Land management changes and sediment control offer best methods for increasing habitat quality and quantity.

Grazing Use of the Area

Valley Creek and tributaries are located within the Stanley Basin Cattle and Horse Allotment. In 1989, the Sawtooth National Forest plans to begin implementing allotment changes to protect and improve riparian areas and anadromous fish habitat. Several miles of riparian streamsides in Stanley Creek and Elk Meadows have already been fenced by the Forest Service in the spring of 1987 to exclude cattle grazing.

Goal and Objectives

The project goal is to increase the production potential of spring chinook salmon and summer steelhead in the Valley Creek drainage by meeting the following objectives:

1. Treat sediment sources at the sources.
2. Construct a side channel to insure fish passage in Valley Creek.
3. Control erosion in Elk Meadows.
4. Restore riparian vegetation.

Project Implementation

The emphasis in the Valley Creek drainage will be directed toward instream sediment reduction, ie: erosion control at the source and riparian revegetation. This can be accomplished by installing setback fences along 8.5 miles of Valley Creek on private lands, extending the present fence another 2.5 miles on Stanley Creek and planting, and fertilizing vegetation within the fenced areas. The channel below the diversion on Valley Creek would be reconstructed to provide adult anadromous fish passage to upper Valley Creek drainage, prevent sediment problems, and increase rearing production.

Treatment of the Elk Meadows site will be delayed until 1991 when the results of the riparian fencing installed in 1987 are known. If the site is still an erosion problem in 1991, erosion control structures would be installed below the present two structures which would be rebuilt.

Production Capability

The area that would be treated contains approximately 1,266,000 square meters of spawning and rearing habitat. This area has historically supported a potential annual production capacity of 797,000 spring chinook and 88,000 summer steelhead smolts for a total of 885,000 smolts. Projects will increase and improve habitat to provide an annual increase of 172,000 spring chinook smolts and 19,000 steelhead smolts for a total increase of 191,000 smolts.

Implementation Schedule

FY 1988: Complete the final design for the Valley Creek drainage including proposed fencing, channel rehabilitation, passage improvements, and riparian revegetation. Construct the Valley Creek side channel and the Stanley Creek riparian fence.

FY 1988 Construct the proposed Valley Creek channel improvements and begin the fence construction in Valley Creek.

FY 1990: Plant and fertilize riparian vegetation in areas where re-establishment is slow. Continue the fence construction on private land along Valley Creek.

FY 1991: Finish the Valley Creek fence construction. Proceed with the Elk Meadows erosion control only if needed.

Sub-Project IIc - Upper Salmon River and Tributaries

Drainage: Salmon River
Location: T. 7-17 N., R. 14-19 E.
Start Date: April 1, 1988
End Date: March 31, 1992

Upper Salmon River and Tributaries 5-Year Plan

Introduction

Four sites were identified on the main stem Salmon River (within the Sawtooth Valley) as major erosion problems. The two private lands sites were located at Idaho Rocky Mountain Ranch and Rember Ranch while the two National Forest sites are located at the Decker Flat Diversion and adjacent to the highway below the Rember Ranch site. These erosion sources contribute significant amounts of sediment during high flows. In addition, spring chinook and summer steelhead spawning and rearing habitat is being degraded.

Beaver Creek (a tributary of the upper Salmon River within the Sawtooth Valley) lacks an adequate water supply for chinook salmon spawning and passage from mid-July on. Because of an irrigation diversion in the lower reach of Beaver Creek, approximately .6 to 1.2 miles of the creek are completely dewatered. The upper portion of the same reach has beaver activity, which helps buffer sediment loading into the stream. In OEA reach 1, there exists problems of braiding and stream trampling by cattle. Both of these problems occur on private land.

