

# IDAHO DEPARTMENT OF FISH AND GAME

FEDERAL AID IN FISH RESTORATION  
1999 Job Performance Report  
Program F-71-R-24



## REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS SALMON REGION (Subprojects I-H, II-H, III-H)

- PROJECT I. SURVEYS AND INVENTORIES**
- Job a<sup>1</sup>. Salmon Region Mountain Lakes Investigations  
- Stocking
  - Job a<sup>2</sup>. Salmon Region Mountain Lakes Investigations  
- Carlson Lake Population Control
  - Job a<sup>3</sup>. Salmon Region Mountain Lakes Investigations
  - Job b. Salmon Region Lowland Lakes Investigations  
- Yankee Fork, Kelly Creek and Squaw Creek Ponds Studies
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- Middle Fork Salmon River Snorkeling Transects
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- Wild Trout Population Surveys - Canyon Creek and Tributaries
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  - Job c<sup>5</sup>. Salmon Region Rivers and Streams Investigations  
- Valley Creek Brook Trout Reduction
- PROJECT II. TECHNICAL GUIDANCE**
- PROJECT III. HABITAT MANAGEMENT**

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## 1999 ANNUAL PERFORMANCE REPORT

State Of: Idaho

Program: Fisheries Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-H: Salmon Region

Job: a<sup>1</sup>

Title: Mountain Lake Investigations - Stocking

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

In summer 1999, the Idaho Department of Fish and Game stocked 79 mountain lakes in the Salmon Region, 62 by plane and 17 by foot. We stocked 57,150 fry in Salmon-Challis National Forest lakes, including 47,650 westslope cutthroat trout *Oncorhynchus clarki lewisi*, and 9,500 sterile rainbow trout *O. mykiss*. The Department used a Cessna-185 fixed-wing aircraft at a cost of \$21.17 per lake.

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## OBJECTIVE

Maintain a viable high mountain lake fishery in the Salmon Region.

## METHODS

We stocked 62 Salmon Region high mountain lakes using a Cessna-185 fixed-wing aircraft; volunteers on foot stocked 17 lakes. Stocking records were summarized for each lake.

## RESULTS

During the summer of 1999, the Department stocked 79 high mountain lakes in the Salmon Region (Table 1). We stocked 57,150 fry in Salmon-Challis National Forest lakes, including 47,650 westslope cutthroat trout *Oncorhynchus clarki lewisi*, and 9,500 sterile rainbow trout *O. mykiss*. Aircraft costs averaged \$21.17 per lake.

Table 1. 1999 Region 7 mountain lake fry plants.

Name	Catalog No.	Species <sup>a</sup>	No. Stocked
Fourth of July Lake	7-1685	C2	1,000
Phyllis Lake	7-1683	C2	500
Elk Lake	7-1479	C2	500
Washington Lake #2	7-1444	C2	500
Challis Creek Lake #2	7-1333	C2	250
Challis Creek Lake #3	7-1335	C2	250
West Fork Bear Creek Lake #1	7-1328	C2	250
Castle Lake #2	7-0837	C2	250
Castle Lake #1	7-0835	C2	250
Martindale Lake #2	7-0816	C2	500
Woodtick Creek Lake #1	7-0810	C2	500
West Fork Camas Creek Lake #1	7-0818	C2	500
West Fork Camas Creek Lake #3	7-0820	C2	750
West Fork Camas Creek Lake #5	7-0824	C2	500
Cache Creek Lake #3	7-0845	C2	250
Cache Creek Lake #1	7-0843	C2	250
Pole Lake	7-0834	C2	500
Liberty Lake #2 (South)	7-0833	C2	500
Rock Lake #1	7-0863	C2	500
Rock Lake #2	7-0864	C2	500
Falconberry Lake	7-0860	C2	500
Nelson Lake #1	7-0870	C2	250
Nelson Lake #2	7-0873	C2	500
China Lake #3	7-0885	C2	750
East Basin Creek Lake #1	7-1514	C2	500
Garland Lake #3	7-1470	C2	500
Garland Lake #2	7-1469	C2	500
Garland Lake #1	7-1468	C2	500
Swimm Lake	7-1467	C2	1,000
Hoodoo Lake	7-1463	C2	250
Gunsight Lake	7-1350	C2	500
Tin Cup Lake	7-1349	C2	500
Ocalkens Lake #1	7-1464	C2	500
Ocalkens Lake #2	7-1465	C2	750
Slide Lake	7-1363	C2	500
Sheep Lake	7-1356	C2	500

<sup>a</sup> C2 = Westslope cutthroat trout.

Table 1. (Continued).

Name	Catalog No.	Species <sup>a</sup>	No. Stocked
Cirque Lake	7-1369	C2	500
Sapphire Lake	7-1367	C2	750
Cove Lake	7-1364	C2	750
Gentian Lake	7-1370	C2	250
Snow Lake	7-1374	C2	250
Island Lake	7-1371	C2	500
Dioxide Lake	7-1377	C2	250
Goat Lake	7-1375	C2	250
Little Redfish Lake	7-1347	C2	250
Big Frog Lake #2	7-1385	C2	1,000
Castle Lake	7-1420	C2	500
Drift Lake (Shallow)	7-1424	C2	500
Headwall Lake	7-1405	C2	250
Lonesome Lake	7-1407	C2	250
Born Lake #2	7-1475	C2	500
Born Lake #3	7-1477	C2	500
Glacier Lake	7-1419	C2	500
Honey Lake	7-1433	C2	750
Heart Lake	7-1434	C2	750
Chamberlain Lake #7	7-1439	C2	500
Castle View Lake	7-1440	C2	250
Martha Lake	7-1569	C2	250
Six Lake #1	7-1672	C2	1,500
Six Lake #3	7-1674	C2	750
Thunder Lake	7-1679	C2	500
Lightning Lake	7-1680	C2	500
Pipe Lake (Blackrock Lake)	7-1732	C2	500
Deer Lake	7-1448	C2	500
MacRae Lake (Upper Deer Lake)	7-1450	C2	500
Yellow Belly Lake	7-1734	C2	5,000
Rocky Lake	7-1135	C2	500
Langer Lake	7-1133	C2	500
Crater Lake	7-1460	C2	1,000
Nyborg Lake (P 38 Lake)	7-1160	C2	750
Martha Lake	7-1443	C2	500
Lola Lake #2	7-1148	C2	150

<sup>a</sup> C2 = Westslope cutthroat trout.

Table 1. (Continued).

Name	Catalog No.	Species <sup>a</sup>	No. Stocked
Kelly Lake	7-0861	C2	250
F 82 Lake	7-1124	C2	500
Elk Lake	7-1163	C2	500
Vanity Lake #13	7-1027	C2	500
Lower Valley Creek Lake	7-1584	C2	500
Upper Valley Creek Lake	7-0000	C2	4,000
Hidden Lake	7-1573	C2	500
Vanity Lake #1	7-1009	K1s	250
Vanity Lake #4	7-1014	K1s	500
Vanity Lake #6	7-1016	K1s	250
Vanity Lake #7	7-1017	K1s	500
Alpine Creek Lake #4	7-1787	K1s	500
Alpine Creek Lake #5	7-1788	K1s	250
Alpine Creek Lake #11	7-1797	K1s	250
Alpine Creek Lake #14	7-1802	K1s	1,000
Rock Lake #1	7-0863	K1s	250
Rock Lake #2	7-0864	K1s	500
Liberty Lake #1	7-0830	K1s	250
Liberty Lake #2	7-0833	K1s	250
Pole Lake	7-0834	K1s	500
Langer Lake	7-1133	K1s	1,000
Ruffneck Lake	7-1130	K1s	500
Island Lake	7-1127	K1s	250
Hat Creek Lake #2	7-1288	K1s	250
Hat Creek Lake #3	7-1289	K1s	500
Hat Creek Lake #4	7-1290	K1s	250
Reflection Lake	7-0770	K1s	250
Buck Lake	7-0764	K1s	500
Doe Lake	7-0766	K1s	250
Twin Cove Lake	7-1733	K1s	500

<sup>a</sup> C2 = Westslope cutthroat trout, K1s = sterile Kamloops rainbow trout.



## 1999 ANNUAL PERFORMANCE REPORT

State Of: Idaho

Program: Fisheries Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-H: Salmon Region

Job: a<sup>2</sup>

Title: Mountain Lake Investigations  
- Carlson Lake Population Control

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

In May 1999, project personnel gill netted and removed stunted brook trout *Salvelinus fontinalis* from Carlson Lake to increase the mean size of the population. We removed 1,151 brook trout during 386.1 diel net hours. Since 1997, 3,428 brook trout have been removed. Average total length of brook trout has increased only 6 mm; however, there has been an obvious improvement in the condition factor of the fish.

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## INTRODUCTION

Carlson Lake is a sub-alpine lake in the Pahsimeroi River drainage located at T11N, R23E, S17 at approximately 2,438 m elevation. An intermittent outlet from the lake drains into Double Springs Creek, a tributary of the Pahsimeroi River. This outlet is only active during summer months in high water years (Liter and Lukens 1994). The Department has stocked brook trout *Salvelinus fontinalis* and rainbow trout *Oncorhynchus mykiss* in the lake.

Historically, Carlson Lake produced 0.9 to 1.4 kg brook trout, but by 1975 there was public concern over the decline in the numbers of these large fish. (Kent Ball, intradepartmental memos 1975). Notes from a 1992 lake survey record that the littoral zone was heavily grazed, aquatic macrophyte growth was prolific, and fish sampled were in poor condition with disproportionately large heads (Liter and Lukens 1994).

In 1993 the department stocked predatory Kamloops strain rainbow trout to reduce the numbers of stunted brook trout and restore larger fish to the lake. However, this introduction evidently failed, as sampling in Carlson Lake since 1993 failed to find any Kamloops strain rainbow trout.

## OBJECTIVE

Improve the quality of angling in Carlson Lake by increasing the average size of brook trout.

## METHODS

May 27-29, 1999 we used ten 1.8 x 38 m variable-sized mesh gill nets to sample and remove brook trout in Carlson Lake. Using a rubber raft, personnel set gill nets perpendicular to the shoreline with the large mesh end of the net towards the middle of the lake. We set the nets late in the evening of May 27, then checked and reset them the morning of May 28. The second set was pulled the following morning. We measured total lengths of 131 of the captured brook trout.

## RESULTS

Project staff captured 1,151 brook trout during 386.1 diel gill net hours. Catch rates averaged 3.0 fish/net/hour (Table 1). Total lengths of 131 of the brook trout ranged from 112 to 300 mm with a mean total length of 198 mm and a median length of 195 mm (Figure 1).



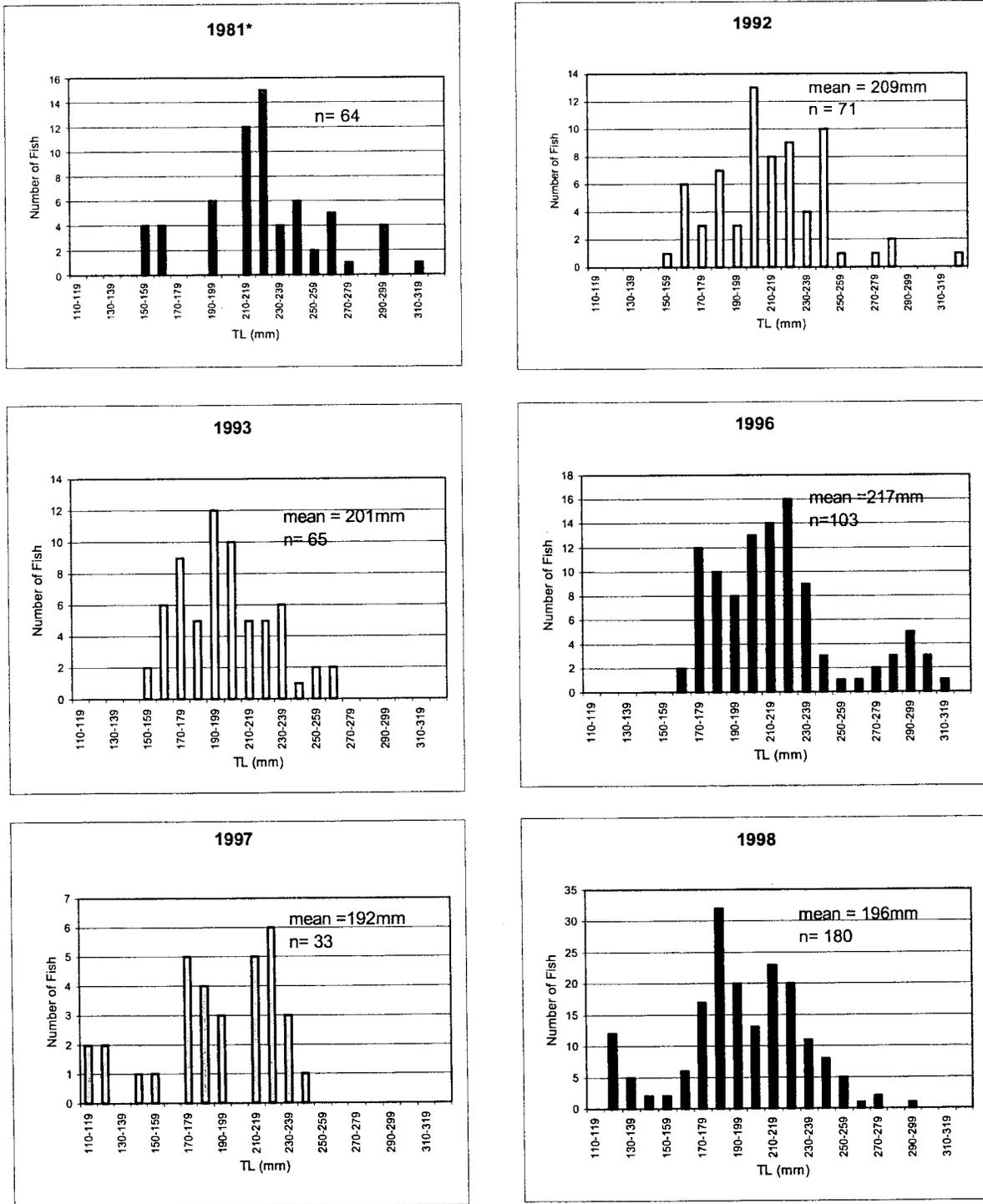


Figure 1. Length frequency histograms for brook trout in Carlson Lake during specified years, 1981-1999. In 1981 a mean length is not available as brook trout were measured by 10 mm length classes and no individual lengths were taken.

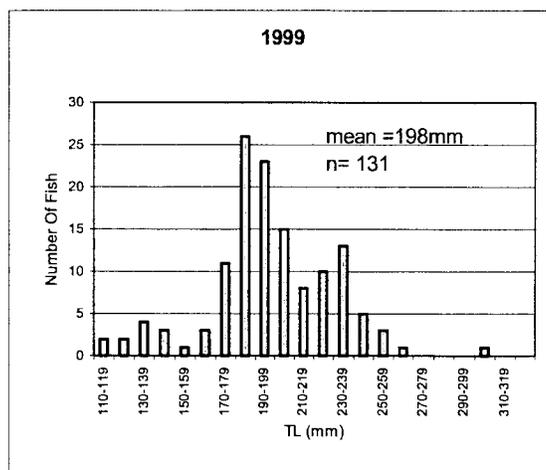


Figure 1. (Continued).

Table 1. Comparison of brook trout lengths and gillnetting efforts in Carlson Lake 1992-1999.

	1992	1996	1997	1998	1999
<b>Date</b>	7/29	6/13	5/27-28	5/22-23	5/27-29
<b>Numbers Removed</b>	N/A	N/A	999	818*	1,151
<b>Size Range (mm)</b>	150-312	164-310	118-240	120-292	112-300
<b>Mean Total Length (mm)</b>	209	217	192	196	198
<b>Total Gill Net Hours</b>	N/A	N/A	466.4	483.3	386.1
<b>Fish/net/hour</b>	N/A	N/A	2.1	1.7	3.0

\*An additional 460 brook trout were removed with explosives

## DISCUSSION

Mean length of captured brook trout has increased 6 mm since the project began in 1997. Although this change is relatively small, fish sampled in 1999 appeared to be healthier with a higher condition factor. We could have quantified a change in condition factor if fish had been weighed at the beginning of the project. In 2000 we will weigh fish as well as measuring total lengths.

To date we have been only marginally successful in controlling stunting of brook trout in Carlson Lake. The Department is considering a chemical treatment (rotenone) during the fall to remove a portion of the brook trout. If successful, the treatment might need to be implemented every 5 to 6 years in order to prevent a recurrence of stunting.

We might also be able to disrupt spawning by blocking access to key spawning areas. This method would work only if spawning were limited to specific areas and if alternative spawning locations were not available. The technique will be investigated in fall 2000 at the peak of expected spawning activity.

The Department has had mixed success in other mountain lakes with introducing predators to reduce numbers of stunted brook trout (Janssen and Patterson, 1993). We might experiment with other predators to determine if a species other than Kamloops strain rainbow trout may be more suited for Carlson Lake.

Fishing regulations for Carlson Lake specify a bag limit of 16 brook trout. This will help limit the population if angler pressure remains stable or increases. To increase fishing pressure, the Department should encourage Federal land managers to improve road access to the lake.

## LITERATURE CITED

- Ball, K. [Intradepartmental memo, Idaho Department of Fish and Game]. 1975.
- Janssen, P., and J. Patterson. 1993. Federal Aid in Fish and Wildlife Restoration. Regional Fisheries Management Investigations, McCall subregion, Mountain Lakes Investigations, Job Performance Report, Project F-71-R19, Idaho Department of Fish and Game, Boise.
- Liter, M., and J.R. Lukens. 1994. Federal Aid in Fish and Wildlife Restoration. Regional Fisheries Management Investigations, Salmon Region, Mountain Lakes Investigations, Job Performance Report, Project F-71-R17, Idaho Department of Fish and Game, Boise.

## APPENDIX

Appendix A. Carlson Lake stocking record.

Date	Species <sup>a</sup>	Size	Pounds	Number	Source
8/5/93	K1	10.5"	192	702	Nampa Hatchery
9/19/75	BK	0-3"	15	2,685	Sandpoint Hatchery
8/5/75	R1	>6"	160	512	Mackay Hatchery
7/20/55	BK	2-3"	10	1,500	Mackay Hatchery
1952	BK	fry	12	1,200	Mackay Hatchery
1950	BK	4"	10	2,000	Mackay Hatchery
1949	BK	3"	5.75	1,040	Mackay Hatchery
1941	BK			2,650	Mackay Hatchery

<sup>a</sup> K1 = Kamloops strain rainbow trout, BK = brook trout, R1 = rainbow trout.

## 1999 ANNUAL PERFORMANCE REPORT

State Of: Idaho

Program: Fisheries Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-H: Salmon Region

Job: a<sup>3</sup>

Title: Mountain Lakes Investigations

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

Project personnel surveyed 35 mountain lakes in the Salmon Region during July and August 1999. All lakes were within the Salmon-Challis National Forest. Surveys measured use, status of fishery, fish population, natural recruitment potential, and past stocking strategies.

#### Authors

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## **OBJECTIVES**

1. Evaluate the Salmon Region mountain lake fish stocking program.
2. Collect data on lake access, trail conditions, angler/camper use, species composition, and spawning habitat for selected Salmon Region mountain lakes.

## **METHODS**

In 1999 Fish and Game Department personnel sampled fish communities in 35 mountain lakes by hook-and-line.

## **RESULTS**

Fish and Game personnel surveyed 35 mountain lakes. Each lake was sampled for use, accessibility, and status of fishery. Results of each survey are listed in Tables 1 through 35.

Table 1. Alpine lake survey data<sup>a</sup> for Alpine Lake #3.

**LAKE LOCATION**

Lake Name: Paragon Lake Survey Date 07-13-99  
 IDFG Catalog #: 70756 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Wilson Creek County: Lemhi  
 Land Area: Bighorn Crags USFS Ranger Dist: \_\_\_\_\_ Elevation (ft): 8,600  
 Section: 8 Township: 20N Range: 15E Acres: 9

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: low Trail Around Lake: na  
 Trampled na Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 2.5 Trailhead Loc: Bighorn Crags

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 3 # Fish Caught 3 Fish/Hour 1  
 Fish Abundance: mod Fish Observed: \_\_\_\_\_ Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:		3					
>399mm:							

**Comments**

Fish are in excellent condition (13 in = 1.5 lbs).

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 2. Alpine Lake survey data<sup>a</sup> for Buck Lake.

**LAKE LOCATION**

Lake Name: Plateau Lake Survey Date 07-13-99  
 IDFG Catalog #: 70632 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Waterfall Creek County: Lemhi  
 Land Area: Bighorn Crags USFS Ranger Dist: Cobalt Elevation (ft): 8,000  
 Section: 7 Township: 20N Range: 15E Acres: 2.2

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: low Trail Around Lake: none  
 Trampled na Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 4 Trailhead Loc: Crags Campground

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 0.16 # Fish Caught 6 Fish/Hour 36  
 Fish Abundance: high Fish Observed: \_\_\_\_\_ Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBTx						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:		6					
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

None.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 3. Alpine lake survey data<sup>a</sup> for Castle Lake.

**LAKE LOCATION**

Lake Name: Castle Lake Survey Date 09-10-99  
 IDFG Catalog #: 71420 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,427  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 2 # Firepits: 2 Litter: \_\_\_\_\_ Trail Around Lake: partial  
 Trampled \_\_\_\_\_ Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 1 # Fish Caught 5 Fish/Hour 5  
 Fish Abundance: high Fish Observed: many fry Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:	3						
250-299mm:	2						
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

Heavy use. No amphibians. Many fry in outlet.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 4. Alpine lake survey data<sup>a</sup> for Castlevie Lake.

**LAKE LOCATION**

Lake Name: Castlevie Lake Survey Date 09-10-99  
 IDFG Catalog #: 71440 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,415  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: \_\_\_\_\_ # Firepits: \_\_\_\_\_ Litter: \_\_\_\_\_ Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 0.5 # Fish Caught 0 Fish/Hour 0  
 Fish Abundance: low Fish Observed: none Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx		
					CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Heavy use. No inlet or outlet. 7 m depth.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 5. Alpine lake survey data<sup>a</sup> for Chamberlain Lake #4.

**LAKE LOCATION**

Lake Name: Chamberlain Lake #4 Survey Date 09-10-99  
 IDFG Catalog #: \_\_\_\_\_ Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,424  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: \_\_\_\_\_ # Firepits: \_\_\_\_\_ Litter: \_\_\_\_\_ Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: \_\_\_\_\_ Hrs Fished \_\_\_\_\_ # Fish Caught \_\_\_\_\_ Fish/Hour \_\_\_\_\_  
 Fish Abundance: high Fish Observed: many small Gear: observ.  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBTx						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Stream runs through lake. Many fry and 5 - 9 in fish.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 6. Alpine lake survey data<sup>a</sup> for Chamberlain Lake #5.

**LAKE LOCATION**

Lake Name: Chamberlain Lake #5 Survey Date 09-10-99  
 IDFG Catalog #: \_\_\_\_\_ Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,271  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: \_\_\_\_\_ # Firepits: \_\_\_\_\_ Litter: \_\_\_\_\_ Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: \_\_\_\_\_ Hrs Fished \_\_\_\_\_ # Fish Caught \_\_\_\_\_ Fish/Hour \_\_\_\_\_  
 Fish Abundance: none Fish Observed: none Gear: \_\_\_\_\_  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Lake is a bog. No amphibians observed.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 7. Alpine lake survey data<sup>a</sup> for Chamberlain Lake #6.

**LAKE LOCATION**

Lake Name: Chamberlain Lake #6 Survey Date 09-10-99  
 IDFG Catalog #: \_\_\_\_\_ Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,845  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: \_\_\_\_\_ # Firepits: \_\_\_\_\_ Litter: \_\_\_\_\_ Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: \_\_\_\_\_ Hrs Fished \_\_\_\_\_ # Fish Caught \_\_\_\_\_ Fish/Hour \_\_\_\_\_  
 Fish Abundance: none Fish Observed: none Gear: \_\_\_\_\_  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

Very shallow. No fish potential. No amphibians observed.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 8. Alpine lake survey data<sup>a</sup> for Chamberlain Lake #7.

**LAKE LOCATION**

Lake Name: Chamberlain Lake #7 Survey Date 09-10-99  
 IDFG Catalog #: 71439 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,189  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 2 # Firepits: 2 Litter: low Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 0 Hrs Fished 0 # Fish Caught 0 Fish/Hour \_\_\_\_\_  
 Fish Abundance: mod Fish Observed: several Gear: gn  
 Hours Set (gn): 9

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:		3					
200-249mm:		5					
250-299mm:		1					
300-349mm:		3					
350-399mm:							
>399mm:							

**Comments**

50:50 finespot and largespot cutthroat. 3.2 m maximum depth.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 9. Alpine lake survey data<sup>a</sup> for Chamberlain Lake #9.

**LAKE LOCATION**

Lake Name: Chamberlain Lake #9 Survey Date 09-10-99  
 IDFG Catalog #: 0 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,180  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: \_\_\_\_\_ # Firepits: \_\_\_\_\_ Litter: \_\_\_\_\_ Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: \_\_\_\_\_ Hrs Fished \_\_\_\_\_ # Fish Caught \_\_\_\_\_ Fish/Hour \_\_\_\_\_  
 Fish Abundance: none Fish Observed: none Gear: \_\_\_\_\_  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Couldn't find lake; must be dry.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 10. Alpine lake survey data<sup>a</sup> for Cornice Lake.

**LAKE LOCATION**

Lake Name: Cornice Lake Survey Date 09-12-99  
 IDFG Catalog #: 71413 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Little Boulder Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,903  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter low Trail Around Lake: partial  
 Trampled no Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 2 Hrs Fished 5 # Fish Caught 15 Fish/Hour 15  
 Fish Abundance: mod Fish Observed: few Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:		3					
200-249mm:		10					
250-299mm:		2					
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

No inlet or outlet. No spawning. Must stock.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 11. Alpine lake survey data<sup>a</sup> for Echo Lake.

**LAKE LOCATION**

Lake Name: Echo Lake Survey Date 07-11-99  
 IDFG Catalog #: 70777 Primary Drainage: Middle Fork Salmon  
 Secondary Drainage: Wilson Creek County: Lemhi  
 Land Area: Bighorn Crags USFS Ranger Dist: Salmon Elevation (ft): na  
 Section: 5 Township: 20N Range: 15E Acres: 5.2

**LAKE USE**

# Campsites: 1 # Firepits: 3 Litter: none Trail Around Lake: partial  
 Trampled no Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 2 Trailhead Loc: Crags Campground

**FISHERY AND FISH POPULATIONS**

# Fishermen: 2 Hrs Fished 1.5 # Fish Caught 5 Fish/Hour 0.6  
 Fish Abundance: low Fish Observed: \_\_\_\_\_ Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:		1					
200-249mm:		1					
250-299mm:		1					
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Very little spawning habitat.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 12. Alpine lake survey data<sup>a</sup> for Emerald Lake.

**LAKE LOCATION**

Lake Name: Emerald Lake Survey Date 09-12-99  
 IDFG Catalog #: 71415 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Little Boulder Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,925  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 0 # Firepits 0 Litter: low Trail Around Lake: partial  
 Trampled \_\_\_\_\_ Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 2 Hrs Fished 1 # Fish Caught 17 Fish/Hour 17  
 Fish Abundance: high Fish Observed: \_\_\_\_\_ Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:		1					
200-249mm:		12					
250-299mm:		3					
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

Low use. No spawning habitat. Nice lake.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 13. Alpine lake survey data<sup>a</sup> for Fourth of July Creek Lake.

**LAKE LOCATION**

Lake Name: Fouth of July Creek Lake Survey Date 09-08-99  
 IDFG Catalog #: 71685 Primary Drainage: Upper Salmon River  
 Secondary Drainage: Fourth of July Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,371  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites 3 # Firepits 3 Litter: low Trail Around Lake: partial  
 Trample: yes Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: Fourth of July Creek

**FISHERY AND FISH POPULATIONS**

# Fisherm 0 Hrs Fished 0 # Fish Caught 0 Fish/Hour \_\_\_\_\_  
 Fish Abundance: mod Fish Observed: several Gear: observation  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT <sup>x</sup>						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:		10					
50-99mm:							
100-149mm:		4					
150-199mm:							
200-249mm:		30					
250-299mm:							
300-349mm:		1					
350-399mm:							
> 399mm:							

**Comments**

Reproduction possible in largest outlet.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 14. Alpine lake survey data<sup>a</sup> for Glacier Lake.

**LAKE LOCATION**

Lake Name: Glacier Lake Survey Date 09-12-99  
 IDFG Catalog #: 71419 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Little Boulder Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,903  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: low Trail Around Lake: none  
 Trampled na Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 2 Hrs Fished 0.75 # Fish Caught 0 Fish/Hour 0  
 Fish Abundance: low/none Fish Observed: none Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBTx						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Little use. May winterkill. No spawning habitat.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 15. Alpine lake survey data<sup>a</sup> for Heart Lake.

**LAKE LOCATION**

Lake Name: Heart Lake Survey Date 09-10-99  
 IDFG Catalog #: 71434 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,197  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 1 # Firepits: 1 Litter: low Trail Around Lake: partial  
 Trampled yes Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 0.5 # Fish Caught 0 Fish/Hour 0  
 Fish Abundance: mod Fish Observed: many Gear: ang/gn  
 Hours Set (gn): 8

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx		
					CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:		1					
200-249mm:		5					
250-299mm:		1					
300-349mm:		1					
350-399mm:							
>399mm:							

**Comments**

Many fry in stream. Heavy use.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 16. Alpine lake survey data<sup>a</sup> for Honey Lake.

**LAKE LOCATION**

Lake Name: Honey Lake Survey Date 09-09-99  
 IDFG Catalog #: 71433 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Lake County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,477  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 1 # Firepits: 1 Litter: low Trail Around Lake: partial  
 Trampled yes Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 1.5 # Fish Caught 1 Fish/Hour 0.67  
 Fish Abundance: mod Fish Observed: many Gear: ang/observ.  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBTx						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:		1					
250-299mm:							
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Heavy use. Fish move between Honey and Heart lakes. Many CT observed in length groups 0-49 mm and 200-249 mm.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 17. Alpine lake survey data<sup>a</sup> for Hope Lake.

**LAKE LOCATION**

Lake Name: Hope Lake Survey Date 09-08-99  
 IDFG Catalog #: 71430 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Chamberlain Creek County: Custer  
 Land Area: White Craggs USFS Ranger Dist: SNRA Elevation (ft): 9,849  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: \_\_\_\_\_ # Firepits: \_\_\_\_\_ Litter: \_\_\_\_\_ Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 0 Hrs Fished 0 # Fish Caught 0 Fish/Hour \_\_\_\_\_  
 Fish Abundance: mod Fish Observed: many fry Gear: observ.  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
	0-49mm:						
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Depth > 5 m. No amphibians observed

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 18. Alpine lake survey data<sup>a</sup> for Liberty Lake #1.

**LAKE LOCATION**

Lake Name: Liberty Lake #1 Survey Date 07-16-99  
 IDFG Catalog #: 70830 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Camas Creek County: Custer  
 Land Area: Sleeping Deer USFS Ranger Dist: Challis Elevation (ft): 8,235  
 Section: 36 Township: 17N Range: 15E Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 1 # Firepits: 1 Litter: low Trail Around Lake: partial  
 Trampled no Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 5 Trailhead Loc: na

**FISHERY AND FISH POPULATIONS**

# Fishermen: 2 Hrs Fished 1.5 # Fish Caught 0 Fish/Hour 0  
 Fish Abundance: low Fish Observed: 7-CUT Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

Little spawning habitat. Few fish observed (14 in).

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 19. Alpine lake survey data<sup>a</sup> for Liberty Lake #2.

**LAKE LOCATION**

Lake Name: Liberty Lake #2 Survey Date 07-16-99  
 IDFG Catalog #: 70833 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Camas Creek County: Custer  
 Land Area: Sleeping Deer USFS Ranger Dist: Challis Elevation (ft): 8,385  
 Section: 36 Township: 17N Range: 15E Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 2 # Firepits: 2 Litter: low Trail Around Lake: partial  
 Trampled no Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 0.75 Trailhead Loc: Sleeping Deer Road

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 1 # Fish Caught 0 Fish/Hour 0  
 Fish Abundance: low Fish Observed: none Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBTx						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

No spawning habitat. No fish. Many invertebrates

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 20. Alpine lake survey data<sup>a</sup> for Noisy Lake.

**LAKE LOCATION**

Lake Name: Noisy Lake Survey Date 09-10-99  
 IDFG Catalog #: 71409 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Little Boulder Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,014  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 2 # Firepits: 2 Litter: \_\_\_\_\_ Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: \_\_\_\_\_ Hrs Fished \_\_\_\_\_ # Fish Caught \_\_\_\_\_ Fish/Hour \_\_\_\_\_  
 Fish Abundance: high Fish Observed: \_\_\_\_\_ Gear: gn  
 Hours Set (gn): 8

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:	5						
250-299mm:	10	2			1		
300-349mm:	5	1			2		
350-399mm:							
>399mm:							

**Comments**

Moderate use. No amphibians observed. Cirque lake.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 21. Alpine lake survey data<sup>a</sup> for Paragon Lake.

**LAKE LOCATION**

Lake Name: Paragon Lake Survey Date 07-13-99  
 IDFG Catalog #: 70756 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Wilson Creek County: Lemhi  
 Land Area: Bighorn Crags USFS Ranger Dist: \_\_\_\_\_ Elevation (ft): 8,600  
 Section: 8 Township: 20N Range: 15E Acres: 9

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: low Trail Around Lake: na  
 Trampled na Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 2.5 Trailhead Loc: Bighorn Crags

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 3 # Fish Caught 3 Fish/Hour 1  
 Fish Abundance: mod Fish Observed: \_\_\_\_\_ Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
	0-49mm:						
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:		3					
>399mm:							

**Comments**

Fish are in excellent condition (13 in = 1.5 lbs).

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 22. Alpine lake survey data<sup>a</sup> for Plateau Lake.

**LAKE LOCATION**

Lake Name: Plateau Lake Survey Date 07-13-99  
 IDFG Catalog #: 70632 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Waterfall Creek County: Lemhi  
 Land Area: Bighorn Crags USFS Ranger Dist: Cobalt Elevation (ft): 8,000  
 Section: 7 Township: 20N Range: 15E Acres: 2.2

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: low Trail Around Lake: none  
 Trampled na Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 4 Trailhead Loc: Crags Campground

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 0.16 # Fish Caught 6 Fish/Hour 36  
 Fish Abundance: high Fish Observed: \_\_\_\_\_ Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx		
					CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:		6					
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

None.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 23. Alpine lake survey data<sup>a</sup> for Plateau Lake.

**LAKE LOCATION**

Lake Name: Plateau Lake Survey Date 08-10-99  
 IDFG Catalog #: 70632 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Waterfall Creek County: Lemhi  
 Land Area: Bighorn Crags USFS Ranger Dist: Cobalt Elevation (ft): 8,000  
 Section: 7 Township: 20N Range: 15E Acres: 2.2

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: low Trail Around Lake: none  
 Trampled na Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 4 Trailhead Loc: Crags Campground

**FISHERY AND FISH POPULATIONS**

# Fishermen: \_\_\_\_\_ Hrs Fished \_\_\_\_\_ # Fish Caught 10 Fish/Hour \_\_\_\_\_  
 Fish Abundance: mod Fish Observed: \_\_\_\_\_ Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:		1					
200-249mm:		5					
250-299mm:		3					
300-349mm:		1					
350-399mm:							
>399mm:							

**Comments**

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 24. Alpine lake survey data<sup>a</sup> for Pole Lake.

**LAKE LOCATION**

Lake Name: Pole Lake Survey Date 07-16-99  
 IDFG Catalog #: 70834 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Camas Creek County: Custer  
 Land Area: Sleeping Deer USFS Ranger Dist: Challis Elevation (ft): 8,003  
 Section: 36 Township: 17N Range: 15E Acres: 3.8

**LAKE USE**

# Campsites: 1 # Firepits: 1 Litter: low Trail Around Lake: na  
 Trampled no Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 1.5 Trailhead Loc: Sleeping Deer Road

**FISHERY AND FISH POPULATIONS**

# Fishermen: 2 Hrs Fished 2 # Fish Caught 12 Fish/Hour 6  
 Fish Abundance: mod Fish Observed: few/small Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBTx						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:		3					
300-349mm:		7					
350-399mm:		0					
>399mm:		2					

**Comments**

Moderate spawning habitat available.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 25. Alpine lake survey data<sup>a</sup> for Quiet Lake.

**LAKE LOCATION**

Lake Name: Quiet Lake Survey Date 09-11-99  
 IDFG Catalog #: 71410 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Little Boulder Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,232  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 7 # Firepits: 7 Litter: mod. Trail Around Lake: partial  
 Trampled yes Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 0.5 # Fish Caught 0 Fish/Hour 0  
 Fish Abundance: low Fish Observed: few fry Gear: ang/gn  
 Hours Set (gn): 8

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:	1						
250-299mm:	1						
300-349mm:							
350-399mm:	2						
> 399mm:	2						

**Comments**

15 m depth. Inlet has spawning habitat.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 26. Alpine lake survey data<sup>a</sup> for Ramshorn Lake.

**LAKE LOCATION**

Lake Name: Ramshorn Lake Survey Date 07-13-99  
 IDFG Catalog #: 70755 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Wilson Creek County: Lemhi  
 Land Area: Bighorn Crags USFS Ranger Dist: Salmon Elevation (ft): na  
 Section: 8 Township: 20N Range: 15E Acres: 10

**LAKE USE**

# Campsites: \_\_\_\_\_ # Firepits: \_\_\_\_\_ Litter: \_\_\_\_\_ Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: \_\_\_\_\_ Hrs Fished \_\_\_\_\_ # Fish Caught \_\_\_\_\_ Fish/Hour \_\_\_\_\_  
 Fish Abundance: \_\_\_\_\_ Fish Observed: \_\_\_\_\_ Gear: \_\_\_\_\_  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 27. Alpine lake survey data<sup>a</sup> for Reflection Lake.

**LAKE LOCATION**

Lake Name: Reflection Lake Survey Date 07-11-99  
 IDFG Catalog #: 70770 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Wilson Creek County: Lemhi  
 Land Area: Bighorn Crags USFS Ranger Dist: Salmon Elevation (ft): na  
 Section: 33 Township: 21N Range: 16E Acres: 9.2

**LAKE USE**

# Campsites: 2 # Firepits: 4 Litter: low Trail Around Lake: partial  
 Trampled no Access Good (mi): na Access Poor (mi): na  
 Access X-Country (mi): na Trailhead Loc: Crags Campground

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 2 # Fish Caught 9 Fish/Hour 4.5  
 Fish Abundance: mod Fish Observed: several Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:		2			2		
200-249mm:		1					
250-299mm:					1		
300-349mm:		1					
350-399mm:		2					
>399mm:							

**Comments**

Limited spawning habitat.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 28. Alpine lake survey data<sup>a</sup> for Rock Lake.

**LAKE LOCATION**

Lake Name: Rock Lake Survey Date 09-12-99  
 IDFG Catalog #: 71417 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Little Boulder Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,930  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: low Trail Around Lake: none  
 Trampled na Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 2 Hrs Fished 1.5 # Fish Caught 10 Fish/Hour 3.3  
 Fish Abundance: \_\_\_\_\_ Fish Observed: \_\_\_\_\_ Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBTx						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:		1					
200-249mm:		9					
250-299mm:							
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Little use. No spawning habitat. 4 m depth.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 29. Alpine lake survey data<sup>a</sup> for Rock Lake #1.

**LAKE LOCATION**

Lake Name: Rock Lake #1 Survey Date 07-17-99  
 IDFG Catalog #: 70863 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Loon Creek County: Custer  
 Land Area: Sleeping Deer USFS Ranger Dist: Challis Elevation (ft): 8,600  
 Section: 2 Township: 16N Range: 15E Acres: 1.2

**LAKE USE**

# Campsites: 1 # Firepits: 1 Litter: low Trail Around Lake: complete  
 Trampled no Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 0.25 Trailhead Loc: Sleeping Deer Road

**FISHERY AND FISH POPULATIONS**

# Fishermen: 2 Hrs Fished 1.5 # Fish Caught 23 Fish/Hour 0  
 Fish Abundance: na Fish Observed: \_\_\_\_\_ Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx		
					CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:		13					
150-199mm:		2					
200-249mm:							
250-299mm:		1					
300-349mm:		7					
350-399mm:							
>399mm:							

**Comments**

Possible spawning in inlet.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 30. Alpine lake survey data<sup>a</sup> for Rock Lake #2.

**LAKE LOCATION**

Lake Name: Rock Lake #2 Survey Date 07-17-99  
 IDFG Catalog #: 70864 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Loon Creek County: Custer  
 Land Area: Sleeping Deer USFS Ranger Dist: Challis Elevation (ft): 8,735  
 Section: 2 Township: 17N Range: 15E Acres: 6.2

**LAKE USE**

# Campsites: 2 # Firepits: 2 Litter: low Trail Around Lake: partial  
 Trampled yes Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 0.5 Trailhead Loc: Sleeping Deer Road

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 1 # Fish Caught 0 Fish/Hour 0  
 Fish Abundance: low Fish Observed: none Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

No spawning habitat. No fish observed.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 31. Alpine lake survey data<sup>a</sup> for Scree Lake.

**LAKE LOCATION**

Lake Name: Scree Lake Survey Date 09-11-99  
 IDFG Catalog #: \_\_\_\_\_ Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Little Boulder Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,416  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: \_\_\_\_\_ Trail Around Lake: \_\_\_\_\_  
 Trampled \_\_\_\_\_ Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 1.5 # Fish Caught 8 Fish/Hour 5.3  
 Fish Abundance: mod Fish Observed: many fry Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:		1					
150-199mm:		1					
200-249mm:		3			1		
250-299mm:		1					
300-349mm:		1					
350-399mm:							
> 399mm:							

**Comments**

Little use. Shallow lake. Natural reproduction.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 32. Alpine lake survey data<sup>a</sup> for Shallow Lake

**LAKE LOCATION**

Lake Name: Shallow Lake Survey Date 09-11-99  
 IDFG Catalog #: 71399 Primary Drainage: East Fork Salmon River  
 Secondary Drainage: Little Boulder Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,747  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: low Trail Around Lake: partial  
 Trampled no Access Good (mi): all Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished \_\_\_\_\_ # Fish Caught 2 Fish/Hour \_\_\_\_\_  
 Fish Abundance: low Fish Observed: a few fry Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBTx						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:		1					
200-249mm:							
250-299mm:		1					
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Few fish. Shallow lake. Don't stock. May winterkill.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 33. Alpine lake survey data<sup>a</sup> for Skyhigh Lake.

**LAKE LOCATION**

Lake Name: Skyhigh Lake Survey Date 07-14-99  
 IDFG Catalog #: 70787 Primary Drainage: Middle Fork Salmon River  
 Secondary Drainage: Wilson Creek County: Lemhi  
 Land Area: Bighorn Crag USFS Ranger Dist: Salmon Elevation (ft): na  
 Section: 32 Township: 21N Range: 15E Acres: 9.1

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: low Trail Around Lake: partial  
 Trampled no Access Good (mi): 0 Access Poor (mi): 0  
 Access X-Country (mi): 25 Trailhead Loc: Crag Campground

**FISHERY AND FISH POPULATIONS**

# Fishermen: 1 Hrs Fished 0.5 # Fish Caught 0 Fish/Hour 0  
 Fish Abundance: low Fish Observed: several Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBTx						
	RBT	CUT	GNT	BLT	CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

Saw several 3 in salmonids.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 34. Alpine lake survey data<sup>a</sup> for Tip Top Lake.

**LAKE LOCATION**

Lake Name: Tip Top Lake Survey Date 07-13-99  
 IDFG Catalog #: 70760 Primary Drainage: Middle Fork Salmon Lake  
 Secondary Drainage: Wilson Creek County: Lemhi  
 Land Area: Bighorn Crag USFS Ranger Dist: Salmon Elevation (ft): na  
 Section: 8 Township: 20N Range: 15E Acres: 2.9

**LAKE USE**

# Campsites: 0 # Firepits: 0 Litter: liw Trail Around Lake: na  
 Trampled no Access Good (mi): 12 Access Poor (mi): 0  
 Access X-Country (mi): 1.5 Trailhead Loc: Crags Campground

**FISHERY AND FISH POPULATIONS**

# Fishermen: 0 Hrs Fished 0 # Fish Caught 0 Fish/Hour 0  
 Fish Abundance: low Fish Observed: none Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
>399mm:							

**Comments**

Shallow. Small. Isolated. No fish. Many frogs.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

Table 35. Alpine lake survey data<sup>a</sup> for Washington Lake #1.

**LAKE LOCATION**

Lake Name: Washington Lake #1 Survey Date 09-08-99  
 IDFG Catalog #: 70961 Primary Drainage: Upper Salmon River  
 Secondary Drainage: Fourth of July Creek County: Custer  
 Land Area: White Clouds USFS Ranger Dist: SNRA Elevation (ft): 9,501  
 Section: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_ Acres: \_\_\_\_\_

**LAKE USE**

# Campsites: 1 # Firepits: 1 Litter: low Trail Around Lake: partial  
 Trampled yes Access Good (mi): \_\_\_\_\_ Access Poor (mi): \_\_\_\_\_  
 Access X-Country (mi): \_\_\_\_\_ Trailhead Loc: \_\_\_\_\_

**FISHERY AND FISH POPULATIONS**

# Fishermen: 2 Hrs Fished 4 # Fish Caught 17 Fish/Hour 2.13  
 Fish Abundance: mod Fish Observed: several Gear: ang  
 Hours Set (gn): \_\_\_\_\_

(Length Frequency)

LENGTH	RBT	CUT	GNT	BLT	RBTx CUT	GRL	EBT
0-49mm:							
50-99mm:							
100-149mm:							
150-199mm:							
200-249mm:							
250-299mm:							
300-349mm:							
350-399mm:							
> 399mm:							

**Comments**

Heavy use. Many brook trout. Spawning potential.

<sup>a</sup> RBT = rainbow trout; CUT = westslope cutthroat trout; GNT = golden trout; BLT = bull trout; GRL = arctic grayling; EBT = brook trout.

## 1999 ANNUAL PERFORMANCE REPORT

State Of: Idaho

Program: Fisheries Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-H: Salmon Region

Job: b

Title: Lowland Lakes Investigations-  
- Yankee Fork, Kelly Creek and  
Squaw Creek Ponds Studies

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

Project staff investigated concerns of the Shoshone-Bannock Indian Tribes that catchable rainbow trout *Oncorhynchus mykiss* stocked in Yankee Fork Salmon River ponds were preying on and/or displacing wild chinook salmon *O. tshawytscha*. We noted no measurable displacement of chinook salmon during intensive diel snorkel efforts. Analysis of 162 catchable rainbow trout stomachs showed no fish or fish parts, indicating catchable rainbow trout did not prey on chinook salmon.

We studied direct angling effort on Kelly Creek Pond, Squaw Creek Pond and the Yankee Fork Pond series. Weekend days received greater angler effort than weekdays, with the greatest effort in July and the lowest effort in August. The Yankee Fork Pond series received the greatest effort. Local anglers (those from Custer County) accounted for only six percent of the effort on all ponds, while non-residents accounted for 34% of the total effort.

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## INTRODUCTION AND STUDY AREA

The Idaho Department of Fish and Game (IDFG) constructed Squaw Creek Pond in 1997 on land donated by the Thompson Creek Mining Company. It encompasses 0.40 ha and has an average depth of 1.83 m. There is no boat ramp, and all fishing occurs from the shoreline. Survey clerks can count anglers from a nearby road.

Squaw Creek Pond is a steelhead acclimation/separation pond where hatchery-reared steelhead *Oncorhynchus mykiss* are planted prior to smolting. After smoltification, migrants escape the pond over a check dam, but non-migrant steelhead remain. Some of these non-migrant steelhead are then stocked in other area ponds.

The Department allows anglers to fish the residual steelhead. Retention of these non-migratory steelhead in ponds precludes negative effects on native fishes that might occur if residual steelhead smolts were stocked directly in the mainstem Salmon River or its tributaries.

Kelly Creek Pond was originally a water reservoir for gold hydromining. It covers 0.60 ha and is about 3 m deep. Access is restricted to small boats (rafts, canoes, etc), and the majority of fishing during the study period occurred from the shoreline. In 1997 Sawtooth Fish Hatchery began stocking Kelly Creek Pond with hatchery rainbow trout and residual steelhead from Squaw Creek Pond.

The Yankee Fork Pond Series is located on the floodplain of the Yankee Fork Salmon River. Gold dredging formed the ponds in the early to mid-1900's. This study focused on pond series 1, 3, and 4. These ponds range from 0.10 ha to 0.60 ha, have an average depth of 1.83 m, and a maximum depth of 3.05 m. Yankee Fork Pond Series 1, 3, and 4 are separate pond series, but are connected to each other via the Yankee Fork of the Salmon River. All fishing observed during the study period occurred from the shoreline.

In the 1980's the Shoshone-Bannock Indian Tribes (SBT) modified the flows through the ponds to create juvenile chinook rearing habitat. The SBT expressed concerns regarding the IDFG's put-and-take hatchery rainbow trout fishery in the Yankee Fork Pond series. The main concern was that catchable rainbow trout might prey on and/or displace Federally listed endangered or threatened species, especially chinook salmon *O. tshawytscha*. To address these concerns, the IDFG and the SBT initiated a cooperative study.

The Department and the SBT began a roving creel survey and intensive snorkel surveys on the Yankee Fork Pond Series. We also conducted a roving creel survey to monitor fishing effort on Squaw Creek and Kelly Creek ponds. The IDFG and SBT used the study to determine if catchable rainbow trout are negatively impacting chinook salmon. The Department can also use the data to more effectively manage stocking in the Yankee Fork Pond series and other area ponds.

## OBJECTIVES

1. Determine the frequency of predation by catchable trout on Federally listed endangered or threatened anadromous stocks in the Yankee Fork Pond series.
2. Determine if catchable rainbow trout displace Federally listed endangered or threatened species within the Yankee Fork Pond series or if there is distinct habitat segregation between stocked and listed fish.
3. Determine return to creel of catchable rainbow trout stocked into the Yankee Fork Pond series and fishing effort and fish/hour on non-migratory steelhead and catchable rainbow trout stocked into Kelly Creek and Squaw Creek ponds.
4. Determine total fishing pressure and distribution of anglers between all the study ponds to plan better distribution of catchable trout and non-migratory steelhead.
5. Determine angler residency to assist the IDFG to better understand its angling public.

## METHODS

### Harvest/Effort - Creel Survey

A roving IDFG or SBT creel clerk conducted angler interviews and effort counts on the Yankee Fork Pond series, Kelly Creek Pond, and Squaw Creek Pond beginning May 31 and concluding September 5, 1999. We included the few days counted in both May and September in the June and August sample intervals, respectively. Neither Kelly Creek nor Squaw Creek ponds were sampled after August 14 due to a lack of personnel.

The roving creel survey followed methods described by Malvestuto et al. (1978) for uniform probability sampling. It consisted of two parts: 1) instantaneous count of anglers to estimate effort and 2) angler interviews to estimate catch per unit effort (C/f). The key assumption for this survey was that C/f for incomplete trips is an unbiased estimator for complete trips.