Other Salmon River tributaries included in this section are Basin, Thompson, Squaw, and Morgan Creeks. These streams are located within the Challis National Forest. The 38 miles of steelhead habitat that were historically occupied in the four streams have been reduced to 14 miles of habitat used at the present. Morgan Creek has no known chinook populations while the other three streams historically supported 21 miles of juvenile chinook rearing. Currently spring chinook spawn and rear in very low numbers in the lower 7.5 miles of Basin Creek, in 2.0 miles of Squaw Creek, and the lower 5.0 miles of Thompson Creek (Tables 1 and 2).

Grazing Use of the Area

These streams have a number of land managers varying from Forest Service and Bureau of Land Management to private. Grazing strategies vary from exclusion and rest rotation to season long on private lands.

In Beaver Creek, the upper portion of OEA reach 1 and all of OEA reach 2 are located within the Smiley Creek Sheep and Goat Allotment. Sheep use the allotment from July through October. Sheep grazing has had minor impact on the streamside vegetation in OEA reach 2. The remaining portion of OEA reach 1 is on private land in which cattle grazing occurs.

Basin and Thompson Creeks are in the Salmon River Front Cattle Allotment, Squaw Creek is in the Squaw Cattle Allotment, and Morgan Creek is in the Morgan Cattle Allotment. Management of these allotments use a rest rotation grazing strategy.

Goal and Objectives

The project goal is to increase the production of spring chinook salmon in upper Salmon River and the tributaries discussed above. This will be accomplished by meeting the following objectives:

1. Treat sediment sources at the sources.

2. Create new juvenile rearing habitat.

3. Work with the private landowners and the State of Idaho to provide minimum fish rearing and passage flows during the summer low flow period.

Project Implementation

Within the Sawtooth National Recreation Area, drop structures have been designed for the major erosion sites on private land along the upper Salmon River (Idaho Rocky Mountain Ranch and Rember Ranch) by GEOMAX (Dr. D. Riechmuth). In addition to the the drop structures on' private lands, two drop structures are needed on National Forest lands (Decker Flat Diversion and adjacent to the highway below the Rember Ranch site). These structures should prevent future erosion problems in the area while increasing the quality and quantity of spring chinook and summer steelhead habitat.

Where needed, the areas around riparian vegetation projects will be fenced until the vegetation becomes reestablished.

Headcuts and degraded stream banks will be treated to prevent further sediment transport to the stream channel.

One mile of Beaver Creek will be fenced on the private land above Highway 75 to exclude grazing. Areas where braiding has occurred below Highway 75 will be treated by installing five erosion control structures to reduce sediment in Beaver Creek, in the Salmon River, and at the Sawtooth National Fish Hatchery downstream.

Production Capability

The area that would be treated contains approximately 5,782,OOO square meters of spawning and rearing habitat. This area has historically supported a potential annual production capacity of 2,766,OOO spring chinook and 372,000 summer steelhead smolts for a total of 3,138,000 smolts. Projects will increase and improve habitat to provide an annual increase of 224,000 spring chinook smolts and 28,000 steelhead smolts for a total annual increase of 252,000 smolts.

Implementation Schedule

FY 1988: Begin the final design for the Upper Salmon River proposed bank stabilization, channel rehabilitation, riparian revegetation, and protective fencing.

Complete the final design for Beaver Creek, including obtaining a memorandum of understanding with the private landowner concerning access to the project site,

stream flow, proposed bank stabilization, channel rehabilitation, riparian revegetation, and protective fencing.

Construct the erosion control structures at the Rember and Idaho Rocky Mountain Ranch sites on the Salmon River main stem as designed by Dr. Reichmuth.

FY 1989: Begin the final design for the upper Salmon River tributaries which include Basin, Thompson, Squaw, and Morgan Creeks. Continue the sediment source and bank stabilization treatment on Beaver Creek (private lands) and two sites on the Salmon River at the Decker Flat Diversion and adjacent to the highway below the Rember Ranch (National Forest System land).

FY 1990: Complete the final design for Basin, Thompson, Squaw, and Morgan Creeks. Finish main stem Upper Salmon River riparian revegetation. Construct structures to control erosion and stabilize sand and fines in the Basin, Thompson, Squaw, and Morgan Creeks drainages. Specific areas of treatment are:

Beaver Creek. Finish and maintain final project which will include one mile of riparian fencing and five erosion control structures.