In general, there were four weekend days and four weekdays randomly selected for each sample month and each Yankee Fork Pond Series. Angler count times within each sample day were randomly distributed between morning (08:00 - 12:00), afternoon (12:00 - 16:00), and evening (16:00 - 20:00) sample periods. Malvestuto et al. (1978) assigned weighted probabilities for selecting sample periods. However, we assigned equal probabilities when selecting daily sample periods (morning, afternoon, evening) as we had no information about previous angler effort. Start times for the creel clerk to perform the survey within the four-hour sample periods were then randomly selected.

We designed a creel schedule for the Yankee Fork Pond Series only. Clerks surveyed Squaw Creek Pond and Kelly Creek Pond either before or after the scheduled Yankee Fork time. We assumed randomness for Squaw Creek and Kelly Creek pond surveys since their creel start times depended on the randomly chosen Yankee Fork Pond Series start times.

For each Yankee Fork Pond Series and month, IDFG and SBT personnel estimated total harvest, total effort, and a mean C/f as described by Malvestuto et al. (1978)

During each sample the creel clerk performed instantaneous angler counts and then interviewed as many anglers as possible to obtain catch information and request fish stomach samples. Interview data included number of hours fished, total number of fish caught (both harvested and released), angler residency, and whether the trip was complete.

### Predation

During creel interviews, survey clerks collected stomach samples from hatchery rainbow trout caught in the Yankee Fork Pond Series. If anglers did not catch enough fish for an adequate sample in a particular month, we gill netted additional rainbow trout to supplement it. Staff gill netted in pond series 3 and 4 five times in June 1999. Nets were set during late evening or early morning hours across the deepest part of the ponds for about one hour.

Sample data included fish species, fish total length (cm), presence of fin clips, and capture location. Stomachs were placed in separate containers, labeled and frozen. IDFG and SBT personnel jointly analyzed stomach contents in November 1999.

### Displacement - Snorkel Estimates

To determine if catchable rainbow trout were displacing listed fish, tribal and IDFG fisheries personnel cooperatively monitored pond series 3 and 4 using standardized snorkel techniques (IDFG, 1991). We scheduled five snorkel sessions between early-May and late-August 1999, including both day and night samples. Descriptions of analysis techniques are available from the SBT (Anderson et al. 2000, in progress).

## **RESULTS AND DISCUSSION**

### Harvest/Effort - Creel Survey

Creel surveys in the Yankee Fork Pond Series showed that the majority of hatchery rainbow trout were harvested, effort was greatest, and C/f was greatest for all pond series during the month of July. Pond Series 1 had the highest harvest, total effort and mean monthly C/f followed by series 3 and 4, respectively (Table 1).

Table 1. Estimates and 95 % confidence intervals (C.I.) of total harvest (number of fish), total effort (number of angler hours) and mean monthly catch per unit effort (fish/hour) of hatchery rainbow trout in the Yankee Fork ponds, June through August 1999.

Pond series	June	July	August
Total Harvest ( $\pm$ 95% C.I.)			
1	359 ( $\pm$ 520)	2,143 ( $\pm$ 1,593)	269 ( $\pm$ 469)
3	117 (224)	818 (1,368)	94 (116)
4	0 (0)	160 (268)	53 (84)
Total Effort ( $\pm$ 95% C.I.)			
1	561 (650)	1,701 (852)	750 (943)
3	306 (505)	461 (637)	144 (111)
4	213 (344)	290 (217)	206 (120)
Mean Monthly Catch-per Unit Effort			
1	0.22 (0.11)	1.97 (0.93)	0.16 (0.11)
3	0.08 (0.06)	0.53 (0.27)	0.08 (0.04)
4	0.00 (0.00)	0.09 (0.06)	0.04 (0.03)

Comparing direct effort among Kelly Creek Pond, Squaw Creek Pond and the Yankee Fork Pond Series (Tables 2, 3, 4 and 5), two temporal trends become apparent. First, angler effort was greater on weekend days than on weekdays. Second, angler effort was greatest in the month of July: 61% of all effort expended for both weekend and weekdays throughout the summer. Mean catch rates were highest during July and lowest during August.

The Yankee Fork Pond Series had more anglers than either Kelly Creek or Squaw Creek ponds. The Pond Series are attractive because they provide anglers with a diversity of pond sizes and shapes. They are close to the Yankee Fork Road and the Yankee Fork drainage has dredge tours and a mining museum, well-advertised tourist attractions.

Catch rates for the Yankee Fork Pond Series were relatively low, probably because their greater fishing area, increased depth, and diverse habitat made fish less susceptible to anglers. In comparison, Kelly Creek Pond and Squaw Creek Pond generally had higher catch rates. We attributed this to their small size, lack of cover and high fish density.

Squaw Creek Pond had some of the highest catch rates measured, but low angler effort. It may be underutilized for a variety of reasons: it is 30 km from nearby communities, it is not accessed by a paved public road, there are no road signs to mark the turnoff, and the small residual steelhead may be unattractive to anglers. In 1999 the number of residual steelhead juveniles was excessive, as demonstrated by the 65 fish caught and released by two anglers in 3.5 hours on July 20, 1999.

Angler interviews indicate 66% of anglers were Idaho residents, but only 6% of the effort is expended by local (Custer County) sportsman (Table 6). Most resident anglers were from Ada, Canyon and Twin Falls counties, accounting for 65% of all resident effort. Non-residents accounted for 34% of the total effort at the ponds with a majority of these anglers from California and Utah.

### **Predation**

IDFG and SBT staff found no fish or fish parts in any of the 162 hatchery rainbow trout stomach samples collected in 1999. The analysis suggests that catchable rainbow trout are not preying on chinook salmon in the Yankee Fork Pond Series. This coupled with the snorkeling results suggest the stocking program in the Yankee Fork Pond series can continue without negatively impacting chinook salmon within the pond series.

### **Displacement - Snorkel Estimates**

For detailed discussion of snorkel results, refer to Anderson et al. 2000, in progress. Results from 1999 efforts indicate few if any juvenile chinook salmon utilize the pond habitat early in the summer, and therefore are not displaced from the pond habitat by stocking hatchery rainbow trout. Snorkeling throughout the summer sample period

Table 2. Number of anglers fishing on Yankee Fork Pond Series 1, 3, and 4, Kelly Creek Pond, and Squaw Creek Pond on weekdays in June, July, and August 1999.

<b>Date</b>	<b>Start Time</b>	<b>Yankee 1</b>	<b>Yankee 3</b>	<b>Yankee 4</b>	<b>Kelly</b>	<b>Squaw</b>
Fri. – 6/4	18:00	0	0	0	0	0
Mon. – 6/7	10:00	0	0	2	3	0
Mon. – 6/21	18:00	0	3	0	1	0
Thur. – 6/24	11:00	4	0	0	0	0
<b>June Totals</b>		<b>4</b>	<b>3</b>	<b>2</b>	<b>4</b>	<b>0</b>
Thur. – 7/8	14:00	9	0	0	3	0
Fri. – 7/9	15:00	4	0	0	0	0
Fri. – 7/16	16:00	0	0	0	0	0
Tue. – 7/20	16:00	5	2	0	0	2
Thur. – 7/29	19:00	1	0	1	1	0
<b>July Totals</b>		<b>19</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>2</b>
Wed. – 8/4	20:00	0	0	0	0	0
Wed. – 8/11	19:00	4	0	0	2	0
Fri. – 8/13	11:00	0	0	0	0	0
<b>August Totals</b>		<b>4</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>
<b>All Months</b>		<b>27</b>	<b>5</b>	<b>3</b>	<b>10</b>	<b>2</b>

Table 3. Number of anglers fishing on Yankee Fork Pond Series 1, 3, and 4, Kelly Creek Pond, and Squaw Creek Pond on weekend days in June, July, and August 1999.

Date	Start Time	Yankee 1	Yankee 3	Yankee 4	Kelly	Squaw
Mon. - 5/31	12:00	5	0	0	0	2
Sat. - 6/12	14:00	3	4	3	0	0
Sun. - 6/13	18:00	0	0	0	2	0
Sun. - 6/20	11:00	3	0	0	0	0
<b>June Total</b>		<b>11</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>2</b>
Sat. - 7/3	16:00	6	15	2	8	3
Sun. - 7/4	12:00	6	0	5	4	0
Sat. - 7/17	17:00	7	0	0	3	0
Sat. - 7/24	14:00	3	0	0	0	0
Sat. - 7/31	19:00	9	0	3	1	3
<b>July Total</b>		<b>31</b>	<b>15</b>	<b>10</b>	<b>16</b>	<b>6</b>
Sat. - 8/7	16:00	7	3	3	2	0
Sat. - 8/14	13:00	0	0	3	0	3
Sat. - 8/21	18:00	2	0	2	n/c	n/c
Sun. - 8/22	11:00	4	2	2	n/c	n/c
Sun. - 8/29	15:00	3	0	0	n/c	n/c
Sat. - 9/4	19:00	1	2	0	n/c	n/c
Sun. - 9/5	15:00	0	0	0	n/c	n/c
<b>August Total</b>		<b>17</b>	<b>7</b>	<b>10</b>	<b>2</b>	<b>3</b>
<b>All Months</b>		<b>59</b>	<b>26</b>	<b>23</b>	<b>20</b>	<b>11</b>

Table 4. Number of fish per hour on Yankee Fork Pond Series 1, 3, and 4, Kelly Creek Pond, and Squaw Creek Pond on weekdays in June, July, and August 1999.

# of Anglers	Location	Date	Total # Fish	Effort Hrs Fished * # Anglers	Fish Per Hour
2	Yankee 1	Thur. - 6/24	0	0.5	0
2	Yankee 1	Thur. - 6/24	0	2	0
3	Yankee 3	Mon. - 6/21	0	4	0
2	Yankee 4	Mon. - 6/7	0	0.5	0
1	Kelly	Mon. - 6/7	4	1	4
2	Kelly	Mon. - 6/7	2	1	2
1	Kelly	Mon. - 6/21	1	0.5	2
No Anglers	Squaw	none	none	none	none
<b>June Totals</b>			<b>7</b>	<b>9.5</b>	
3	Yankee 1	Thur. - 7/8	10	15	0.67
1	Yankee 1	Thur. - 7/8	0	0.67	0
2	Yankee 1	Thur. - 7/8	0	2	0
2	Yankee 1	Fri. - 7/9	4	2	2
2	Yankee 1	Fri. - 7/9	12	2	6
5	Yankee 1	Tue. - 7/20	0	2.5	0
1	Yankee 1	Thur. - 7/29	6	0.5	12
1	Yankee 1	Thur. - 7/29	0	0.25	0
2	Yankee 3	Thur. - 7/8	0	0.33	0
2	Yankee 3	Tue. - 7/20	0	0.67	0
1	Yankee 4	Thur. - 7/8	0	0.67	0
2	Yankee 4	Thur. - 7/29	0	0.17	0
2	Kelly	Thur. - 7/8	5	4	1.25
1	Kelly	Thur. - 7/8	0	0.25	0
1	Kelly	Thur. - 7/29	2	1	2
2	Squaw	Tue. - 7/20	65	7	9.29
<b>July Totals</b>			<b>104</b>	<b>39.01</b>	
4	Yankee 1	Wed. - 8/11	2	4	0.5
No Anglers	Yankee 3	Wed. - 8/11	none	none	none
No Anglers	Yankee 4	Wed. - 8/11	none	none	none
6	Kelly	Wed. - 8/11	3	6	0.5
No Anglers	Squaw	Wed. - 8/11	none	none	none
<b>August Totals</b>			<b>5</b>	<b>10</b>	
<b>All Months</b>			<b>116</b>	<b>58.51</b>	

Table 5. Number of fish per hour on Yankee Fork Pond Series 1, 3, and 4, Kelly Creek Pond, and Squaw Creek Pond on weekend days in June, July, and August 1999.

# of Anglers	Location	Date	Total # Fish	Effort Hrs Fished * # Anglers	Fish Per Hour
3	Yankee 1	Mon. - 5/31	11	6	1.83
2	Yankee 1	Mon. - 5/31	6	2	3
3	Yankee 1	Sat. - 6/12	4	4.5	0.89
4	Yankee 3	Sat. - 6/12	13	12	1.08
2	Yankee 3	Sat. - 6/12	0	0.5	0
1	Yankee 3	Sat. - 6/12	0	0.67	0
No Anglers	Yankee 4	none	none	none	none
2	Kelly	Sun. - 6/13	6	4	1.5
2	Squaw	Mon. - 5/31	5	0.17	29.94
<b>June totals</b>			<b>45</b>	<b>29.84</b>	
1	Yankee 1	Sat. - 7/3	1	0.5	2
6	Yankee 1	Sat. - 7/3	8	12	0.67
2	Yankee 1	Sat. - 7/3	0	0.67	0
1	Yankee 1	Sat. - 7/3	7	7	1
1	Yankee 1	Sat. - 7/3	2	6	0.33
1	Yankee 1	Sat. - 7/3	1	1	1
2	Yankee 1	Sat. - 7/3	1	4	0.25
3	Yankee 1	Sun. - 7/4	15	7.5	2
3	Yankee 1	Sun. - 7/4	9	6	1.5
2	Yankee 1	Sat. - 7/17	1	1	1
2	Yankee 1	Sat. - 7/17	1	1	1
2	Yankee 1	Sat. - 7/17	0	1	0
3	Yankee 1	Sat. - 7/24	0	1.5	0
1	Yankee 1	Sat. - 7/31	0	0.75	0
1	Yankee 1	Sat. - 7/31	3	0.75	4
2	Yankee 1	Sat. - 7/31	0	1	0
1	Yankee 1	Sat. - 7/31	1	1.5	0.67
2	Yankee 3	Sat. - 7/3	4	3	1.33
4	Yankee 3	Sat. - 7/3	11	4	2.75
2	Yankee 3	Sat. - 7/3	5	2	2.5
2	Yankee 3	Sat. - 7/3	6	2	3
2	Yankee 3	Sat. - 7/17	12	2	6
2	Yankee 4	Sat. - 7/3	0	1	0
3	Yankee 4	Sun. - 7/4	6	4.5	1.33
3	Yankee 4	Sat. - 7/31	0	1.5	0
2	Kelly	Sat. - 7/3	1	2	0.5
4	Kelly	Sat. - 7/3	4	2	2
1	Kelly	Sat. - 7/3	10	3	3.33
1	Kelly	Sat. - 7/3	2	0.25	8
3	Kelly	Sun. - 7/4	7	6	1.17

Table 5. (Continued).

# of Anglers	Location	Date	Total # Fish	Effort Hrs Fished * # Anglers	Fish Per Hour
1	Kelly	Sun. - 7/4	1	1.5	0.67
1	Kelly	Sun. - 7/4	0	1.5	0
2	Kelly	Sat. - 7/17	3	0.5	6
1	Kelly	Sat. - 7/17	0	0.17	0
1	Kelly	Sat. - 7/17	1	0.17	5.99
1	Kelly	Sat. - 7/31	0	0.75	0
2	Squaw	Sat. - 7/3	10	0.67	14.93
1	Squaw	Sat. - 7/3	14	0.33	42.42
2	Squaw	Sat. - 7/3	1	0.33	3.03
3	Squaw	Sat. - 7/31	42	6	7
<b>July Totals</b>			<b>190</b>	<b>98.33</b>	
1	Yankee 1	Sat. - 8/7	0	1	0
1	Yankee 1	Sat. - 8/7	0	1	0
1	Yankee 3	Sat. - 8/7	2	1	2
2	Yankee 3	Sat. - 8/7	0	0.67	0
1	Yankee 4	Sat. - 8/7	0	0.17	0
1	Yankee 4	Sat. - 8/7	0	0.17	0
2	Yankee 4	Sat. - 8/14	0	0.33	0
1	Yankee 4	Sat. - 8/14	2	2	1
2	Kelly	Sat. - 8/7	0	0.67	0
3	Squaw	Sat. - 8/14	14	3	4.67
2	Yankee 1	Sat. - 8/21	2	12	0.17
1	Yankee 4	Sat. - 8/21	0	0	0
1	Yankee 1	Sun. - 8/22	3	4	0.75
1	Yankee 3	Sun. - 8/22	0	3	0
1	Yankee 4	Sun. - 8/22	0	4	0
1	Yankee 3	Sat. - 9/4	1	2	0.5
<b>August Totals</b>			<b>24</b>	<b>35.00</b>	
<b>TOTALS</b>			<b>259</b>	<b>163.18</b>	

Table 6. Residency of anglers interviewed at Yankee Fork Pond Series 1, 3, and 4, Kelly Creek Pond and Squaw Creek Pond, summer 1999.

<u>Resident Anglers</u>		<u>Non-Resident Anglers</u>	
Ada	37	Alabama	2
Bannock	3	California	14
Bennewah	1	Florida	3
Bingham	1	Illinois	1
Blaine	2	Kansas	2
Bonneville	1	Nevada	9
Canyon	18	New Mexico	1
Cassia	7	Oregon	4
Custer	10	Pennsylvania	1
Elmore	1	Tennessee	2
Gooding	4	Utah	13
Iowa	1	Washington S	2
Jerome	3	<u>Wyoming</u>	<u>3</u>
Lemhi	2	<b>Total</b>	<b>57</b>
Minidoka	1		
Twin Falls	17		
<u>Washington</u>	<u>2</u>		
<b>Total</b>	<b>111</b>		

Summary of Anglers		
	Number	%
Lemhi and Custer Counties (local anglers)	12	7.1
Resident but non-local anglers	99	58.9
Non-resident anglers	57	33.9

demonstrated overall salmonid densities in the pond series were highest in July and August, 1999. (Anderson et al., 2000, in progress)

There were no clear trends in habitat use and/or segregation between juvenile chinook salmon and hatchery rainbow trout observed in 1999 (Anderson et al., 2000, in progress). This is inconsistent with prior findings in the pond series that have observed apparent segregation between chinook salmon parr and hatchery rainbow trout. Chinook salmon parr were primarily observed in channel habitat, but hatchery rainbow trout were found in pond habitat (Anderson et al. 1999). Either segregation did not occur within the pond habitat in 1999, or the results were an artifact of snorkel sampling or of the small sample number of hatchery rainbow trout

### **RECOMMENDATIONS**

1. Adjust the stocking schedules for the Yankee Fork Pond Series and Kelly Creek pond to coincide with peaks in angler activity in June and July just before weekends and reduce stocking frequency and numbers in August.
2. Increase number of signs advertising pond locations to make anglers more aware of fishing opportunities. Road signs should also be placed at road turns to guide anglers to the ponds.
3. Cull and possibly feed residual steelhead at Squaw Creek Pond to maximize growth of the remaining fish. If they are more attractive to anglers, angler effort may increase.

## LITERATURE CITED

- Malvestuto, S.P., W.D. Davies, and W.L. Shelton. 1978. An evaluation of the roving creel survey with nonuniform probability sampling. *Transactions of the American Fisheries Society* 107:255-262.
- Anderson, J.L., K. Bacon, and A. Sisneros. 1999. Salmon River habitat enhancement. Shoshone-Bannock Tribes, 1998 Annual Report, Project Number 94-50, Bonneville Power Administration, Portland, Oregon.
- Anderson, J.L., K. Bacon, and K. Denny. In preparation. Salmon River habitat enhancement. Shoshone Bannock Tribes, 1999 Annual Report, Project Number 94-50, Bonneville Power Administration, Portland, Oregon.

## 1999 ANNUAL PERFORMANCE REPORT

STATE OF: Idaho

Project: Fisheries Management F-71-R-24

PROJECT I: Surveys and Inventories

Subject I-H: Salmon Region

JOB NO: c<sup>1</sup>

Title: Rivers and Streams Investigations  
- Middle Fork Salmon River Snorkeling  
Transects

PERIOD COVERED: July 1, 1999 to June 30, 2000

### ABSTRACT

In August 1999, project personnel used snorkeling and angling to sample 29 Middle Fork Salmon River transects and 9 tributary sites for fish presence and density. Mean densities of age 1 and older westslope cutthroat trout *Oncorhynchus clarki lewisi*, juvenile rainbow/steelhead trout *O. mykiss*, and juvenile chinook salmon *O. tshawytscha* counted in Middle Fork Salmon River transects were 1.65, 0.89, and 2.41 fish/100 m<sup>2</sup>, respectively. In Middle Fork Salmon River tributary transects, westslope cutthroat trout densities averaged 1.13/100 m<sup>2</sup>, rainbow trout/steelhead averaged 3.79/100 m<sup>2</sup>, and chinook salmon averaged 3.37/100 m<sup>2</sup>.

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## INTRODUCTION

The Middle Fork Salmon River (MFSR), part of the Wild and Scenic Rivers System, flows through a remote area in east central Idaho. The Frank Church River of No Return Wilderness Area encompasses the river. The MFSR originates at the confluence of Bear Valley and Marsh creeks near Cape Horn Mountain and flows 171 km to its confluence with the Salmon River, 92 km downstream from Salmon, Idaho (Figure 1).

Primitive roads access Dagger Falls and the headwaters of some tributaries. Access to the lower 156 km of the MFSR is limited to aircraft, float boats, or horse/foot trails.

The Middle Fork Salmon River is a major recreational river that offers a wide variety of outdoor and backcountry experiences. The number of people floating the river during the permit season has increased substantially in the past 30 years from 625 in 1962 to 11,296 in 1999. The US Forest Service estimates total use is 68,129 days (U.S. Forest Service, Salmon-Challis National Forest, Middle Fork Ranger District, 1999).

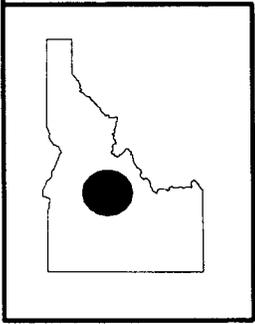
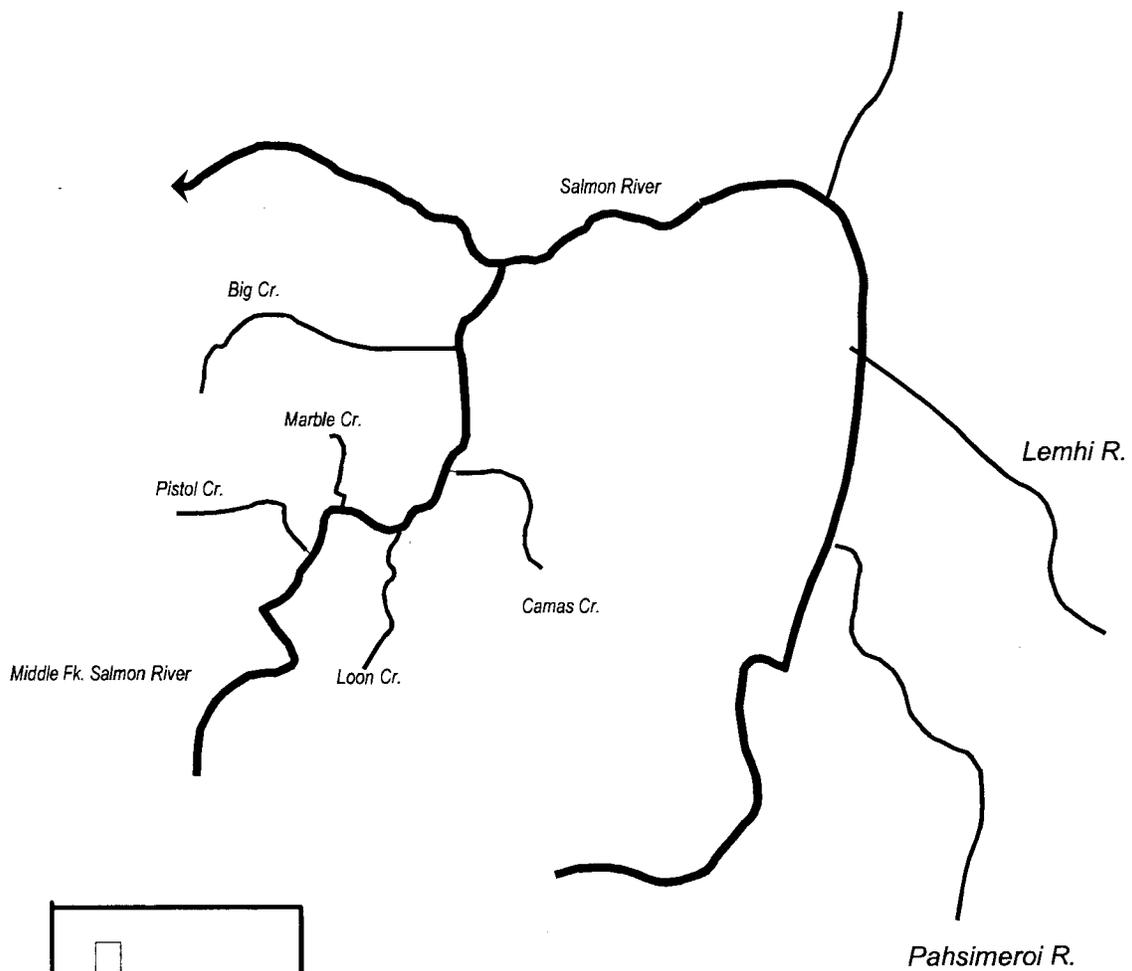
The earliest MFSR fishery study conducted in 1959 and 1960 evaluated the life history and seasonal movements of westslope cutthroat trout *Oncorhynchus clarki lewisi* (Mallet 1963). In 1971 the Idaho Department of Fish and Game initiated studies to monitor MFSR westslope cutthroat trout abundance and to evaluate catch-and-release regulations established by the Idaho Fish and Game Commission in 1972. The Commission adopted similar regulations for major MFSR tributaries in the early and mid-1980s.

The 1971 study included establishment of snorkeling transects to be surveyed periodically (Corley 1972; Jeppson and Ball 1977, 1979). Since then the Department has begun additional studies within the Middle Fork Salmon River drainage. In 1981 we began to evaluate wild steelhead trout populations *O. mykiss* on the MFSR (Thurrow 1982, 1983, 1985). In 1985 the Department started measuring juvenile steelhead, chinook salmon *O. tshawytscha* and westslope cutthroat trout densities in the MFSR and its tributaries (Reingold and Davis 1987a, 1987b, 1988; Lukens and Davis 1989; Davis et al. 1992; Schrader and Lukens 1992; LITER and Lukens 1992).

This report, a continuation of the 1985 study, presents data collected in August 1999 on fish densities in the Middle Fork Salmon River drainage.

## OBJECTIVES

1. Monitor juvenile steelhead trout and chinook salmon densities within the Middle Fork Salmon River and its tributaries.
2. Monitor the effects of catch-and-release regulations on resident fish populations in the MFSR drainage, particularly on westslope cutthroat trout.



vicinity map

Figure 1. Map of Middle Fork Salmon River and tributaries, Idaho.

## METHODS

August 6 to August 13 1999, project personnel snorkeled 29 Middle Fork Salmon River transects (Table 1) and 9 traditional MFSR tributary transects (Table 2). The MFSR tributary transects on Upper Big Creek, Upper Marble Creek, Upper Camas Creek and two sites on Wilson Creek, sampled in 1996, were not surveyed.

The snorkeling techniques are described by Reingold and Davis (1987a, 1987b) and Scully et al. (1990). We used conventional fly-fishing and spin cast gear to evaluate fish species and length frequencies on the MFSR below the confluence of Boundary Creek.

## RESULTS

### Middle Fork Salmon River Snorkeling Transects

We counted 304 westslope cutthroat trout, 24 juvenile rainbow trout/steelhead, and 470 juvenile chinook salmon in MFSR transects.(Table 3). Mean densities were 1.65, 0.89, and 2.41 fish/100 m<sup>2</sup> for westslope cutthroat trout, rainbow trout/steelhead and chinook salmon, respectively (Table 4).

### Middle Fork Salmon River Tributary Snorkeling Transects

Juvenile rainbow trout/steelhead densities ranged from 0 to 0.76 fish/100 m<sup>2</sup> with a mean of 0.24 fish/100 m<sup>2</sup> (Table 5). Mean juvenile chinook salmon density was 3.37 fish/100 m<sup>2</sup> and ranged from 0 to 10.03 fish/100 m<sup>2</sup>. Mean westslope cutthroat trout density was 1.13 fish/100 m<sup>2</sup> and ranged from 0 to 4.39 fish/100 m<sup>2</sup>.

### Project Angling

Idaho Department of Fish and Game project anglers caught 322 fish: 182 westslope cutthroat trout (56.6%), 132 rainbow trout/steelhead (41.0%), and 8 rainbow trout/westslope cutthroat trout hybrids (2.4%) (Figure 2.). Mean total lengths were 259 mm for westslope cutthroat trout and 190 mm for rainbow trout/steelhead.

Table 1. Locations and dimensions of sample transects on Middle Fork Salmon River, August 1999.

Location River km <sup>a</sup>	Transect Name	Transect Length (m)	Visibility (m)	Visibility Corridor (m)	Area (m <sup>2</sup> )	Species Present <sup>b</sup>
0.3	Boundary	91	3.8	7.6	691.6	SB
4.3	Gardells Hole	87	2.5	5	435	C2, ck
8.8	Velvet	43	1.9	3.8	163.4	C2, ck
13.6	Elkhorn	112	2.6	5.2	582.4	SB
21.3	Sheepeater	123	2.5	5	615	SB
24.5	Geryhound	63	2.5	5	315	C2, ck
29.6	Rapid River	103	2.8	5.6	576.8	SB
40	Indian	168	2.8	5.6	940.8	SB
44.3	Pungo	67	2.1	4.2	281.4	C2, ck
51	Marble Pool	187	4.9	9.8	1832.6	C2, ck
52.3	Skijump	78	4.3	8.6	670.8	SB
60.6	Lower Jackass	162	3.6	7.2	1166.4	C2, ck
64.6	Cougar	106	3.1	6.2	657.2	SB
73.9	Whitey Cox	92	2.9	5.8	533.6	C2, ck
74.1	Rock Island	104	4.2	8.4	873.6	SB
82.9	Hospital Pool	103	2.7	5.4	556.2	C2, ck
84.3	Hospital Run	168	2.8	5.6	940.8	SB
92.6	Tappan Pool	238	2.2	4.4	1047.2	C2, ck
92.8	Tappan Run	156	2.2	4.4	686.4	SB
106.6	Flying B	83	2.6	5.2	431.6	C2, ck
108.6	Airstrip	151	2.5	5	755	SB
119.7	Survey	137	2.4	4.8	657.6	SB
124.6	Big Creek Bridge	201	3.6	7.2	1447.2	C2, ck
127.8	Love Bar	166	3.9	7.8	1294.8	SB
135.8	Ship Island	120	3	6	720	C2, ck
144	Little Ouzel	98	3	6	588	SB
144.6	Otter Bar	232	3	6	1392	C2, ck
151.5	Goat Creek Pool	92	2.7	5.4	496.8	C2, ck
151.8	Goat Creek Run	92	2.7	5.4	496.8	SB

<sup>a</sup> River km start at Dagger Falls.

<sup>b</sup> SB = Steelhead, b group; C2 = westslope cutthroat trout; ck = chinook salmon.

Table 2. Middle Fork Salmon River tributary snorkeling transects, August 1999.

<b>Transect Name*</b>	<b>Length (m)</b>	<b>Area (m<sup>2</sup>)</b>	<b>Location</b>
Pistol Creek #1 (lower)	47	658	At mile marker 16
Pistol Creek #2 (upper)	42	294	Above mile marker 16
Indian Creek #1 (lower)	39	368.55	75 m above mouth
Indian Creek #2 (upper)	57	342	300 m above mouth
Marble Creek #1 (lower)	43	533.2	Above pack bridge
Loon Creek #1 (lower)	38	319.2	Below pack bridge
Loon Creek #2 (upper)	54	453.6	360 m above pack bridge
Camas Creek #1 (lower)	68	870.4	From pack bridge downstream
Big Creek #1 (lower)	55.5	510.6	360 m above mouth

\* Marble Creek #2, Camas Creek #2, and both Wilson Creek sites were not snorkeled in 1999.

Table 3. Numbers of westslope cutthroat trout and rainbow trout/steelhead by length group (mm), chinook salmon by age group, and other fish, Middle Fork Salmon River snorkel counts, July 1999. BU = bull trout and WF = mountain whitefish.

Transect Name	River km	Westslope Cutthroat Trout (C2)			Rainbow Trout/Steelhead (R1)			Chinook			WF Fish	Other Fish	Total Fish			
		<75	75-150	150-230 >300	C2	75-150	150-230	230-300 >300	Total R1	Age 0				Age 1	Ck	
Boundary	0.3	0	0	2	4	0	0	0	0	1	0	1	0	10	0	15
Gardells Hole	4.3	0	0	9	16	0	0	0	0	0	0	0	0	22	13	51
Velvet	8.8	0	0	1	8	9	0	14	0	3	0	3	0	6	0	32
Elkhorn	13.6	0	0	7	4	11	0	0	0	1	0	1	0	17	0	29
Sheepeater	21.3	0	0	0	0	11	7	0	18	0	0	0	0	21	0	39
Greyhound	24.5	0	0	11	16	2	0	0	2	31	0	31	1	16	0	66
Rapid River	29.6	0	2	3	18	0	6	0	6	0	0	0	0	23	2	49
Indian	40	0	2	3	28	1	0	0	1	176	0	176	0	7	2	214
Pungo	44.3	0	0	6	11	2	6	1	9	37	0	37	0	17	1	75
Marble Pool	51	0	7	10	34	1	4	0	9	80	0	80	1	57	1	182
Skijump	52.3	0	3	2	9	0	1	0	1	36	0	36	0	11	0	57
Lower Jackass	60.6	0	12	11	28	1	8	2	11	9	0	9	1	24	5	78
Cougar	64.6	0	2	3	13	1	2	0	3	17	0	17	0	9	0	42
Whitey Cox	73.9	0	2	2	5	0	0	0	0	4	0	4	0	3	2	14
Rock Island	74.1	0	0	0	0	0	2	0	2	4	0	4	0	9	0	15
Hospital Pool	82.9	0	1	11	16	0	0	0	0	42	0	42	0	8	60	126
Hospital Run	84.3	0	5	10	23	3	5	0	8	0	0	0	0	20	0	52
Tappan Pool	92.6	0	4	7	11	0	3	0	6	0	0	0	0	12	4	33
Tappan Run	92.8	0	1	2	4	0	5	3	8	0	0	0	0	15	0	27
Flying B	107	0	0	3	4	0	3	0	3	0	0	0	0	17	0	24
Airstrip	109	0	0	4	4	0	5	0	5	0	0	0	0	20	7	36
Survey	120	0	0	2	2	0	1	0	1	23	0	23	0	29	22	77
Big Creek Bridge	125	0	0	3	13	0	9	0	9	0	0	0	0	21	6	49
Love Bar	128	0	0	1	9	1	6	2	9	2	0	2	0	15	1	36
Ship Island	136	0	0	7	8	0	3	0	3	0	0	0	0	0	1	12
Little Ouzel	144	0	0	0	1	0	0	0	0	0	0	0	0	3	0	4
Otter Bar	145	0	0	1	2	0	10	0	10	3	0	3	0	15	28	58
Goat Creek Pool	152	0	0	1	3	1	0	0	1	1	0	1	0	1	2	8
Goat Creek Run	152	0	0	1	2	0	2	0	2	0	0	0	0	25	20	49
<b>Total</b>		<b>0</b>	<b>9</b>	<b>45</b>	<b>139</b>	<b>111</b>	<b>304</b>	<b>24</b>	<b>102</b>	<b>15</b>	<b>0</b>	<b>141</b>	<b>470</b>	<b>4</b>	<b>453</b>	<b>1,549</b>

Table 4. Densities (fish/100 m<sup>2</sup>) of westslope cutthroat trout, rainbow trout/steelhead, and chinook salmon, Middle Fork Salmon River snorkel transects July 1999.

Transect Name	River km	Area (m <sup>2</sup> )	Densities (fish/100m <sup>2</sup> )				Total Fish*
			Westslope Cutthroat Trout	Rainbow Trout	Chinook Salmon		
Boundary	0.3	691.6	0.58	0.00	0.14	2.17	
Gardells Hole	4.3	435.0	3.68	0.00	0.00	11.72	
Velvet	8.8	163.4	5.51	8.57	1.84	19.58	
Elkhorn	13.6	582.4	1.89	0.00	0.17	4.98	
Sheepeater	21.3	615.0	0.00	2.93	0.00	6.34	
Greyhound	24.5	315.0	5.08	0.63	9.84	20.95	
Rapid River	29.6	576.8	3.12	1.04	0.00	8.50	
Indian	40.0	940.8	2.98	0.11	18.71	22.75	
Pungo	44.3	281.4	3.91	3.20	13.15	26.65	
Marble Pool	51.0	1,832.6	1.86	0.49	4.37	9.93	
Skijump	52.3	670.8	1.34	0.15	5.37	8.50	
Lower Jackass	60.6	1,166.4	2.40	0.94	0.77	6.69	
Cougar	64.6	657.2	1.98	0.46	2.59	6.39	
Whitey Cox	73.9	533.6	0.94	0.00	0.75	2.62	
Rock Island	74.1	873.6	0.00	0.23	0.46	1.72	
Hospital Pool	82.9	556.2	2.88	0.00	7.55	22.65	
Hospital Run	84.3	940.8	2.44	0.85	0.00	5.53	
Tappan Pool	92.6	1,047.2	1.05	0.57	0.00	3.15	
Tappan Run	92.8	686.4	0.58	1.17	0.00	3.93	
Flying B	106.6	431.6	0.93	0.70	0.00	5.56	
Airstrip	108.6	755.0	0.53	0.66	0.00	4.77	
Survey	119.7	657.6	0.30	0.15	3.50	11.71	
Big Creek Bridge	124.6	1,447.2	0.90	0.62	0.00	3.39	
Love Bar	127.8	1,294.8	0.70	0.70	0.15	2.78	
Ship Island	135.8	720.0	1.11	0.42	0.00	1.67	
Little Ouzel	144.0	588.0	0.17	0.00	0.00	0.68	
Otter Bar	144.6	1,392.0	0.14	0.72	0.22	4.17	
Goat Creek Pool	151.5	496.8	0.60	0.20	0.20	1.41	
Goat Creek Run	151.8	496.8	0.40	0.40	0.00	9.86	

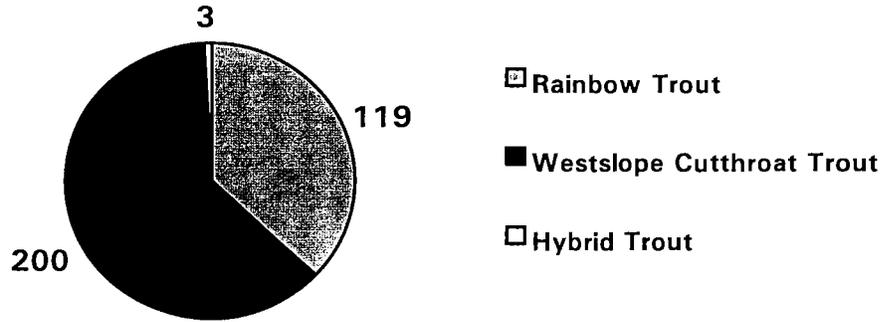
\*Total fish includes suckers, northern pikeminnow, shiners, whitefish, and bull trout.

Table 5. Numbers of westslope cutthroat trout and rainbow trout/steelhead by length group (mm), chinook salmon by age group, and other fish species counted in Middle Fork Salmon River tributaries\*, August 1999.

Transect Name	Area (m <sup>2</sup> )	Rainbow Trout/ Steelhead			Westslope Cutthroat Trout					Chinook Salmon			White-fish	Bull Trout				
		<75	75-150	150-230	230-300	>300	Density	75-150	150-230	230-300	>300	Density			Age 0	Age 1	total	Density
Pistol Creek #1 (lower)	658	5	5	5	2	0	2.58	2	4	2	1	1.67	66	0	66	10.03	9	0
Pistol Creek #2 (upper)	294	1	11	8	0	0	6.80	0	1	0	0	0.34	2	0	2	0.68	3	0
Indian Creek #1 (lower)	368.6	2	13	2	0	0	4.61	1	2	1	0	1.09	7	0	7	1.90	2	1
Indian Creek #2 (upper)	342	1	14	5	0	0	5.85	0	0	0	0	0.00	18	0	18	5.26	1	1
Marble Creek #1 (lower)	533.2	0	4	5	1	0	1.88	0	2	1	0	0.56	0	0	0	0.00	3	0
Loon Creek #1 (lower)	319.2	0	0	14	5	0	5.95	0	4	6	4	4.39	23	0	23	7.21	13	2
Loon Creek #2 (upper)	453.6	1	3	1	0	0	1.10	0	4	2	1	1.54	20	0	20	4.41	4	0
Camas Creek #1 (lower)	870.4	0	7	4	1	0	1.38	0	0	1	2	0.34	2	0	2	0.23	36	0
Big Creek #1 (lower)	510.6	0	4	15	1	0	3.92	0	0	1	0	0.20	3	0	3	0.59	12	0
Column total	4,349.6	10	61	59	10	0		3	17	14	8		141	0	141		83	4
Grand total					140					44					141		83	4
Mean Density (fish/100 m <sup>2</sup> )							3.79					1.13				3.37		

\* Marble Creek #2, Camas Creek #2, and both Wilson Creek sites were not sampled in 1999.

**Species Composition of Fish Caught by Project Anglers**



**Length Frequency For Rainbow/Steelhead Trout and Westslope Cutthroat Trout in Middle Fork Salmon River Project Angling**

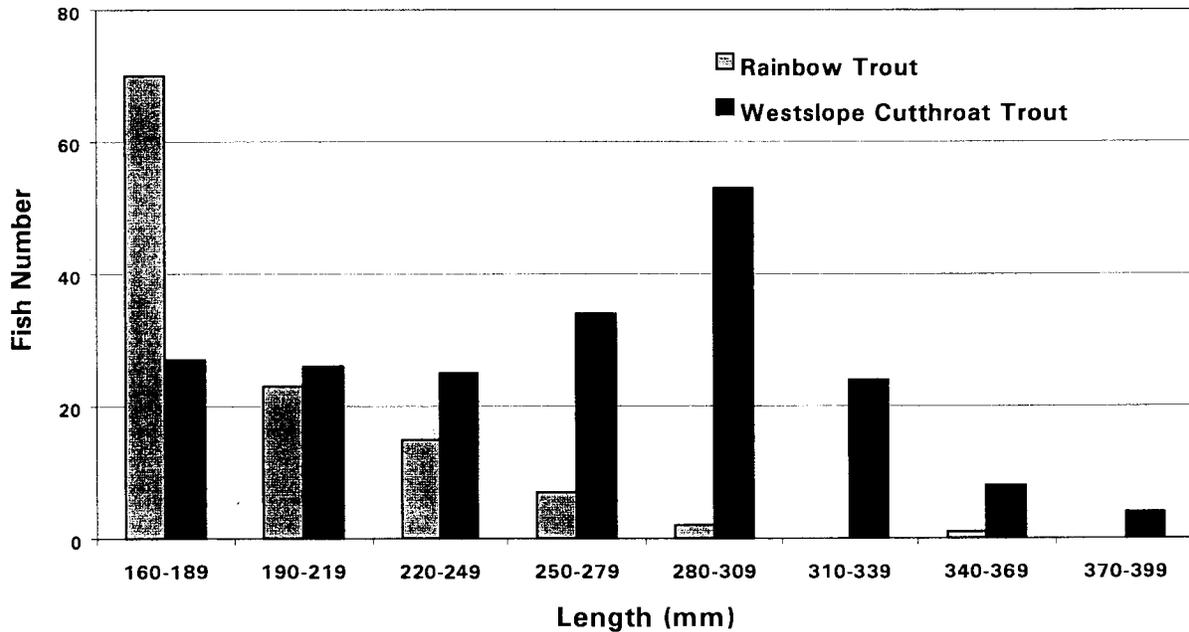


Figure 2. Species composition of fish caught by Department project anglers and length frequency of westslope cutthroat trout and rainbow trout/steelhead, July 1999.

## DISCUSSION

### Middle Fork Salmon River Snorkeling Transects

In 1986, juvenile steelhead densities showed a downward trend. This trend had leveled off by 1993 and increased between 1996 and 1999 (Figure 3). The decrease in steelhead densities probably reflected poor downstream migration conditions for smolts. The relationship between resident rainbow trout, residual steelhead, and migratory steelhead makes this data difficult to interpret.

Since 1989 there has been a dramatic decline in chinook salmon densities, for reasons similar to those for the decrease in steelhead. However, there was an increase between 1996 and 1999, and juvenile chinook salmon numbers in traditional MFSR transects are now similar to those seen in 1989 (Figure 4).

The density of westslope cutthroat trout counted increased in 1996 and again in 1999, probably because of better in-river conditions (Figure 5). The density of westslope cutthroat trout larger than 300 mm was at the highest level since 1987.

In 1971 when project personnel first established snorkeling transects specifically for westslope cutthroat trout, observed numbers were low. The Idaho Fish and Game Commission established catch-and-release regulations for the Middle Fork Salmon River in 1972. After this, westslope cutthroat trout numbers increased and appeared to peak in the early to mid-1980's. The trend during the early 1990's had been a general decline with very low numbers observed. However, westslope cutthroat trout are now slowly increasing in numbers and size (Figure 6).

Liter and Lukens (1993) hypothesized westslope cutthroat trout declines may be caused by drought. Since 1994 there has been a reprieve in the drought conditions experienced during the late 1980's and early 1990's. A corresponding increase in westslope cutthroat trout, chinook salmon, and rainbow/steelhead trout densities supports Liter and Lukens supposition.

### Middle Fork Salmon River Tributary Snorkeling Transects

Between 1993 and 1999, westslope cutthroat trout densities varied little in transects snorkeled (Figure 7). Although there was some slight variation in densities among tributaries, no major changes occurred. The variations probably reflect no more than normal yearly population fluctuations. Excluding four data points for westslope cutthroat trout densities, (Big Cr. 1983, Pistol Cr. 1985, 1986, and Camas Cr. 1988) tributary densities have varied little since 1981.

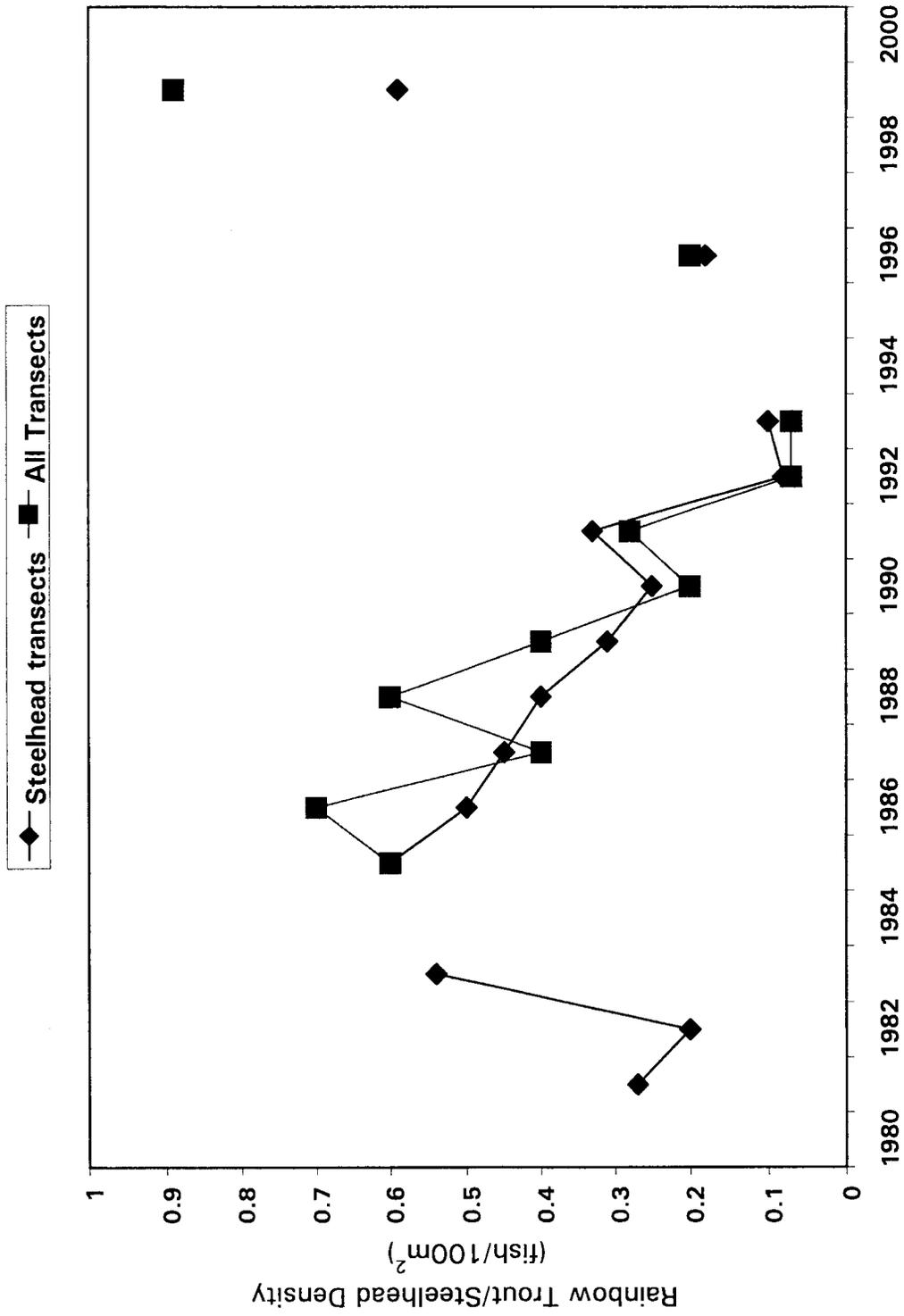


Figure 3. Densities of juvenile rainbow trout/steelhead counted in all transects and in steelhead-only transects (see Table 1) for Middle Fork Salmon River snorkeling surveys in 1981-1983, 1985-1993, 1996, and 1999. Data for 1981-1983 from Thurow (1982, 1983, 1985). Not all transects were sampled in all years.