Basin Creek. Headcutting on Kelly Creek. Eroding tailing piles of the old uranium mine in East Basin Creek. The decomposed granite slopes in the lower 1.5 miles of main Basin Creek. Eroding banks in Little Basin Creek.

Thompson Creek. Bank instability and lack of stream habitat diversity in the four miles of Thompson Creek below Pat Hughes Creek. Eroding banks at the abandoned Scheelite Jim Mine above Buckskin Creek.

Squaw Creek. Headcuts in Trealor Creek and Second Creek. Natural eroding bare hills in Cinnabar Creek. The lower end of Squaw Creek dries up during low flow periods.

Morgan Creek. Ten foot cascading falls on Morgan Creek four miles above the mouth. High instream sediments areas and degraded riparian vegetation on the lower 18 miles of Morgan Creek.

FY 1991: Complete the riparian revegetation and the sediment source reduction treatments on Squaw and Morgan Creeks. The emphasis will be on the Bureau of Land Management and private ownership downstream from the Challis National Forest boundary.

VIII. PROJECT MONITORING

Physical monitoring of the projects will be accomplished by the Forest Service in consultation with the Idaho Department of Fish and Game and the Shoshone-Bannock Indian Tribe and consists of two parts: 1) a check of the project area after spring runoff to determine maintenance needs, and 2) a complete physical survey of the habitat before and after project implementation to document changes in anadromous fish habitat production capability. This survey will include instream sediment samples, photo point recording over time, and observations of the structures at different stream flows. This monitoring will pinpoint areas of habitat capability increase and measure the total amount of physical habitat available to anadromous fish after completing passage improvements. Physical monitoring will be coordinated with Project 83-7, Idaho Department of Fish and Game who will conduct the project fish population monitoring which will be combined with the physical habitat monitoring data to verify the smolt estimates in tables 1, 2, and 3.

Physical monitoring of all BPA anadromous fish improvement projects will start with a comprehensive physical survey prior to implementation. All projects in last year's program had this survey in July and early August 1987. Monitoring activities planned for 1988 include: 1) Resurvey of the Knapp Creek and Bearskin reaches to document any physical changes occurring during spring runoff is scheduled for July 1988. 2) Physical stream surveys, scheduled for August 1988, of the Boulder Creek (Little Salmon River) and the Johnson Creek (East Fork of the South Fork Salmon River) passage projects completed in 1984-85 to record the amount of habitat that has been made available to anadromous fish as a result of the passage projects.

Methods of Physical Monitoring

The physical survey is a field combination of stream reach inventory, channel stability evaluation, and fishery habitat appraisal in anadromous and potentially anadromous streams. Each stream is walked completely over the linear length under survey during the low flow period, to collect data on the biological and hydrological conditions. These survey methods were derived from previous experience and procedures developed by the Forest Service in Region I (Pfankuck, 1978), which have proved to be reliable and effective for inventorying habitat conditions for northwest salmonids.

The survey method relies on both measurements and observations, requiring a minimum of equipment. The equipment includes a thermometer, for water and air temperature determinations; a compass, for stream orientation; a clinometer, for gradient and slope gauging; a spherical densiometer, for cover quantification; a five-foot pole, graduated in half of foot lengths, for depth and area measurements; and a camera, for documentation. These instruments are readily available as basic tools of a biologist. Length and area measurements are made by the pendulum swing of the measured pole previously calibrated. The parameters that can not be quantitatively measured, such as stability and stream morphology, are rated using a set of evaluation criteria. Results are found to be uniform between surveyors and produced an accurate account of stream conditions.

Each stream is divided into reaches which are delineated by a significant change in a stream property such as bottom composition, gradient, or flow and OEA

reaches. The biological and physical properties of each reach are recorded to provide the following data:

1. Fishery Habitat:

   Velocity, flow, average and maximum depth, average width, substrate composition, spawning gravel availability, water and air temperatures, turbidity, barriers to migration, shelter, stream class, and fish species and numbers observed.