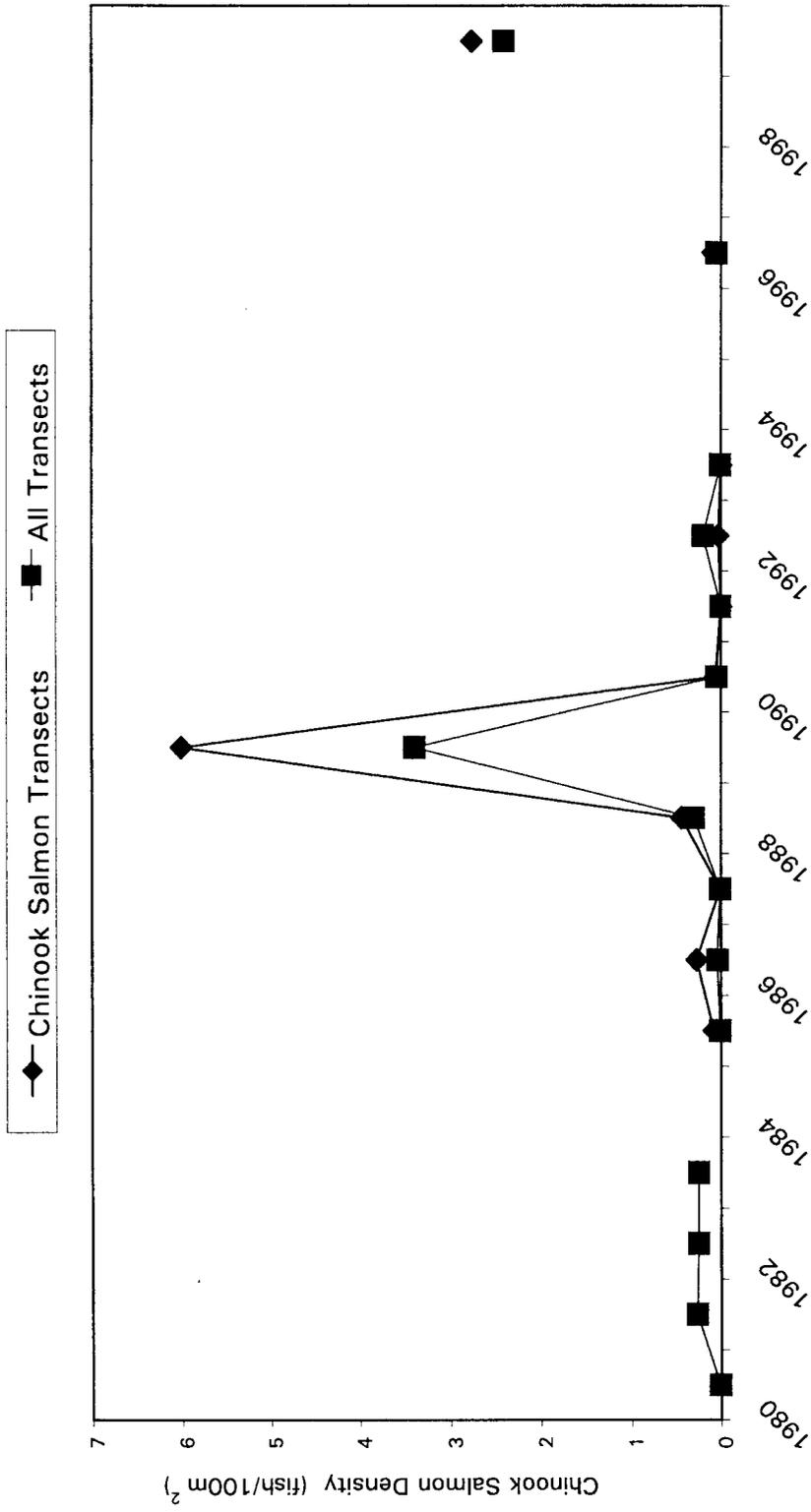


Figure 4. Densities of chinook salmon in all transects and in chinook salmon/westslope cutthroat trout-only transects (see Table 1) for Middle Fork Salmon River snorkeling surveys in 1981-1983, 1985-1993, 1996, and 1999. Data for 1981-1983 from Thurow (1982, 1983, 1985). Not all transects were sampled in all years.

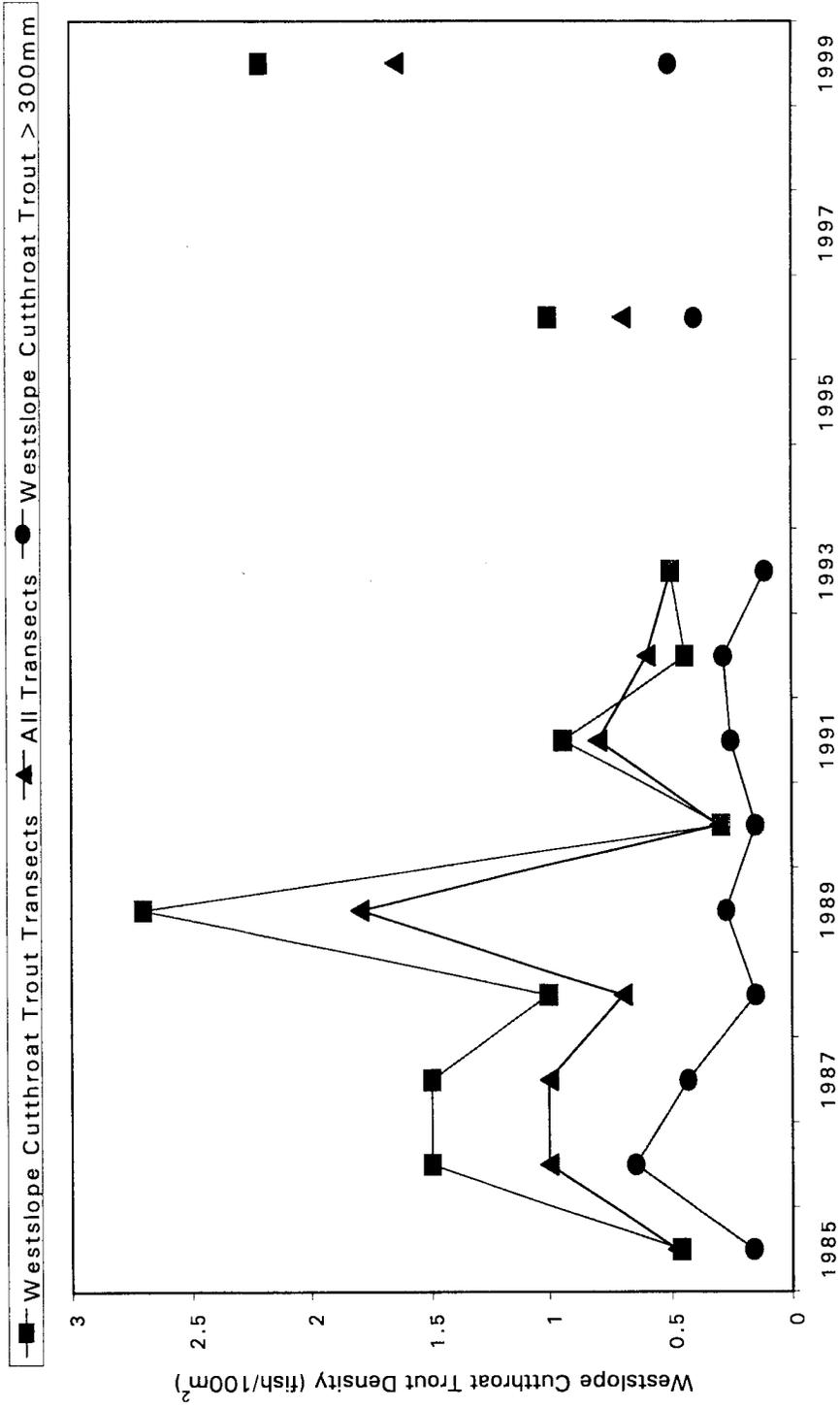


Figure 5. Densities of westslope cutthroat trout in all transects and in chinook salmon/westslope cutthroat trout-only transects (see Table 1) for Middle Fork Salmon River snorkeling surveys in 1981-1983, 1985-1993, 1996, and 1999. Data for 1981-1983 from Thurow (1982, 1983, 1985). Not all transects were sampled in all years.

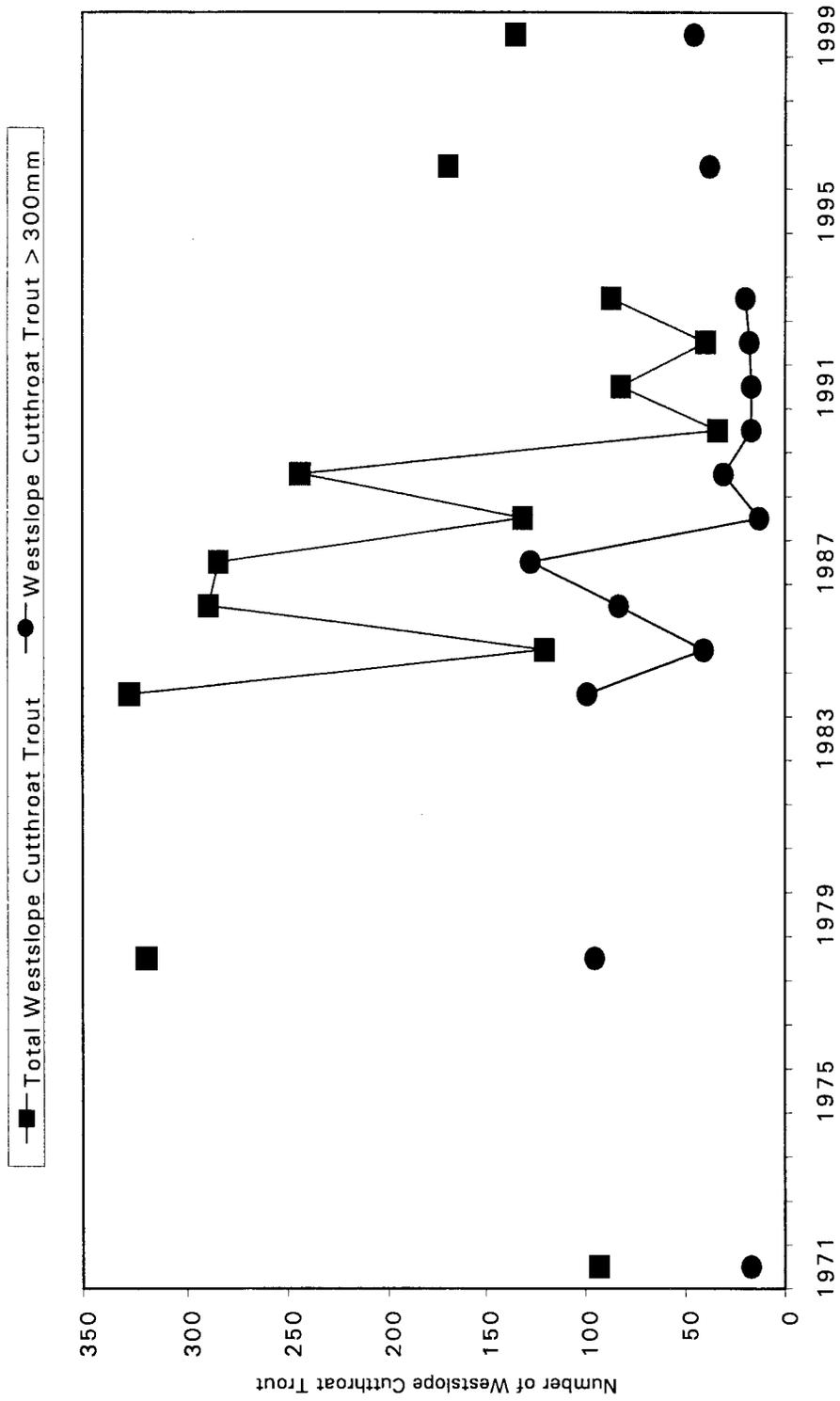


Figure 6. Number of westslope cutthroat trout counted in traditional Middle Fork Salmon River snorkeling transects (Pungo, Marble Pool, Lower Jackass, Whitey Cox, Hospital Pool, Tappan Pool, Flying B, Big Creek Bridge, Ship Island, Otter Bar, and Goat Creek Pool), 1971-1999.

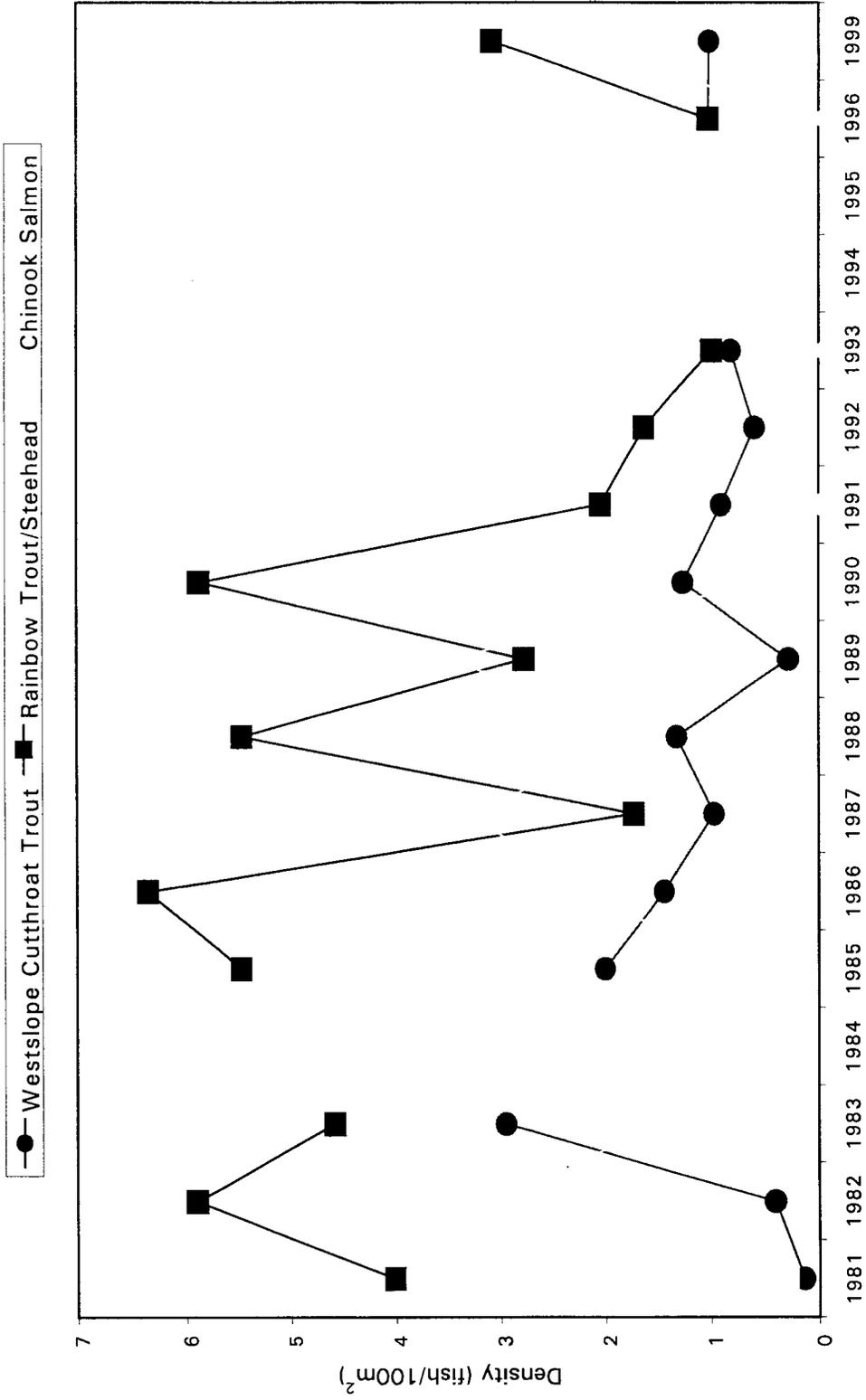


Figure 7. Mean densities of westslope cutthroat trout, chinook salmon, and rainbow trout/steelhead counted in Middle Fork Salmon River tributary transects, 1981-1983, 1985-1993, 1996, and 1999.

In eight of the nine transects, we observed chinook salmon. Although densities are still well below desirable levels this was a substantial increase from 1996 when chinook salmon were seen in only one of thirteen transects. Chinook salmon densities have been low in all the MFSR tributaries snorkeled since 1990 (Figure 7).

Rainbow trout/steelhead densities have increased since 1995. Yearly spawner escapement and down-river migration conditions heavily influence juvenile steelhead densities. In most cases Middle Fork Salmon River drainage fish stocks have responded to the favorable water conditions experienced in the last few years.

### **Project Angling**

The Idaho Fish and Game Commission established catch-and-release regulations in MFSR in 1972. Before this approximately 20% of the westslope cutthroat trout caught by project anglers were larger than 300 mm (Figure 8). Since the regulation change, this proportion has fluctuated yearly ranging from 33 to 53% and averaged 43%. The proportion of large westslope cutthroat trout caught in 1996 was 33% and increased slightly in 1999 to 36.2%. This fluctuation is probably because of variation in sample timing, gear type, angler skill, and fish migration patterns. The mean length of creel fish is currently 271.3 mm.

### **RECOMMENDATION**

Continue monitoring densities of juvenile rainbow/steelhead trout, westslope cutthroat trout and chinook salmon in the MFSR and tributaries by snorkeling transects once every three years between the second week of July and the third week of August.

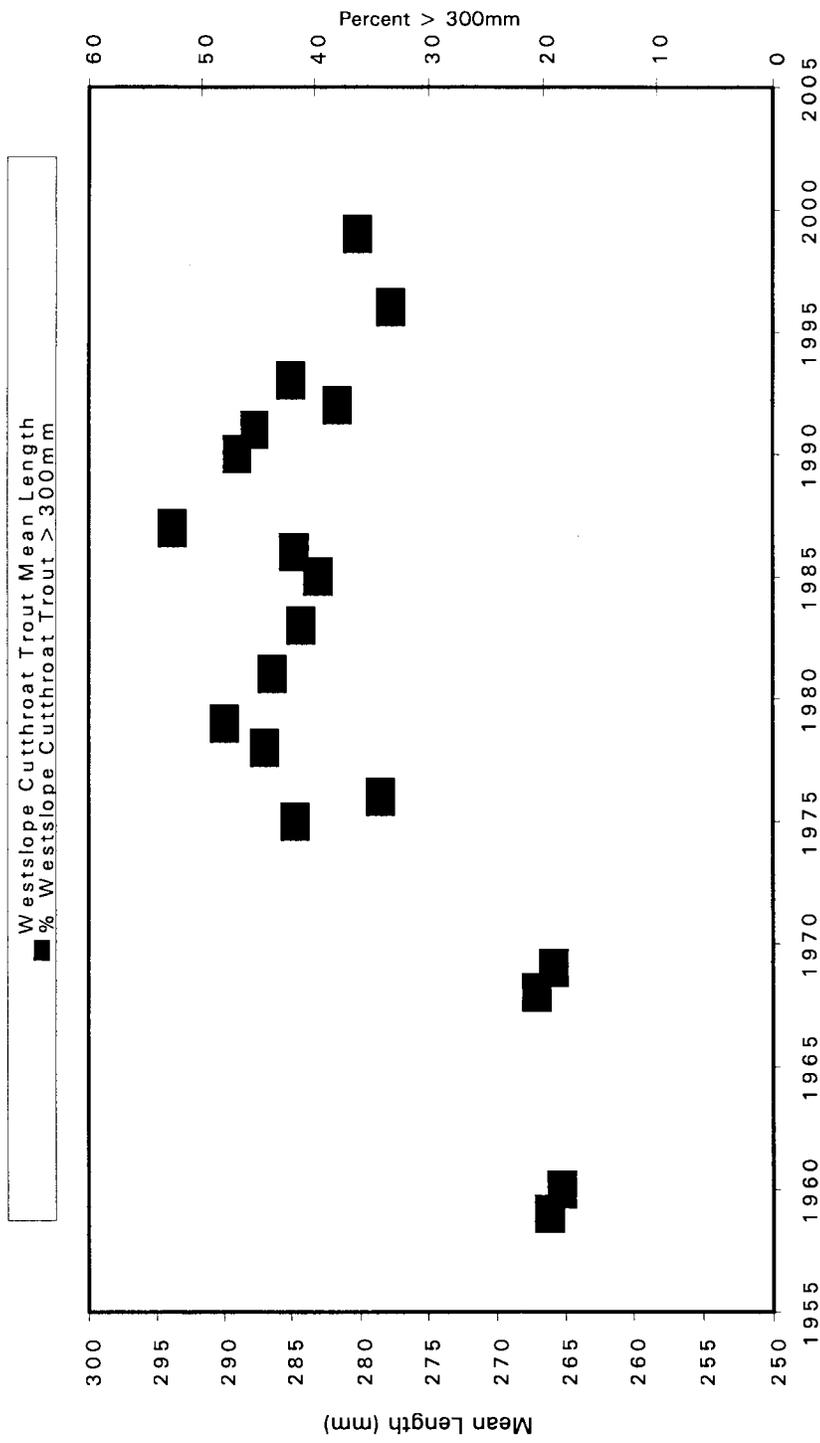
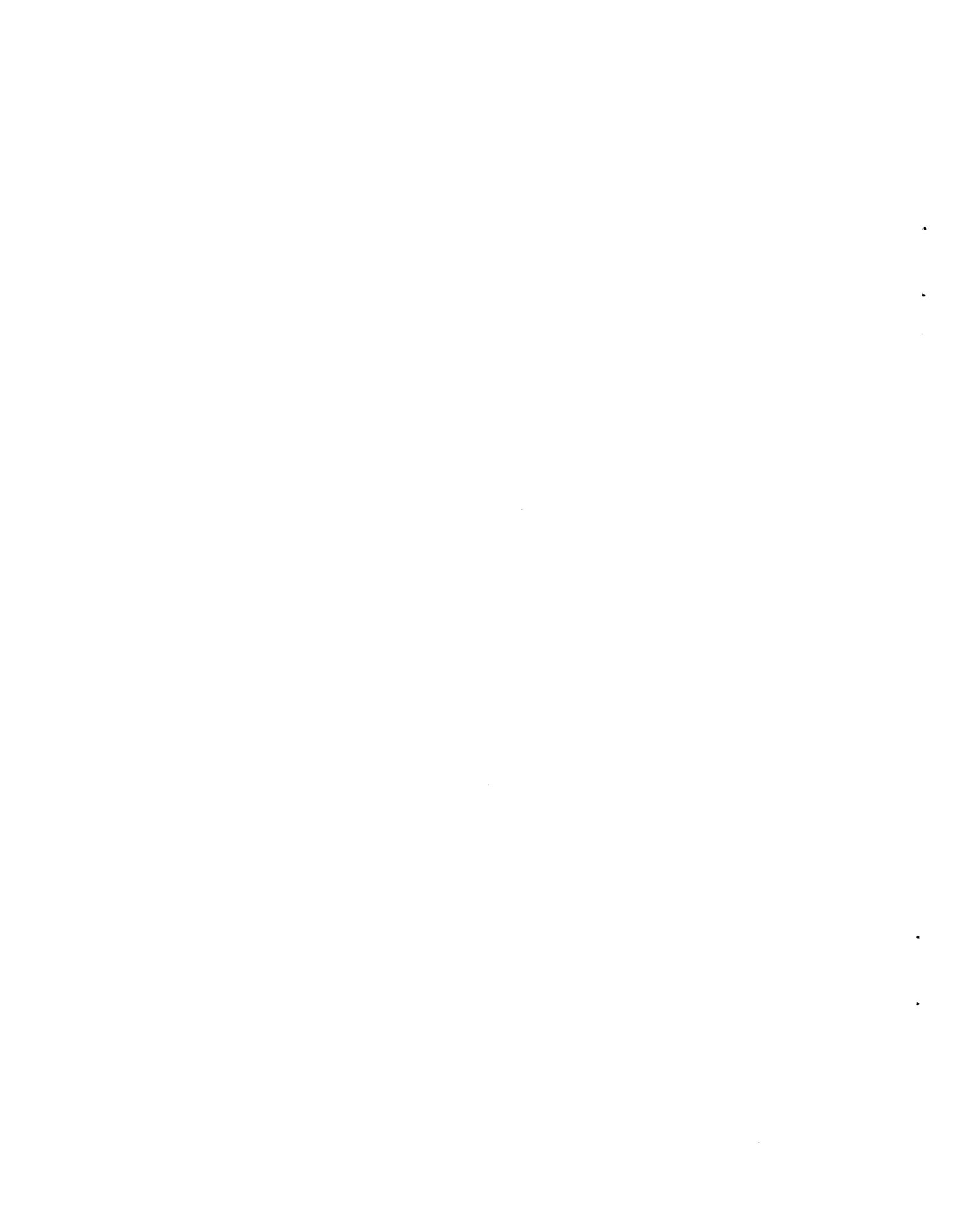


Figure 8. Mean length and proportion of westslope cutthroat trout larger than 300 mm sampled by project angling in the Middle Fork Salmon River, 1959-1999.



## LITERATURE CITED

- Corley, D.R. 1972. Snorkel trend counts of fish in the Middle Fork - 1971. Idaho Department of Fish and Game, Completion Report, Boise.
- Davis, J.A., J.R. Lukens, and W.C. Schrader. 1992. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-14, Job Performance Report, Boise.
- Jeppson, P., and K. Ball. 1977. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-1, Job 6, Job Performance Report, Boise.
- Jeppson, P., and K. Ball. 1979. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-3, Job 6, Job Performance Report, Boise.
- Liter, M., and J.R. Lukens. 1992. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-16, Job Performance Report, Boise.
- Lukens, J.R., and J.A. Davis. 1989. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-13, Job 6(SAL), Job Performance Report, Boise.
- Mallet, J.L. 1963. The life history and seasonal movements of cutthroat trout in the Salmon River, Idaho. Master's thesis. University of Idaho, Moscow.
- Reingold, M., and J.A. Davis. 1987a. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-10, Job 6(SAL), Job Performance Report, Boise.
- Reingold, M., and J.A. Davis. 1987b. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-11, Job 6(SAL), Job Performance Report, Boise.
- Reingold, M., and J.A. Davis. 1988. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-12, Job 6(SAL), Job Performance Report, Boise.
- Schrader, W.C., and J.R. Lukens. 1992. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-15, Job 6(SAL), Job Performance Report, Boise.
- Scully, R.J., E.J. Leitzinger, and C.E. Petrosky. 1990. Idaho habitat evaluation for off-site mitigation record, part I. U.S. Department of Energy, Bonneville Power Administration,



Contract No. DE-A179-84BP13381, Project 83-7, Annual Report 1988, Portland, Oregon.

Thurow, R. 1982. Middle Fork Salmon River fisheries investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-73-R-4, Job Performance Report, Boise.

Thurow, R. 1983. Middle Fork Salmon River fisheries investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-73-R-5, Job Performance Report, Boise.

Thurow, R. 1985. Middle Fork Salmon River fisheries investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-73-R-6, Job Performance Report, Boise.

## 1999 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fishery Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-H: Salmon Region

Job: c<sup>2</sup>

Title: Rivers and Streams Investigations

- Wild Trout Population Surveys

- Canyon Creek and Tributaries

Contract Period: July 1, 1996 to June 30, 1997

### ABSTRACT

In spring 1999 the Lemhi Model Watershed Project reconnected Canyon Creek to the Lemhi River and installed an improved sprinkler system on adjacent private property to prevent dewatering of the creek during the irrigation season.

During fall 1998 and summer and fall 1999 project personnel sampled Canyon Creek and several tributary streams to determine fish species composition, size structure, and abundance. We saw rainbow trout *Oncorhynchus mykiss* in Canyon and Cruikshank creeks; however, we saw only westslope cutthroat trout *O. clarki lewisi* in Wildcat and Frank Hall creeks. Rainbow trout were the dominant salmonid species in Canyon Creek during both the summer and fall. Westslope cutthroat trout appear to over-winter in Canyon Creek before moving into adjacent tributaries during the spring and summer.

Project personnel will survey Canyon Creek annually to monitor changes in the fish community after the reconnection to the Lemhi River.

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## INTRODUCTION

Irrigators divert much water from tributaries of the Lemhi River. Most tributaries are no longer confluent with the Lemhi River, inhibiting anadromous and resident fish migration into the tributaries. We know of only one tributary, Hayden Creek that supports anadromous fish.

In 1998, Lemhi Model Watershed Project and Idaho Fish and Game biologists proposed reconnecting Canyon Creek with the upper Lemhi River. Canyon Creek originates near the Montana border below Bannock Pass. It flows parallel to State Highway 29, and joins the Lemhi River near the town of Leadore. For over 75 years irrigators have dewatered Canyon Creek during the summer and early fall. In spring 1999, the Lemhi Model Watershed Project reconnected Canyon Creek and installed an improved sprinkler irrigation system that requires less water.

In November 1998 project personnel established and surveyed three permanent sites in Canyon Creek to monitor resultant changes in fish species composition, size structure, and abundance. (Global Positioning System (GPS) coordinates for these sites are listed in Appendix A). We sampled the uppermost site again in summer 1999 and all three sites in November 1999.

In addition to the Canyon Creek sites, we sampled three tributaries (Cruikshank, Wildcat, and Frank Hall creeks) during summer 1999 to assess fishery composition, size, and abundance. We also collected genetic samples from westslope cutthroat trout *Oncorhynchus clarki lewisi* in these tributaries to determine if westslope cutthroat trout and rainbow trout *O. mykiss* had hybridized.

## OBJECTIVES

1. Monitor Canyon Creek, determining fishery composition, size, and abundance at project sites.
2. Determine species composition, size, and abundance of all salmonid species in the Cruikshank subbasin including Cruikshank, Frank Hall, and Wildcat creeks.
3. Obtain genetic samples from westslope cutthroat trout in the Cruikshank subbasin including Frank Hall and Wildcat creeks.

## METHODS

### Canyon Creek

Project personnel electrofished Canyon Creek sites during June and November 1999. In June, high water prevented us from effectively sampling the lower two sites. In November we fished all three Canyon Creek sites.

Transects lengths ranged from 65 to 119 m. Sample sites had natural barriers at the upper and lower ends and block nets were not needed. We attempted to catch all sizes of game and non-game fish using a Smith Root SR-15 backpack unit, working upstream with each consecutive pass immediately after and with equal effort to the previous pass. We continued electrofishing until we achieved 50% reduction. All fish were identified, measured for total length (mm), and released.

We estimated density (fish/100m<sup>2</sup>) using Microfish population software (Van Deventer and Platts, 1989). Because electrofishing does not effectively sample smaller fish, we did not include fish less than 70 mm total length in population estimates.

### Cruikshank Subbasin

In June 1999 project staff sampled one site in Cruikshank Creek, two sites in Frank Hall Creek, and two sites in Wildcat Creek. Electrofishing methods were the same as those for Canyon Creek.

We took genetic samples from westslope cutthroat trout in Cruikshank, Frank Hall, and Wildcat creeks. A thumbnail size piece of caudal fin was clipped and preserved in a vial containing 5 ml lysis buffer solution. The genetics research lab at the University of Idaho, Moscow analyzed the samples.

## RESULTS

### Canyon Creek

In summer 1999 the lower two sites were not sampled due to high water. We measured a fish density of 12.81 fish/100m<sup>2</sup> at the upper site, slightly lower than that reported in fall 1998. During spring 1999 no westslope cutthroat trout were captured in the upper monitoring site (Figure 1).

Project personnel sampled all three sites in November 1999. Results were similar to those of November 1998 with the exception of the lowermost site, where population estimates increased from 0 fish/100m<sup>2</sup> in 1998 to 1.2 fish/100m<sup>2</sup> in 1999. Also,

### Fish Densities For Canyon Creek Monitoring Sites

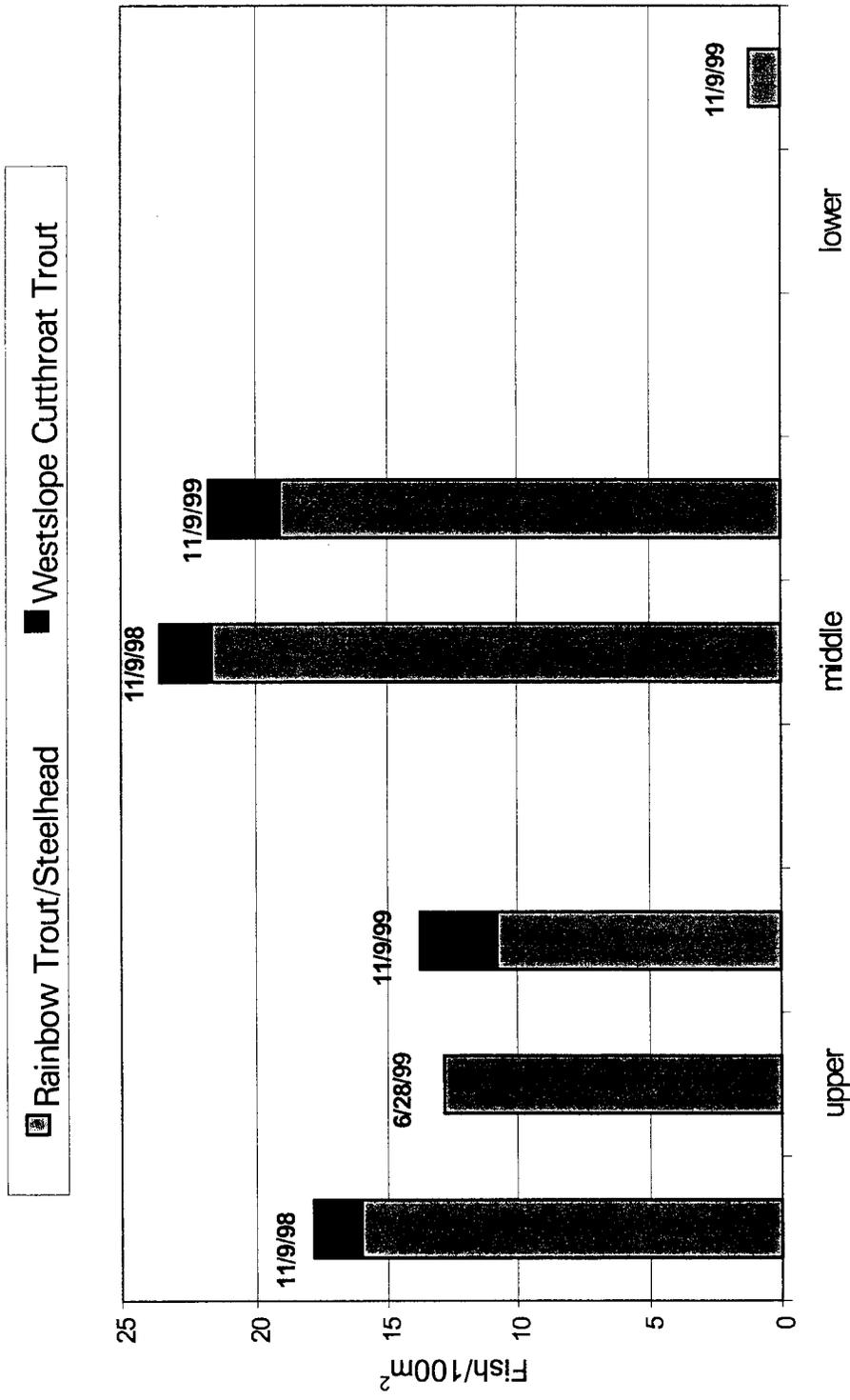


Figure 1. Summary of fish densities in Canyon Creek on three different sample dates.

westslope cutthroat trout densities increased in the fall of 1999 in the two upper sites.

**Cruikshank Subbasin**

We sampled five sites in the Cruikshank subbasin: two in Wildcat Creek, two in Frank Hall Creek, and one on Cruikshank Creek. At these sites westslope cutthroat trout was the only fish species observed. Westslope cutthroat trout densities were higher at the Frank Hall and Wildcat sites than at the Cruikshank site (Table 1).

Table 1. Westslope cutthroat trout and rainbow trout/steelhead population estimates for the Cruikshank subbasin sampled in June 1999.

<u>Stream / Site</u>	Area (m <sup>2</sup> )	Population estimate (fish/100m <sup>2</sup> )	Upper 95% C.I.	Lower 95% C.I.	Capture Probability
Wildcat Creek, upper	40.96	17.10	19.65	14.53	0.875
Wildcat Creek, gate	51.80	11.58	16.82	6.35	0.75
Cruikshank Creek, old cabin	159.21	4.40	5.06	3.74	0.875
Frank Hall Creek, upper	63.50	17.32	21.27	13.38	0.786
Frank Hall Creek, lower	88.18	19.28	28.10	10.46	0.625

**DISCUSSION**

Comparison of results among Canyon Creek sites suggest that westslope cutthroat trout are present in the fall, but not during the spring. This indicates a migratory fluvial population of westslope cutthroat trout in the Canyon Creek system.

On July 25, 1989 Fish and Game staff electrofished Canyon Creek in a similar survey. Ninety-five percent of the fish captured were rainbow trout and the other 5% were rainbow trout/westslope cutthroat trout hybrids (Schrader et al 1992). This supports the conclusion that westslope cutthroat trout over-winter in Canyon Creek and spend spring and summer in the tributary streams.

Reconnecting Canyon Creek to the Lemhi River opened up potential over-winter habitat in the upper Lemhi for Canyon Creek westslope cutthroat trout and provided access to additional spawning and rearing areas for anadromous fish.

Fish densities at sites in the Cruikshank basin are similar with the exception of the old cabin site on Cruikshank Creek. It has a substantially lower fish density than the other headwater streams sampled (Table 1). Anglers have greater access to this portion of Cruikshank Creek, and low fish density may reflect a higher angling mortality. It is also possible that westslope cutthroat trout may have moved upstream to spawn during the sample time.

## LITERATURE CITED

- VanDeventer, J.S. and W.S. Platts. 1989. Microcomputer software system for generating population statistics from electrofishing data – users guide for Microfish 3.0. General Technical Report INT 254. USDA Forest Service, Intermountain Research Station, Boise, Idaho.
- Schrader, W.C., J.R. Lukens and J.A. Davis. 1992. Regional Fishery Management Investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration. F-71-R14, Job 6 (Sal)-c<sup>2</sup>, Job Performance Report, Boise.

## **APPENDICES**



Appendix A. Global Positioning System coordinates for long term monitoring sites, Canyon Creek.

Upper Site	Zone 12	East 0321178	North 4958648
Middle Site	Zone 12	East 0319945	North 4956495
Lower Site	Zone 12	East 0312842	North 4951322

Appendix B. Electrofishing results for Canyon Creek, Idaho.

Site	Date	Area (m <sup>2</sup> )	Population estimate (fish/100m <sup>2</sup> )	Upper 95% Confidence Interval	Lower 95% Confidence Interval	Capture Probability	Observed %Cutthroat
<b>upper</b>	11/9/98	459.8	17.83	22.25	13.42	0.581	10.2
	6/28/99	460.56	12.81	13.81	11.81	0.803	0
	11/9/99	378.6	13.73	14.72	12.75	0.823	21.6
<b>middle</b>	11/9/98	335.14	23.57	26.38	20.76	0.716	8.2
	11/9/99	206.9	21.75	25.95	17.55	0.683	12.2
<b>lower</b>	11/9/98	*	0				0
	11/9/99	170	1.2**	N/A	N/A	N/A	0

\* No fish were captured, therefore no measurements were recorded.

\*\* Total fish observed; sample size too small sample to calculate population estimate.

## 1999 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fishery Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-H: Salmon Region

Job: c<sup>3</sup>

Title: Rivers and Stream Investigations  
- Wild Trout Population Surveys  
- Big Springs Creek

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

Project personnel conducted rainbow trout *Oncorhynchus mykiss* spawning ground surveys the upper Lemhi River to monitor the effects of fishing regulation changes and habitat improvement projects sponsored by the Lemhi Model Watershed Project. We noted a substantial increase in overall counts in 2000 compared to previous years.

Authors:

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## OBJECTIVE

Evaluate the effects of harvest restrictions and habitat improvement efforts on resident rainbow trout *Oncorhynchus mykiss* spawning in the upper Lemhi River.

## STUDY AREA AND METHODS

In 1994 the Idaho Department of Fish and Game initiated informal redd counts for resident rainbow trout on Big Springs Creek, a tributary to the Lemhi River near Leadore, Idaho. In 1997 we established three transect areas to monitor long term trends in the population; two on Big Springs Creek and one on the Lemhi River. The two sites on Big Springs Creek include all of Big Springs Creek as it flows through the Karl Tyler Ranch and the Darwin Neibaur Ranch. The Lemhi River site includes that length of the river within Merrill Beyeler Ranch boundaries.

We conduct redd counts annually between April 20 and May 3. Typically by the third week of April peak spawning activity has ceased, therefore the counts should represent the total spawning activity for the year.

## RESULTS AND DISCUSSION

Table 1 lists redd counts recorded since 1994. In 2000 there was a substantial increase in overall redd counts, particularly on Big Springs Creek. These increases probably reflect several factors: 1) the Idaho Fish and Game Commission imposed a 14" minimum size restriction in 1996; 2) the Lemhi Model Watershed Project began habitat improvement projects in 1995; and 3) water flows increased because of a reprieve in the drought conditions experienced in the late 1980's and early 1990's. Project staff will continue to monitor these sites and evaluate trends in the rainbow trout population.

Table 1. Numbers of resident rainbow trout redds counted in Big Springs Creek (BSC) and Lemhi River, 1994 through 2000.

Date	Lemhi River Beyeler Ranch <sup>a</sup>	BSC Neibaur Ranch <sup>b</sup>	BSC Tyler Ranch <sup>c</sup>	Total
4/26/94	-	-	-	40 <sup>d</sup>
5/3/95	-	57	-	57
5/3/96	7	32	-	39
4/21-5/3/97	8	44	45	97
5/3/98	18	93	124	235
4/29/99	29	39	71	139
4/20/00	23	160	123	306

<sup>a</sup> Habitat improvement project implemented spring 1995.

<sup>b</sup> Habitat improvement project implemented summer 1996.

<sup>c</sup> Habitat improvement project implemented spring 1998.

<sup>d</sup> Incidental count taken during a Lemhi Model Watershed Project habitat survey, includes all of Big Spring Creek.

## 1999 ANNUAL PERFORMANCE REPORT

State Of: Idaho

Program: Fisheries Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-H: Salmon Region

Job: c<sup>4</sup>

Title: Rivers and Streams Investigations  
- Wild Trout Population Surveys  
- Yankee Fork Ranger District Stream Investigations

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

During summer 1998, Idaho Fish and Game and Salmon-Challis National Forest personnel sampled 31 tributaries on the Yankee Fork Ranger District to determine fish species composition, relative abundance and size distribution. Westslope cutthroat trout *Oncorhynchus clarki lewisi* was the predominant species found (27 tributaries). Bull trout *Salvelinus confluentus* were observed in four tributaries, and rainbow trout/steelhead *O. mykiss* were found in three tributaries.

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## **INTRODUCTION**

The Idaho Department of Fish and Game (IDFG) and the Yankee Fork Ranger District (YFRD) of the Salmon-Challis National Forest cooperatively inventoried fish on the YFRD, where there is little comprehensive data available on fishery status. Accurate and current information is needed to effectively manage fish stocks, particularly in light of current or proposed Endangered Species listings of species occurring in the upper Salmon River drainage.

## **OBJECTIVE**

Determine species composition, relative abundance, and size structure of salmonids and other fish species in selected streams in the Yankee Fork Ranger District of Salmon-Challis National Forest.

## **STUDY AREA AND METHODS**

Between July 14 and September 14, 1998, Idaho Department of Fish and Game and Salmon-Challis National Forest fishery personnel surveyed 31 streams on the Yankee Fork Ranger District. Stream characteristics (temperature, gradient, altitude, and area sampled) were recorded. Other site characteristics such as map coordinates and time sampled are on file at both the Yankee Fork Ranger District and at the IDFG, Salmon Regional office.

We sampled by multiple pass electrofishing using a Smith Root SR-15 backpack-shocking unit and attempted to catch all sizes of game and non-game fish. Transects lengths ranged from 50-117 m. Crews worked upstream, with each consecutive pass made immediately after and with equal effort to the previous one, until we achieved a 50% reduction in fishes. Captured fish were measured to total length (mm), placed in holding pens, and monitored for recovery until all passes were completed. Once electrofishing was completed, we returned fish to the general area from which they were captured.

We used Microfish population software (Van Deventer & Platts, 1989) to calculate density estimates (fish sampled per 100m<sup>2</sup>). Because of the difficulties in capturing smaller fish, we did not use fish less than 70 mm in the population estimates; however, they were included in length frequency tables. If the consecutive passes did not achieve the appropriate reduction, no population estimate was listed in this report. Population estimates that include all species and sizes of fish are on location at the Yankee Fork Ranger District office and at the IDFG Salmon Regional office.

## RESULTS AND DISCUSSION

Combined population estimates for all species of trout are shown by sample site in Table 1. Population estimates for individual trout species are listed by site in Tables 2, 3, and 4. Twenty-nine of the 31 streams surveyed had salmonids (Appendix A). Cabin Creek had the highest estimated westslope cutthroat trout *Oncorhynchus clarki lewisi* densities while East Basin Creek and Sunday Creek had the highest densities of rainbow trout/steelhead *O. mykiss* and bull trout *Salvelinus confluentus*, respectively. First and Gardener creeks were the only tributaries where crews did not find salmonids.

Total length data for each trout species are summarized in Tables 5, 6, and 7. We measured 664 salmonids with total lengths of 70 mm or greater: 93.5% westslope cutthroat trout, 4.2% rainbow trout/steelhead, and 2.3% bull trout.

Tributaries with the largest westslope cutthroat trout were Basin Creek (160 mm) and Squaw Creek (159 mm). Seventeen out of 28 tributaries produced westslope cutthroat trout with total lengths greater than 200 mm. Squaw Creek was the only tributary where we found a rainbow trout greater than 200 mm. East Basin Creek produced the one bull trout (340 mm) greater than 200 mm.

Appendix A lists stream sites surveyed, dates of sampling, and transect measurements.

Table 1. Combined trout population estimates, 95% confidence intervals (C.I.), and capture probabilities estimated for selected streams using Microfish software. Only trout > 70 mm total length were used in estimates.

Stream	Transect	Fish Sampled (n)	Population Estimate	Fish/100m <sup>2</sup>	Upper 95% C.I.	Lower 95% C.I.	Capture Probability
Basin Creek	U	8	8	2.27	2.850	1.688	0.8
Bayhorse Creek	M	21	22	7.84	9.336	6.344	0.75
Bayhorse Creek	U	15	15	10.36	11.717	9.001	0.833
Bayhorse Creek	L	14	**	**	**	**	**
Burnt Creek	M	5	**	**	**	**	**
Cabin Creek	L	9	9	31.36	37.798	24.920	0.818
Cash Creek	M	21	23	8.50	10.949	6.056	0.677
Cash Creek	U	13	14	5.49	7.516	3.460	0.684
Cash Creek	L	1	1	0.51	*	*	*
Cinnibar Creek	L	6	6	3.74	4.493	2.983	0.857
Cinnibar Creek	U	1	1	0.65	*	*	*
Cinnibar Creek	M	14	**	**	**	**	**
Coal Creek	L	16	16	11.92	13.319	10.526	0.842
Coal Creek	M	16	16	14.07	15.720	12.424	0.842
Duffy Creek	U	6	6	2.27	3.288	1.242	0.75
Duffy Creek	L	9	9	3.36	4.052	2.672	0.818
Duffy Creek	M	5	5	3.07	3.976	2.170	0.833
East Basin Creek	L	11	11	4.35	5.336	3.356	0.786
East Basin Creek	U	10	**	**	**	**	**
East Basin Creek	M	11	**	**	**	**	**
Happy Hollow Creek	L	3	3	3.74	*	*	*
Hay Creek	L	18	19	15.86	19.824	11.896	0.72
Hay Creek	M	9	9	8.71	10.501	6.924	0.818
Juliette Creek	L	2	2	3.87	*	*	*
Kelley Creek	M	12	12	14.49	17.324	11.662	0.8
Kelley Creek	L	7	7	6.71	7.717	5.706	0.875
Kinnikinic Creek	U	24	25	16.16	19.031	13.290	0.75
Kinnikinic Creek	L	4	4	2.63	3.909	1.348	0.8
Kinnikinic Creek	M	7	7	7.49	8.609	6.365	0.875
Little Basin Creek	U	8	**	**	**	**	**
Little Basin Creek	L	6	6	1.75	2.543	0.961	0.75
Little Basin Creek	M	5	5	1.94	2.513	1.372	0.833
Martin Creek	U	18	18	9.13	9.691	8.574	0.9
Martin Creek	M	19	**	**	**	**	**
Muley Creek	M	15	15	9.79	10.605	8.977	0.882
Muley Creek	L	7	7	8.20	*	*	*
Pack Creek	U	8	8	12.33	13.767	10.886	0.889
Pack Creek	L	18	18	14.84	15.746	13.932	0.9
Peach Creek	U	8	8	3.74	4.175	3.301	0.889

Table 1. (Continued).

Stream	Transect	Fish Sampled (n)	Population Estimate	Fish/100m <sup>2</sup>	Upper 95% C.I.	Lower 95% C.I.	Capture Probability
Peach Creek	M	20	**	**	**	**	**
Peach Creek	L	27	**	**	**	**	**
Rough Creek	L	6	6	9.60	11.539	7.661	0.857
Second Creek	M	3	3	10.60	*	*	*
Second Creek	L	1	1	1.49	*	*	*
Sheep Creek (Squaw)	L	7	7	6.84	9.101	4.571	0.778
Sheep Creek (Squaw)	U	12	12	8.46	8.942	7.971	0.923
Short Creek	U	6	6	12.10	14.540	9.653	0.857
Short Creek	L	3	3	6.22	*	*	*
Squaw Creek	M	5	5	1.47	1.902	1.038	0.833
Squaw Creek	U	26	26	5.97	6.399	5.550	0.867
Sunday Creek	M	6	6	2.35	*	*	*
Thompson Creek	U	13	14	4.24	5.810	2.675	0.684
Thompson Creek	L	4	4	1.09	1.625	0.560	0.8
Thompson Creek	M	16	**	**	**	**	**
Trail Creek	U	17	17	9.78	11.210	8.342	0.81
Trail Creek	M	10	10	8.37	9.785	6.951	0.833
Trail Creek	L	12	12	11.72	13.157	10.280	0.882
Trealor Creek	M	11	11	19.43	22.207	16.663	0.846
Willow Creek	U	15	15	7.23	8.551	5.907	0.789
Willow Creek	L	24	24	11.90	12.866	10.932	0.857
Willow Creek	M	10	10	6.15	6.628	5.664	0.909

\* 100 percent depletion achieved on first pass.

\*\* 50 percent depletion not achieved.

Table 2. Westslope cutthroat trout population estimates, 95% confidence intervals (C.I.), and capture probabilities. Only trout > 70 mm total length were used in estimates.

Stream	Transect	Cutthroat Sampled	Population Estimate	Fish 100/m <sup>2</sup>	Upper 95% C.I.	Lower 95% C.I.	Capture Probability
Basin Creek	U	3	3	0.85	*	*	*
Bayhorse Creek	U	15	15	10.36	11.717	9.001	0.833
Bayhorse Creek	M	21	22	7.84	9.336	6.344	0.75
Bayhorse Creek	L	14	**	**	**	**	**
Burnt Creek	M	5	**	**	**	**	**
Cabin Creek	L	9	9	31.36	37.798	24.920	0.818
Cash Creek	L	1	1	0.51	*	*	*
Cash Creek	M	21	23	8.50	10.949	6.056	0.677
Cash Creek	U	13	14	5.49	7.516	3.460	0.684
Cinnibar Creek	L	6	6	3.74	4.493	2.983	0.857
Cinnibar Creek	U	1	1	0.65	*	*	*
Cinnibar Creek	M	14	**	**	**	**	**
Coal Creek	L	16	16	11.92	13.319	10.526	0.857
Coal Creek	M	16	16	14.07	15.720	12.424	0.85
Duffy Creek	U	6	6	2.27	3.288	1.242	0.75
Duffy Creek	M	5	5	3.07	3.976	2.170	0.833
Duffy Creek	L	9	9	3.36	4.052	2.672	0.818
East Basin Creek	U	10	**	**	**	**	**
Happy Hollow Creek	L	3	3	3.74	*	*	*
Hay Creek	L	18	19	15.86	19.824	11.896	0.72
Hay Creek	M	9	9	8.71	10.501	6.924	0.818
Juliette Creek	L	2	2	3.87	*	*	*
Kelley Creek	L	7	7	6.71	7.717	5.706	0.875
Kelley Creek	M	12	12	14.49	17.324	11.662	0.8
Kinnikinic Creek	L	4	4	2.63	3.909	1.348	0.8
Kinnikinic Creek	M	7	7	7.49	8.609	6.365	0.875
Kinnikinic Creek	U	24	25	16.16	19.031	13.290	0.75
Little Basin Creek	L	6	6	1.75	2.543	0.961	0.75
Little Basin Creek	M	5	5	1.94	2.513	1.372	0.833
Little Basin Creek	U	8	**	**	**	**	**
Martin Creek	M	16	**	**	**	**	**
Martin Creek	U	18	18	9.13	9.691	8.574	0.9
Muley Creek	L	7	7	8.20	*	*	*
Muley Creek	M	15	15	9.79	10.605	8.977	0.882
Pack Creek	L	18	18	14.84	15.746	13.932	0.9
Pack Creek	U	8	8	12.33	13.767	10.886	0.889
Peach Creek	U	8	8	3.74	4.175	3.301	0.889
Peach Creek	M	20	**	**	**	**	**
Peach Creek	L	27	**	**	**	**	**
Rough Creek	L	6	6	9.60	11.539	7.661	0.857
Second Creek	M	3	3	10.60	*	*	*

Table 2. (Continued).