2. Physical Features:

   Gradient, stream stage and channel stability. Channel stability was evaluated by estimating the following: upper bank land form, slope, mass wasting hazard. debris jam potential, vegetation bank protection, lower bank channel capacity, bank rock content, flow deflectors and obstructions, bank cutting and point-bar deposition, channel bottom rock angularity, brightness of bottom, particle packing, percent stable material and size distribution, scour and deposition, and the amount of clinging vegetation.

3. Riparian Environment:

   typical width of the riparian zone, the type and percentage of vegetation in the riparian, the size of the vegetation, the plant community composition by dominance and the stream surface shade.

Within each reach, every pool and riffle is measured to provide an accurate pool/riffle ratio. Photography is used extensively to document the conditions of each reach. Photos are taken of major features, such as barriers, pollution indicators, major substrate problems, cattle use indicators, beaver use indicators, and past logging activities.

In addition, intensive monitoring of approximately three sample reaches per stream will be conducted. This intensive sampling will combine the IDFG ocular transects and Sawtooth National Forest Phases I and II.

This monitoring effort is designed to ensure that the direct habitat improvements scheduled for this project are accomplished and the habitat is improved to the stated objective.

Results of this physical monitoring will be coordinated with the Idaho Department of Fish and Game and the Shoshone-Bannock Indian Tribes fish population monitoring to produce a comprehensive annual report for all the projects.

x. PROJECT MAINTENANCE

Maintenance of the project over time is essential to provide the long term increases in anadromous fish production anticipated. Even though the project has been and will continue to be designed to be maintenance free, a small amount of annual maintenance will be programed beyond **1992.**

XI. REFERENCES

Anadromous Species Presence/Absence Files for the Salmon Basin. NW Power Planning Council, Oct. 1987.

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OEA Research. Middle Fork of the Salmon River, Aquatic and Riparian Area Inventory, 1987.

Pfankuck, Dale J. Stream Reach Inventory and Channel Stability Evaluation. Northern Region, USDA Forest Service, June 1978.

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XII. BUDGET SUMMARY

A Summary of the 84-24 - Phase I and II
Middle Fork and Upper Salmon Rivers Projects for FY 1988-1992

Sub-Projects	FY-88	FY-89	FY-90	FY-91	FY-92
PHASE I					
Project leader	59,814	61,621	63,427	65,347	67,378
PHASE II					
I. Middle Fork Salmon River					
a. Hear Valley Creek (Hear Valley Creek Portion)					
1. Design	6,000	5,000			
2. Implementation	10,000	40,000	30.000	20,000	DONE
Subtotals	16,000	45,000	30,000	20,000	DONE
b. Elk Creek					
1. Design	8,000	4,000			
2. Implementation	40,000	30,000	25,000	10,000	DONE
Subtotals	48,000	34,000	25,000	10,000	DONE
c. Marsh Creek					
1. Design	6,000	3,000	DONE	DONE	
2. Implementation		10,000	15,000	10,000	DONE
Subtotals	6,000	13,000	15,000	10,000	DONE
II. Upper Salmon River and Tributaries Anadromous Fish Habitat Improvement					
a. Pole and Valley Projects					
1. Design	3,000	3,000			
2. Implementation	29,000	30,000	30,000	30,000	DONE
Subtotals	32,000	33,000	30,000	30,000	DONE
b. Upper Salmon River and Tributaries					
1. Design	19,000	14,000	4,000	DONE	
2. Implementation	50,000	40,000	70,000	90,000	DONE
Subtotals	69,000	54,000	74,000	90,000	DONE
III. Physical Monitoring	50,000	50,049	51,065	52,081	51,968
IV. Project Maintenance	5,000	10,000	15,000	15,000	5,000
PHASE I & II GRAND TOTALS	$285,814	300,670	303,492	287,428	124,346