Stream	Transect	Cutthroat Sampled	Population Estimate	Fish 100/m <sup>2</sup>	Upper 95% C.I.	Lower 95% C.I.	Capture Probability
Second Creek	L	1	1	1.49	*	*	*
Sheep Creek (Squaw)	U	12	12	9.20	8.942	7.971	0.867
Sheep Creek (Squaw)	L	7	7	6.84	9.101	4.571	0.778
Short Creek	U	6	6	12.10	14.540	9.653	0.857
Short Creek	L	3	3	6.22	*	*	*
Squaw Creek	M	2	2	0.59	*	*	*
Squaw Creek	U	26	26	5.97	6.399	5.550	0.867
Thompson Creek	U	13	14	4.24	5.810	2.675	0.684
Thompson Creek	M	16	**	**	**	**	**
Trail Creek	M	10	10	8.37	9.785	6.951	0.833
Trail Creek	U	17	17	9.78	11.210	8.342	0.81
Trail Creek	L	12	12	11.72	10.527	13.431	0.882
Trealor Creek	M	11	11	19.43	22.207	16.663	0.846
Willow Creek	L	24	24	11.90	12.866	10.932	0.857
Willow Creek	U	15	15	7.23	8.551	5.907	0.789
Willow Creek	M	10	10	6.15	6.628	5.664	0.909
		621					

\* 100 percent depletion achieved on first pass.

\*\* 50 percent depletion not achieved.

Table 3. Rainbow trout/steelhead population estimates, confidence intervals (C.I.), and capture probabilities. Only trout > 70 mm total length were used in estimates.

Stream	Transect	RBT Sampled	Population Estimate	Rainbow Trout /100m <sup>2</sup>	Upper 95% C.I.	Upper 95% C.I.	Capture Probability
East Basin Creek	M	10	**	**	**	**	**
East Basin Creek	L	11	11	4.35	5.336	3.356	0.786
Squaw Creek	M	3	3	0.88	1.825	-0.061	0.75
Thompson Creek	L	4	4	1.09	1.625	0.560	0.8

\*\* 50 percent depletion not achieved

Table 4. Bull trout population estimates, confidence intervals (C.I.), and capture probabilities. Only trout > 70 mm total length were used in estimates.

Stream	Transect	Bull Trout Sampled	Population Estimate	Bull Trout /100m <sup>2</sup>	Actual Upper C.I.	Actual Lower C.I.	Capture Probability
Basin Creek	U	5	**	**	**	**	**
East Basin Creek	M	1	1	0.44	*	*	*
Martin Creek	M	3	3	1.82	3.776	-0.126	0.75
Sunday Creek	U	6	6	2.35	*	*	*

\* 100 percent depletion achieved on first pass.

\*\* 50 percent depletion not achieved.

Table 5. Westslope cutthroat trout length frequencies for selected streams in the Yankee Fork Ranger District of Salmon-Challis National Forest. Fish of all lengths are included.

Stream	Sample Size	Mean Total Length (mm)	Minimum Total Length (mm)	Maximum Total Length (mm)	Standard Deviation
Basin Creek	3	160.0	155	165	**
Bayhorse Creek	53	124.3	60	230	44.47
Burnt Creek	8	66.9	40	100	**
Cabin Creek	10	91.0	60	110	**
Cash Creek	36	137.8	40	280	48.25
Cinnabar Creek	21	126.2	90	250	37.85
Coal Creek	35	125.1	55	220	42.20
Duffy Creek	20	126.0	70	210	39.26
East Basin Creek	10	141.0	80	205	**
Happy Hollow Creek	5	142.0	65	210	**
Hay Creek	28	118.3	60	220	38.11
Juliette Creek	3	73.3	60	90	**
Kelley Creek	19	110.5	70	235	**
Kinnikinic Creek	37	135.7	55	222	36.80
Little Basin Creek	19	136.7	75	195	**
Martin Creek	34	145.9	90	220	31.68
Muley Creek	35	87.4	45	170	33.80
Pack Creek	26	122.1	85	190	28.47
Peach Creek	59	125.1	55	220	38.32
Rough Creek	6	105.0	90	120	**
Second Creek	4	146.3	70	240	**
Sheep Creek	20	124.5	20	190	48.12
Short Creek	12	90.4	60	125	**
Squaw Creek	28	158.8	100	220	33.93
Thompson Creek	30	126.8	55	250	43.78
Trail Creek	40	130.3	65	205	37.27
Trealor Creek	11	115.5	70	190	**
Willow Creek	51	135.4	60	230	40.20

Table 6. Rainbow trout total lengths for selected streams in the Yankee Fork Ranger District of Salmon-Challis National Forest. Fish of all lengths are included.

<b>Stream</b>	<b>Sample Size</b>	<b>Mean Total Length (mm)</b>	<b>Minimum Total Length (mm)</b>	<b>Maximum Total Length (mm)</b>	<b>Standard Deviation</b>
East Basin Creek	28	97.0	50	165	32.58
Squaw Creek	3	138.3	95	220	**
Thompson Creek	4	138.8	110	165	**

Table 7. Bull trout total lengths for selected streams in the Yankee Fork Ranger District of Salmon Challis National Forest. Fish of all lengths are included.

<b>Stream</b>	<b>Sample Size</b>	<b>Mean Total Length (mm)</b>	<b>Minimum Total Length (mm)</b>	<b>Maximum Total Length (mm)</b>	<b>Standard Deviation</b>
Basin Creek	5	125.0	70	165	**
East Basin Creek	1	340.0	340	340	**
Martin Creek	3	93.3	90	95	**
Sunday Creek	7	116.4	50	160	**

\* No standard deviation calculated due to small sample size.



## LITERATURE CITED

VanDeventer, J.S. and W.S. Platts. 1989. Microcomputer software system for generating population statistics from electrofishing data – users guide for Microfish 3.0. General Technical Report INT 254. USDA Forest Service, Intermountain Research Station, Boise, Idaho.



## **ACKNOWLEDGEMENTS**

We wish to express our appreciation to Eric Grohs and Tom Montoya for their many hours of data compilation and cooperation in the completion of this project.



**APPENDIX**



Appendix A. Site characteristics for selected streams in Yankee Fork Ranger District of Salmon-Challis National Forest.

Stream	Transect	Sample Date	Channel Type	Gradient	Temp (°C)	Length (m)	Mean Width (m)	Area (m <sup>2</sup> )	Altitude (m)
Basin Creek	U	8/17/98	B	4	11	97.5	3.61	352.59	2,191
Bayhorse Creek	U	8/28/98	B	5	11	117.0	1.24	144.84	2,499
Bayhorse Creek	M	8/31/98	B	8	13	78.0	3.60	280.64	2,207
Bayhorse Creek	L	8/31/98	A	12	11	73.2	3.78	276.48	2,019
Burnt Creek	L	9/3/98	B	NA	13	50.9	0.65	32.89	NA
Burnt Creek	M	9/3/98	A	NA	12	73.2	0.73	53.51	1,951
Burnt Creek *	U	9/3/98	B	4	10	65.0	0.70	45.57	2,408
Cabin Creek	L	8/3/98	B	6	15	50.0	0.57	28.65	NA
Cash Creek	L	7/21/98	B	3	15	87.8	2.22	194.78	1,878
Cash Creek	M	7/21/98	B	4	15	97.5	2.77	270.53	1,905
Cash Creek	U	7/21/98	B	5.2	10	107.3	2.38	255.07	2,134
Cinnabar Creek	L	7/28/98	B	3.1	18	87.8	1.83	160.54	NA
Cinnabar Creek	M	7/20/98	B	6.4	16	97.5	1.88	183.13	NA
Cinnabar Creek	U	7/20/98	B	6.5	12	78.0	1.98	154.53	1,951
Coal Creek	L	8/6/98	B	12	11	73.2	1.83	134.23	1,902
Coal Creek	M	8/6/98	B	10	10	82.9	1.37	113.71	2,006
Coal Creek *	U	8/6/98	B	NA	9	97.5	1.41	137.94	1,960
Duffy Creek	U	8/20/98	B	11	10	87.8	3.02	264.89	2,195
Duffy Creek	M	8/18/98	A	16	10	58.5	2.78	162.68	NA
Duffy Creek	L	8/18/98	B	7	11	97.5	2.74	267.56	2,012
East Basin Creek	U	8/21/98	B	8	12	78.0	3.35	261.14	2,012
East Basin Creek	M	8/21/98	B	8	13	58.5	3.92	229.39	1,939
East Basin Creek	L	8/7/98	B	3.7	17	68.3	3.71	253.05	1,920
First Creek *	U	7/22/98	B	NA	9	NA	NA	NA	NA
Gardener Creek *	M	7/14/98	B	6.2	11	68.3	1.08	73.88	2,098
Happy Hollow Creek	L	9/2/98	B	6	8	58.5	1.37	80.27	2,256
Hay Creek	L	8/20/98	B	10	10	75.0	1.60	119.79	2,012
Hay Creek	M	8/20/98	A	16	9	70.0	1.48	103.27	2,134
Juliette Creek	L	8/31/98	B	6	10	58.5	0.88	51.73	2,080

Appendix A. (Continued).

Stream	Transect	Sample Date	Channel Type	Gradient	Temp (oC)	Length (m)	Mean Width (m)	Area (m2)	Altitude (m)
Kelley Creek	L	8/7/98	B	2.5	12	73.2	1.43	104.35	1,963
Kelley Creek	M	8/7/98	B	2.7	14	68.3	1.21	82.82	2,024
Kelley Creek *	U	8/7/98	B	5	12	NA	NA	NA	1,890
Kinnikinic Creek	M	8/4/98	B	2	9	50.3	1.86	NA	2,347
Kinnikinic Creek	U	8/3/98	B	5.5	8	87.8	1.76	154.65	NA
Kinnikinic Creek	L	8/4/98	B	4.9	10	57.9	2.63	152.16	2,195
Little Basin Creek	L	8/18/98	B	5	10	87.8	3.90	342.48	2,042
Little Basin Creek	M	8/18/98	B	8	9	87.8	2.93	257.39	2,073
Little Basin Creek	U	8/18/98	B	6	8	107.3	2.87	308.05	2,164
Martin Creek	U	8/24/98	B	10	8	63.4	3.11	197.10	2,262
Martin Creek	M	8/24/98	B	10	10	68.3	2.41	164.40	2,080
Muley Creek	L	7/15/98	B	5	12	70.0	1.22	85.40	2,005
Muley Creek *	U	7/15/98	B	NA	12	70.0	1.04	72.80	2,182
Muley Creek	M	7/15/98	B	18	12	68.3	2.24	153.16	2,076
Pack Creek	L	8/26/98	B	6	9	100.0	1.21	121.31	2,316
Pack Creek	U	8/26/98	B	16	9	50.0	1.30	64.92	2,509
Peach Creek	M	7/13/98	B	3.28	13	117.0	3.41	399.56	2,009
Peach Creek	U	7/13/98	B	5.1	11	97.5	2.19	214.05	NA
Peach Creek	L	7/14/98	B	5.6	10	87.8	2.39	209.77	2,004
Rough Creek	L	8/26/98	B	10	9	50.0	1.25	62.48	2,304
Second Creek *	U	7/22/98	B	NA	12	58.5	0.57	33.53	2,304
Second Creek	M	7/22/98	B	7.2	15	50.0	0.57	28.35	1,951
Second Creek	L	7/22/98	B	7	13	100.0	0.67	67.06	1,890
Sheep Creek (Squaw)	U	9/14/98	A	NA	9	80.0	1.77	141.91	NA
Sheep Creek (Squaw)	L	9/14/98	A	NA	9	70.0	1.46	102.41	2,076
Short Creek	U	8/20/98	B	7	14	58.5	0.85	49.59	2,134
Short Creek	L	8/20/98	B	6	13	58.5	0.82	48.16	1,951
Squaw Creek	U	7/27/98	C	3.1	14	117.0	3.72	435.23	2,256
Squaw Creek	M	8/25/98	B	8	10	78.0	4.36	340.10	1,918

Appendix A. (Continued).

Stream	Transect	Sample Date	Channel Type	Gradient	Temp (°C)	Length (m)	Mean Width (m)	Area (m <sup>2</sup> )	Altitude (m)
Squaw Creek *	L	8/25/98	B	6	14	97.5	4.69	457.83	1,819
Sunday Creek	M	8/17/98	B	4	10	97.5	2.62	255.67	2,192
Sunday Creek *	U	8/6/98	B	3	11	48.8	1.18	57.67	2,329
Thompson Creek	L	7/29/98	B	4.2	15	87.8	4.17	366.02	NA
Thompson Creek	M	7/28/98	B	2.3	12	58.5	3.54	206.91	NA
Thompson Creek	U	7/28/98	B	4.7	11	97.5	3.38	329.99	NA
Trail Creek	M	9/1/98	B	9	11.5	50.9	2.35	119.46	2,016
Trail Creek	U	9/1/98	B	3	10.5	79.2	2.19	173.91	2,225
Trail Creek	L	9/1/98	B	6	12.5	68.3	1.50	102.39	1,969
Trealar Creek *	L	7/16/98	B	5.7	13	78.0	0.55	43.29	1,951
Trealar Creek *	U	7/16/98	B	10	9	68.3	0.60	41.20	2,134
Trealar Creek	M	7/16/98	B	5.7	9	68.3	0.83	56.60	2,071
Willow Creek	L	8/27/98	C	4	10	78.0	2.58	201.68	2,249
Willow Creek	U	8/27/98	B	6	7	97.5	2.13	207.51	2,362
Willow Creek	M	8/27/98	C	4	9	87.8	1.85	162.68	2,298

\* No salmonids found in transect

## 1999 ANNUAL PERFORMANCE REPORT

State Of: Idaho

Program: Fisheries Management F-71-R-24

Project I: Surveys and Inventories

Subproject I-H: Salmon Region

Job: c<sup>5</sup>

Title: Rivers and Streams Investigations  
- Valley Creek Brook Trout Reduction

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

Since 1995 Idaho Fish and Game personnel have electrofished and removed 25,737 brook trout *Salvelinus fontinalis* from Valley Creek to open habitat for native fishes. To reestablish native fishes, we have stocked 102,902 native bull trout *S. confluentus*, westslope cutthroat trout *Oncorhynchus clarki lewisi* and rainbow trout/westslope cutthroat trout hybrids from adjacent watersheds.

Members of the Shoshone Bannock Indian Tribes snorkeled in Valley Creek and found that brook trout densities have declined substantially since we began reduction efforts. However there has not been a corresponding increase in numbers of native fish. Throughout the drainage native fishes are present in low numbers in areas that previously contained only brook trout. We believe that it will take more time before increases in native fish populations are apparent.

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## INTRODUCTION

The Idaho Department of Fish and Game (IDFG) is involved in numerous research and management projects to return to fishable levels those native fish stocks federally listed as threatened or endangered (or proposed for listing). The IDFG Salmon Region is attempting to reestablish native fishes into Valley Creek, in the Sawtooth Valley near Stanley, Idaho.

Native salmonid fishes of the Valley Creek drainage include chinook salmon *Oncorhynchus tshawytscha*, steelhead/rainbow trout *O. mykiss*, bull trout *Salvelinus confluentus*, westslope cutthroat trout *O. clarki lewisi* and mountain whitefish *Prosopium williamsoni*. The only salmonids known to be introduced in the watershed are brook trout *S. fontinalis* and lake trout *S. namaycush*. Lake trout are confined to Stanley Lake and have never been observed elsewhere in the basin.

We suspect that brook trout in both Valley Creek and other western watersheds may suppress the reestablishment of native fishes if numbers of native fishes have been driven below some threshold level. Habitat loss, historically liberal fishing regulations and the introduction of brook trout have compromised native fishes stocks in Valley Creek.

To help reestablish native fishes in Valley Creek the IDFG is reducing brook trout numbers. This is not an attempt to eliminate brook trout from the watershed, although this would be a desirable result. Complete removal of brook trout would be physically, and most likely, socially impossible to implement. The objective is to open niches for wild stocks and to increase the size of remaining brook trout, thus making them more appealing to anglers. Although brook trout are abundant in the watershed, anglers do not generally target the fish, due to their small size.

In 1995 we began to reduce brook trout numbers in Valley Creek. This report summarizes project results for the first 5 years.

## OBJECTIVES

1. Evaluate the effectiveness of multiple-pass and multiple-year electrofishing on reducing numbers of brook trout.
2. Assess the reintroduction of native cutthroat and bull trout from nearby streams for reestablishment of a fishable population.

## STUDY AREA

Valley Creek is located in Custer County in central Idaho. It flows into the Salmon River at river km 609.0, and is bordered by the Sawtooth Mountains on the south and the headwaters of the Middle Fork Salmon River on the north (Figure 1). Elevation ranges from

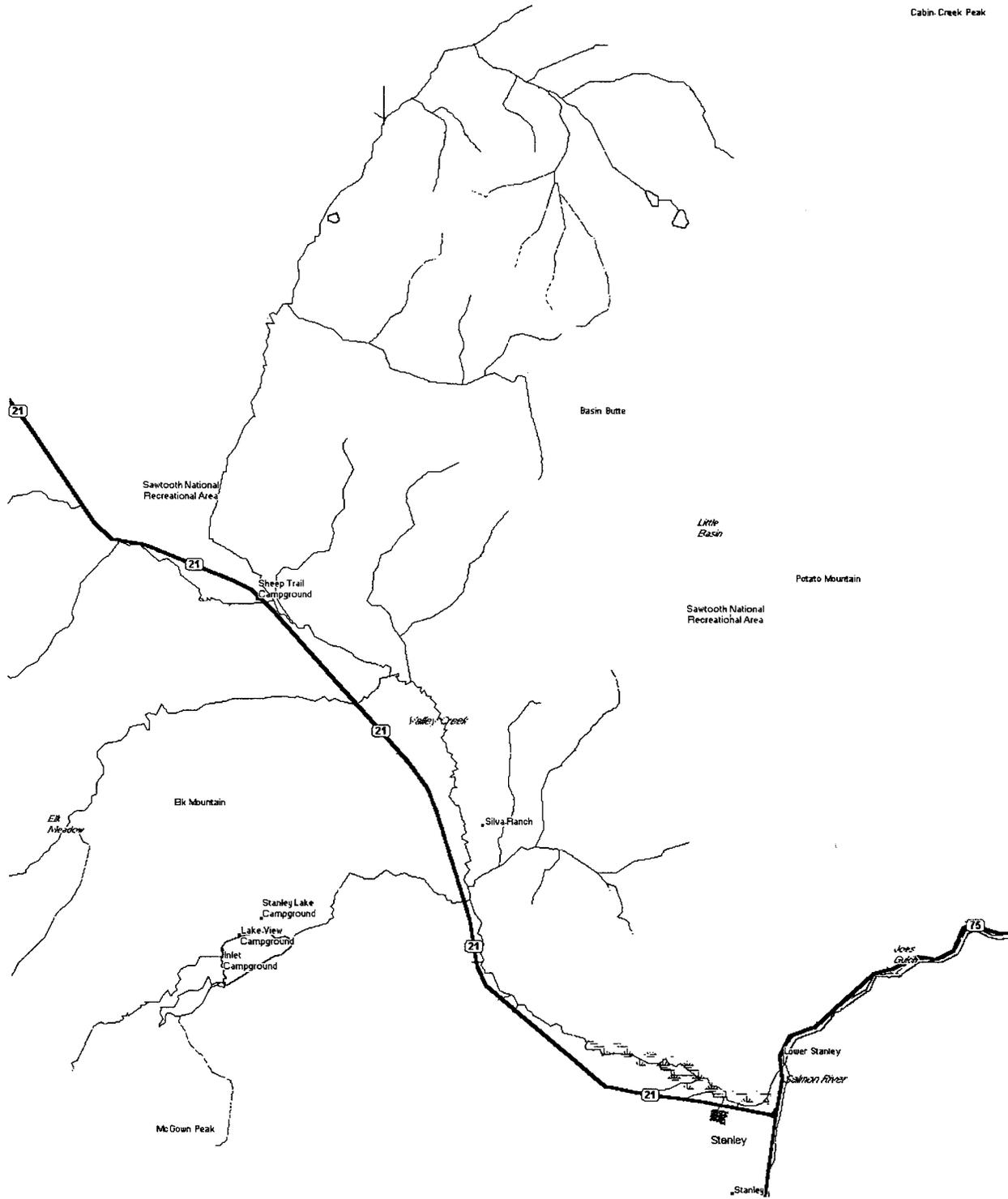


Figure 1. Map of the Valley Creek drainage, central Idaho.

1,887 to 3,277 m. Land uses within the watershed are typical of central Idaho and include recreation, grazing, and very limited private mining and timber harvest.

Our study area begins 9.6 km upstream from Valley Creek's confluence with the Salmon River and extends upstream for approximately 12 km. The lower 0.8 km of Elk Creek, East Fork Valley Creek and several unnamed sloughs and side tributaries are also included.

## **METHODS**

Project personnel used Smith-Root SR-15 backpack units and attempted to catch all sizes of game fishes encountered. Native fishes were identified and immediately released unharmed. Brook trout were placed on the stream bank.

We recorded numbers of brook trout removed; other species were noted in general terms at the end of each removal effort. Annual effort varied depending on schedules, available personnel, and funding.

IDFG staff also electrofished nearby tributaries to capture native fishes for restocking the study area. All sizes of westslope cutthroat trout and bull trout were captured and released in Valley Creek, usually the same day of capture. Additionally, we collected adult westslope cutthroat trout in the spring by angling and by upstream trapping at Dagger Falls on the Middle Fork Salmon River.

To evaluate basin-wide changes in fish populations, we depended on existing anadromous fish reports. Snorkel surveys, conducted by the Shoshone-Bannock Indian Tribes, provided an independent evaluation of the project with no additional cost or effort to the IDFG.

## **RESULTS AND DISCUSSION**

### **Removal Efforts**

IDFG project personnel have removed 25,737 brook from the Valley Creek watershed since 1995 (Table 1). Densities of all size classes of brook trout have declined also (Figures 2-4). This data suggest the reduction program is effectively impacting the brook trout population. The benefits of this impact are not yet apparent in other native salmonid populations (Figure 5); however, it will take several fish generations before any valid conclusions can be drawn.

Table 1. Number of brook trout removed from Valley Creek 1995-1999.

Year	No. of Brook Trout Removed
1995	193
1996	4,804
1997	16,025
1998	4,503
1999	212
Total	25,737

### **Reintroduction Efforts**

To date IDFG has stocked 102,902 native fishes of various sizes into Valley Creek. Sources were primarily local watersheds (Table 2). The largest single stocking was on September 26, 1996 when 100,000 Montana strain westslope cutthroat were stocked. We believe this was largely a failure, as some of these fish retained at Sawtooth hatchery had very poor survival.

In 1997 project personnel transported larger westslope cutthroat trout (294-389 mm), believed to be pre-spawning adults, from the Middle Fork Salmon River to Valley Creek. We implanted these fish with radio transmitters to evaluate both retention time and spawning behavior (Liter et al. 2000, in preparation). Results from this and subsequent plants indicate the fish remain in Valley Creek for up to 1 month after stocking.

We now believe the westslope cutthroat trout used in the tracking experiment were not ready for spawning. Although the fish appeared large and gravid, we later discovered that they had a high condition factor and were probably not mature enough to spawn until the following spring. In the future, we will attempt to collect actual spawners by trapping earlier in spring to overlap with the spawning migration to the upper Middle Fork Salmon River.

### **RECOMMENDATIONS**

1. Continue to have Shoshone-Bannock Indian Tribe fisheries staff snorkel Valley Creek to evaluate response of brook trout and native fish stocks to brook trout reduction.
2. Refine the collection of westslope cutthroat trout spawners in the Middle Fork Salmon River to ensure that only ripe fish are transported to Valley Creek.
3. Evaluate actual costs of brook trout reduction to determine if the program is successful and cost-effective.

Table 2. Fish stocked in Valley Creek 1995 through 1999.

<b>1995</b>				
Date	Species <sup>a</sup>	Number	Size (mm)	Source
10/12	C2	10	75 - 280	Upper Yankee Fork Salmon River
10/12	C2	6	75 - 280	Upper Yankee Fork Salmon River
10/12	C2	20	75 - 280	Upper Yankee Fork Salmon River
10/12	C2	9	75 - 280	Upper Yankee Fork Salmon River
10/12	C2	7	75 - 280	Upper Yankee Fork Salmon River
10/12	C2	14	75 - 280	Upper Yankee Fork Salmon River
10/12	C2	<u>30</u>	75 - 280	Upper Yankee Fork Salmon River
	<b>Total</b>	<b>96</b>		
9/29	BU	7	75 - 280	Upper Yankee Fork Salmon River
10/12	BU	<u>7</u>	75 - 280	Upper Yankee Fork Salmon River
	<b>Total</b>	<b>14</b>		
<b>1996</b>				
Date	Species	Number	Size (mm)	Source
6/19	C2	9	N / A	Salmon River (Below MFSR)
6/19	C2	5	N / A	Middle Fork Salmon River (Dagger Falls)
6/24	C2	15	310	Middle Fork Salmon River and Salmon River
7/31	C2	13	120 - 360	Middle Fork Salmon River (Dagger Falls)
9/26	C2	100,000	25	Montana strain
10/5	C2	125	N / A	Grouse Creek (Loon Creek Tributary)
10/15	C2	25	75 - 210	Fisher Creek (Salmon River Tributary)
10/15	C2	325	75 - 290	Grouse Creek (Loon Creek Tributary)
10/16	C2	25	N / A	Fisher Creek (Salmon River Tributary)
10/17	C2	<u>200</u>	N / A	Grouse Creek (Loon Creek Tributary)
	<b>Total</b>	<b>100,742</b>		
10/5	BU	6	N / A	West Fork Mayfield Creek (Loon Creek Tributary)
10/16	BU	<u>20</u>	N / A	West Fork Mayfield Creek (Loon Creek Tributary)
	<b>Total</b>	<b>26</b>		
<b>1997</b>				
Date	Species	Number	Size (mm)	Source
6/17	C2	10	>300	Middle Fork Salmon River (Dagger Falls)
6/23	C2	71	>300	Middle Fork Salmon River (Dagger Falls)
9/5	C2	144	100 - 250	Rapid River (Middle Fork Salmon River Tributary)

<sup>a</sup> C2 = westslope cutthroat trout, BU = bull trout, RC = rainbow trout/cutthroat trout hybrid.

Table 2. (Continued).

Date	Species <sup>a</sup>	Number	Size (mm)	Source
9/29	C2	77	100 - 300	Morse Creek (Pahsimeroi River Tributary)
10/3	C2	110	100 - 325	Morse Creek (Pahsimeroi River Tributary)
10/6	C2	118	75 - 300	McKim Creek (Pahsimeroi River Tributary)
10/9	C2	<u>181</u>	N / A	Morgan Creek
<b>Total Cutthroat</b>		<b>711</b>		
9/5	BU	15	90 - 280	Rapid River (Middle Fork Salmon River Tributary)
9/29	BU	56	90 - 280	Morse Creek (Pahsimeroi River Tributary)
10/3	BU	67	90 - 280	Morse Creek (Pahsimeroi River Tributary)
10/6	BU	55	75 - 320	McKim Creek (Pahsimeroi River Tributary)
10/9	BU	<u>22</u>	N / A	Morgan Creek (Pahsimeroi River Tributary)
<b>Total</b>		<b>215</b>		
9/5	RC	<u>5</u>	100 - 160	Rapid River (Middle Fork Salmon River Tributary)
<b>Total</b>		<b>5</b>		
<hr/>				
<b>1998</b>				
Date	Species	Number	Size (mm)	Source
6/9-7/2	C2	203	255-357	Middle Fork Salmon River (Dagger Falls)
6/18	C2	42	127-255	Morse Creek (Pahsimeroi River Tributary)
10/14	C2	173	75-204	Grouse Creek (Loon Creek Tributary)
10/14	C2	<u>4</u>	75-204	Morse Creek (Pahsimeroi River Tributary)
<b>Total</b>		<b>422</b>		
6/18	BU	19	127-255	Morse Creek (Pahsimeroi River Tributary)
10/14-15	BU	<u>317</u>	75-306	Morse Creek (Pahsimeroi River Tributary)
<b>Total</b>		<b>336</b>		
<hr/>				
<b>1999</b>				
Date	Species	Number	Size (mm)	Source
10/5	C2	64	87 -232	Float Creek (Rapid River Tributary)
10/6	C2	179	87 -232	Float Creek (Rapid River Tributary)
10/6	C2	<u>24</u>	87 -232	Vanity Creek (Rapid River Tributary)
<b>Total</b>		<b>267</b>		

<sup>a</sup> C2 = westslope cutthroat trout, BU = bull trout, RC = rainbow trout/cutthroat trout hybrid.

Table 2. (Continued).

Date	Species <sup>a</sup>	Number	Size (mm)	Source
10/5	BU	6	87 -232	Float Creek (Rapid River Tributary)
10/6	BU	29	87 -232	Float Creek (Rapid River Tributary)
10/6	BU	33	87 -232	Vanity Creek (Rapid River Tributary)
<b>Total</b>		<b>68</b>		

<sup>a</sup> C2 = westslope cutthroat trout, BU = bull trout, RC = rainbow trout/cutthroat trout hybrid.

Brook Trout <90mm

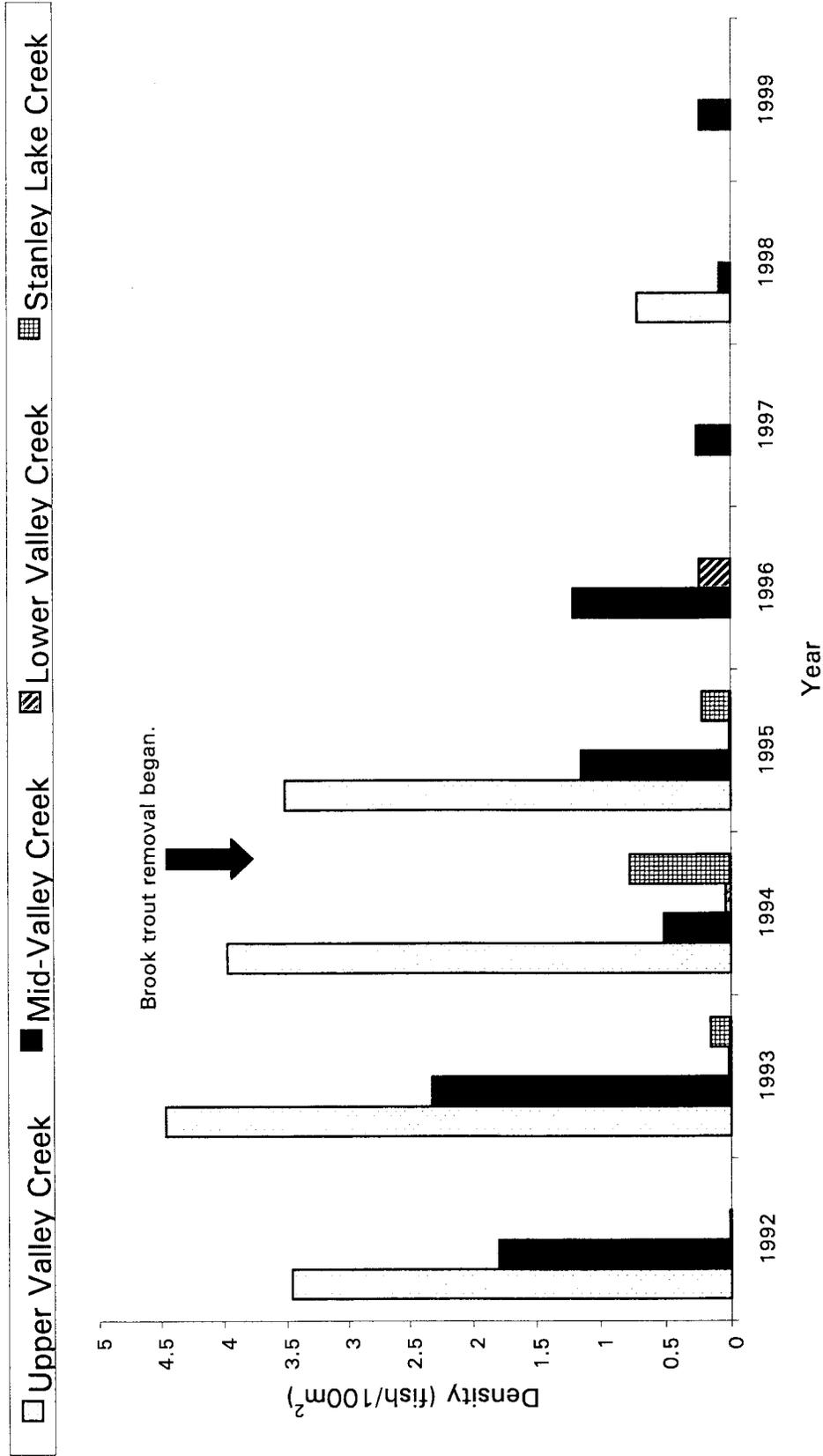


Figure 2. Density of Brook trout < 90 mm total length in Valley Creek, 1992 – 1999 (Data provided by Shoshone-Bannock Indian Tribes, Idaho Supplementation and General Parr Monitoring studies).

### Brook Trout 90-170mm

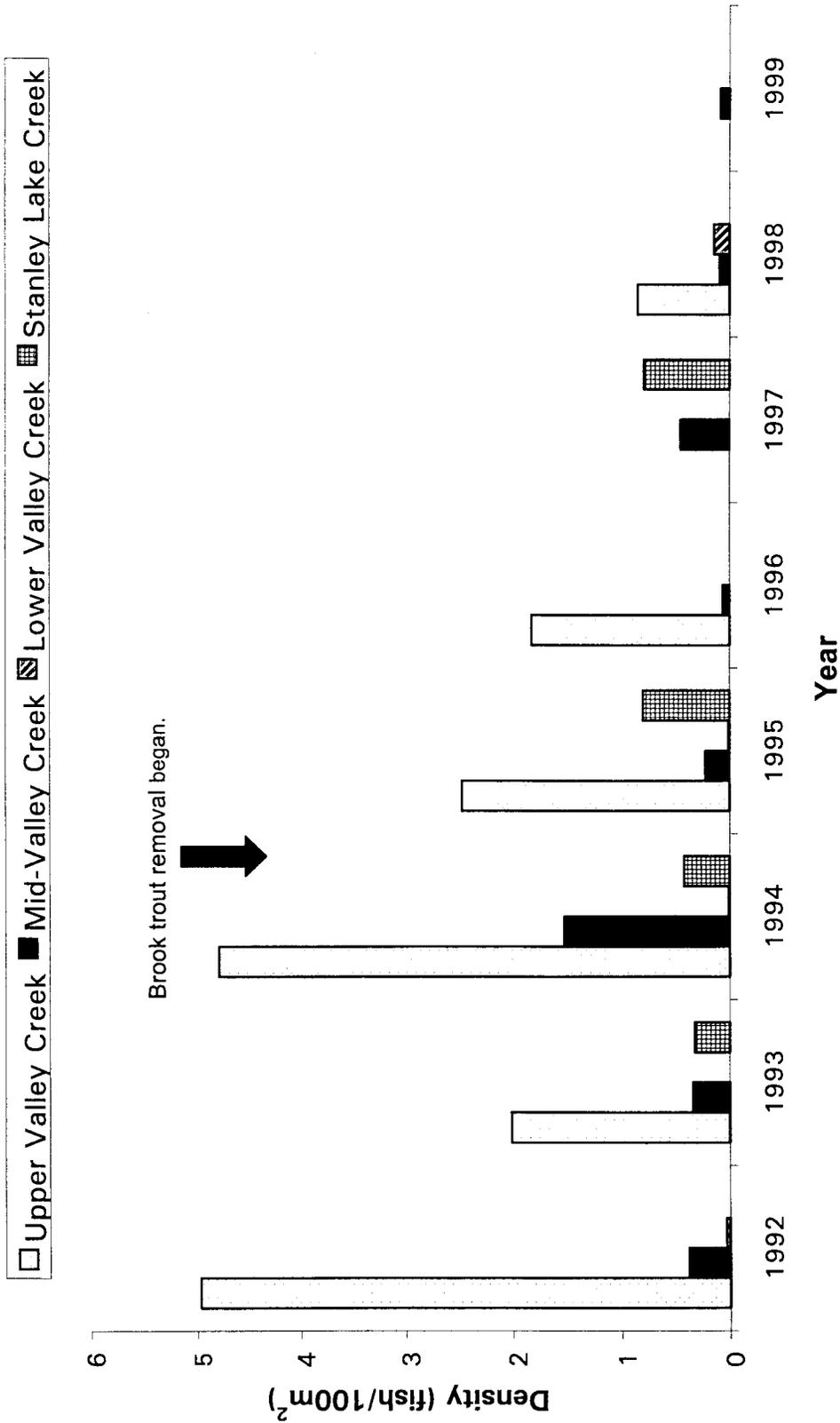


Figure 3. Density of brook trout 90 – 170 mm total length in Valley Creek, 1992 – 1999 (Data provided by Shoshone-Bannock Indian Tribes, Idaho Supplementation and General Parr Monitoring studies).

Brook Trout > 170mm

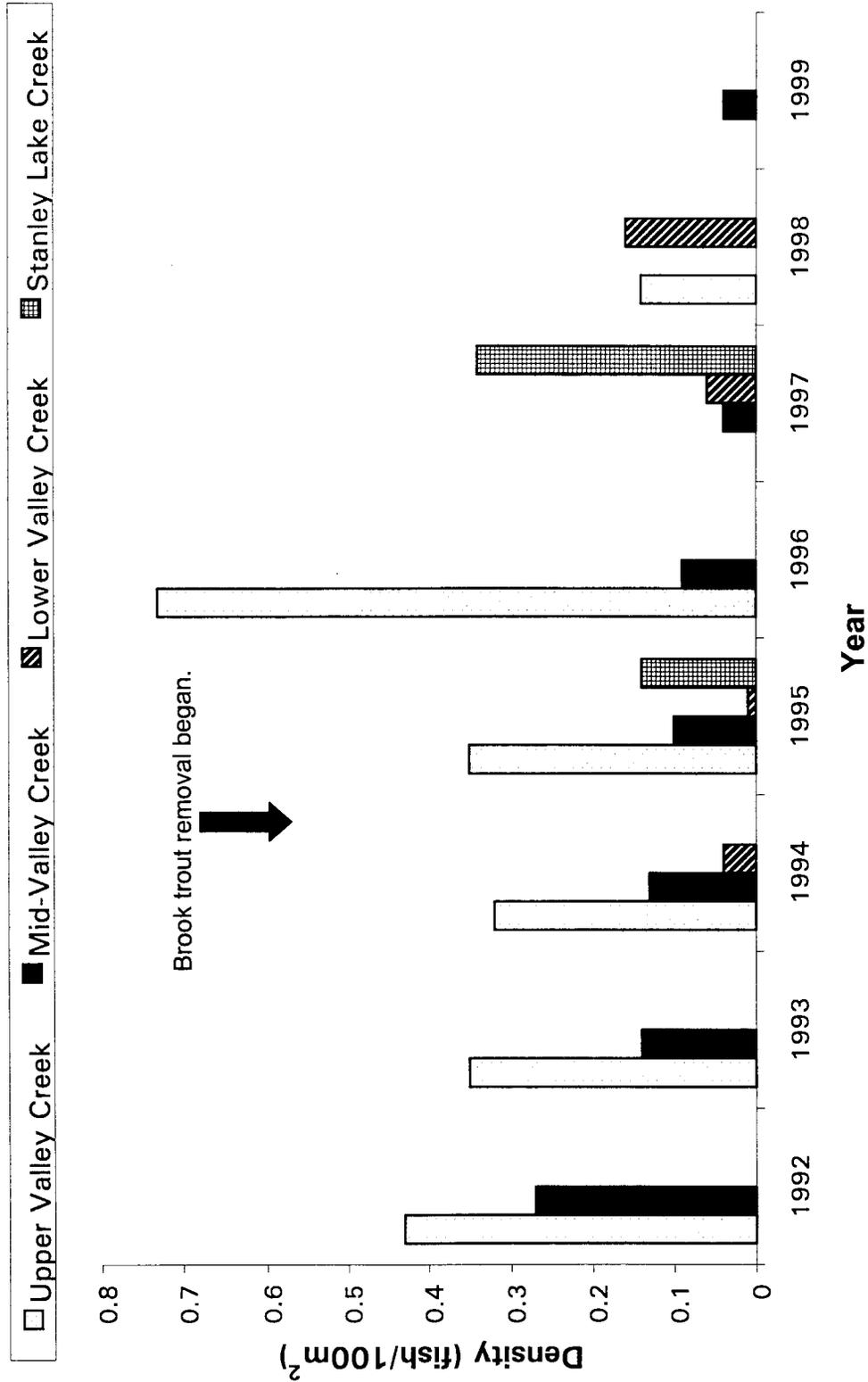


Figure 4. Density of brook trout > 170 mm total length in Valley Creek, 1992 – 1999 (Data provided by Shoshone-Bannock Indian Tribes, Idaho Supplementation and General Parr Monitoring studies).

### Bull Trout, Westslope Cutthroat Trout, and Steelhead Densities

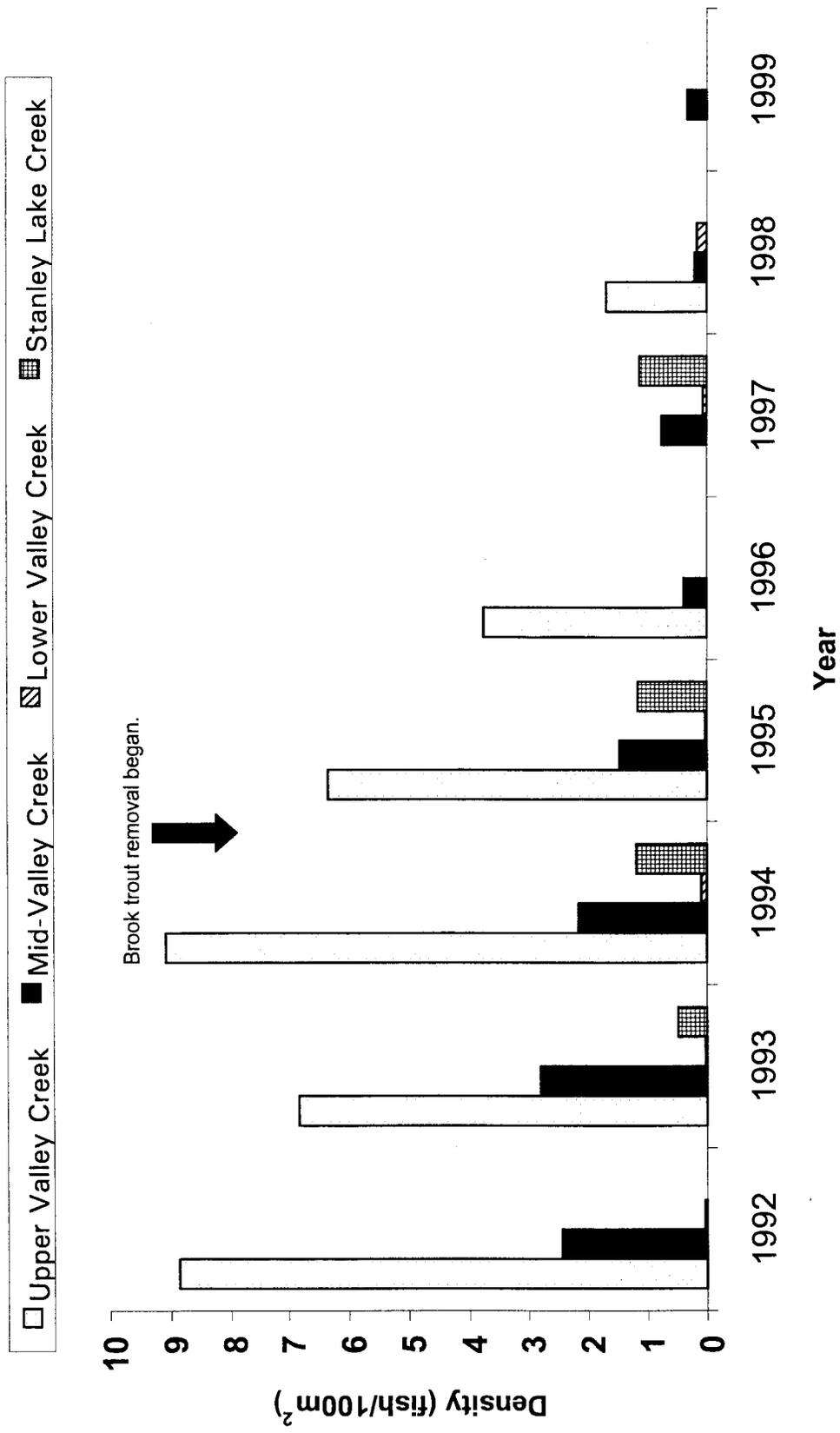


Figure 5. Population densities of bull trout, westslope cutthroat trout and steelhead in Valley Creek, 1992-1999.

## LITERATURE CITED

Liter, M., T. Curet and M. Larkin. 2000, in preparation. Regional fishery management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, F-71-R-23, Job Performance Report, Boise.

## 1999 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fishery Management F-71-R-24

Project II: Technical Guidance

Subproject II-H: Salmon Region

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

During 1999, project staff provided technical assistance, as time allowed, to all requesting state and federal agencies. We submitted comments to agencies and private entities concerning stream alterations, bank stabilization, mining operations and reclamation plans, fish rearing proposals, private ponds, water right applications, grazing allotments, timber sales, highway reconstruction, habitat improvements, bridge reconstruction and hydropower projects. We also conducted on-site inspections of proposed, on-going and completed projects.

Idaho Department of Fish and Game personnel participated in angler informational meetings, school presentations, multi-agency and private landowner collaborative groups, and the 1-800-ASK-FISH program. Of the estimated 45,000 anglers that fish in the Salmon region, approximately 90% live outside the area. Because these anglers are not familiar with our waters, we respond to over 2,500 requests for basic information on fishing opportunities, techniques, regulations and area specifics.

#### Authors:

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## OBJECTIVES

1. Assist the Idaho Department of Water Resources, the Idaho Department of Lands, the US Army Corps of Engineers and other state, federal, local and private entities in evaluating the effects of habitat manipulation on fish and fish habitat.
2. Recommend procedures that minimize adverse effects on aquatic habitat and fish caused by stream course alterations.
3. Provide information on all aspects of fisheries and aquatic habitat as requested.

## METHODS

We responded to most requests for data, expertise, and recommendations from individuals, government agencies, and corporations. Project staff attended meetings, conducted field inspections, and generated responses as appropriate.

## RESULTS

During 1999, we responded via letters, e-mail, field inspections, meetings, and reports to requests for technical assistance or comments on water and fishery-related matters as follows:

Agency	Number of Requests
Idaho Outfitters and Guides Licensing Board	2
USDA Forest Service	12
Idaho Department of Water Resources	49
Idaho Department of Transportation	2
Private and Miscellaneous	12
US Army Corps of Engineers	17
Custer/Lemhi County Commissioners	2
Shoshone-Bannock Indian Tribe	3
Lemhi County Building and Safety Inspector	2
Idaho Division of Environmental Quality	3
Idaho Department of Lands	2
US Bureau of Land Management	1
US Fish and Wildlife Service	2
National Marine Fisheries Service	20
Mining Industry	2

Private Fish Pond Owners	6
Cities of Salmon, Challis and Stanley	3
US Marshal's Office	1

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Total = 127

Project personnel usually contacted agencies and private landowners by telephone. Commonly, we responded to stream alteration proposals by meeting with the applicant on-site, determining the nature of the situation, and sending written or verbal comments to the appropriate agency. Due to the remoteness of the Salmon Region, we were often the only agency representatives available to conduct on-site inspections.

We responded to numerous inquiries from the public (via telephone, letter and in person) about when, where, and how to participate in regional fisheries, ranging from steelhead angling to alpine lake fishing.

We reported weekly steelhead fishing results on the local radio station and in area newspapers throughout the season.

Fisheries staff helped private landowners form a collaborative group to deal with natural resource issues in Custer County and a second group specifically for East Fork Salmon River issues. The Custer County Group was successful in obtaining an additional \$50,000 from Bonneville Power Administration for fishery habitat improvement projects and the East Fork Group obtained a total of \$32,000 from the US Forest Service Intermountain Region Partnership Fund, the Idaho Conservation League, and the Fish America Foundation.

Because the Salmon Region has no full-time Information and Education personnel, we respond to numerous requests by local schools for fish and wildlife related presentations. During 1999, Salmon Region fisheries personnel gave 21 presentations to approximately 250 students in five different schools.

### RECOMMENDATIONS

1. Technical guidance on issues involving fishery resources in the Salmon Region should be continued to assist in maintaining fishery resources in the region.
2. Because of the number of requests for technical guidance and the potential impacts of projects to remaining fish resources in the Salmon Region, consideration should be given to adding staff to administer habitat issues.

## 1999 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fishery Management F-71-R-24

Project III: Habitat Management

Subproject III-H: Salmon Region

Contract Period: July 1, 1999 to June 30, 2000

### ABSTRACT

During 1999, project personnel completed construction of an urban fishing pond in Challis. We obtained \$50,000 from Bonneville Power Administration for work on a 12-mile reach of the Salmon River near Challis, Idaho. We contracted for a detailed river study through the University of Idaho, Boise Eco-hydraulics office. A Master's Degree candidate should complete the study in spring 2000.

Fisheries staff continued work on habitat restoration projects with the Idaho Department of Fish and Game Fish Screen Program, the Natural Resource Conservation Service, and the Lemhi Model Watershed Program. We completed nine projects with the Lemhi Model Watershed Program involving stream bank stabilization and riparian fencing. Canyon Creek, a small tributary stream near Leadore, was reconnected to the Lemhi River.

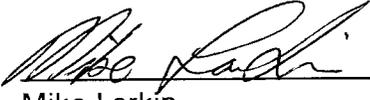
We are helping write a proposal to reconnect Falls Creek to the Pahsimeroi River in cooperation with four ranchers. Another proposal to convert to sprinkler irrigation on two ranches in the lower Pahsimeroi River will restore fish access to about 3 miles of habitat and eventually open up an additional 12.5 miles of habitat in Big Springs Creek.

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**Approved by:**

IDAHO DEPARTMENT OF FISH AND GAME



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