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Jerry M. Conley, Director

FEDERAL AID IN FISH RESTORATION

Job Performance Report

Project F-71-R-16

REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

Job No. 7-a	Region 7 Mountain Lake Investigations
Job No. 7-b	Region 7 Lake and Reservoir Investigations
Job No. 7-c[1]	Region 7 River and Stream Investigations-Salmon and Middle Fork Salmon River Snorkeling Transects and Middle Fork Salmon River Creel Census
Job No. 7-c[2]	Region 7 River and Stream Investigations-Lemhi and Pahsimeroi River Wild Trout and Habitat Surveys and Salmon River Creel Survey
Job No. 7-d	Region 7 Technical Guidance
Job No. 7-e	Region 7 Salmon and Steelhead Investigations

By

Mark Liter, Regional Fishery Biologist
James R. Lukens, Regional Fisheries Manager

November 1992

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JOB PERFORMANCE REPORT

STATE OF: Idaho

NAME: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO.: F-71-R-16

TITLE: Region 7 Mountain Lake Investigations

JOB NO.: 7-a

PERIOD COVERED: July 1, 1991 to June 30, 1992

ABSTRACT

In 1991, 48 lakes in the Sawtooth Wilderness and 60 lakes in the Challis National Forest were stocked with fish. A Hughes 500D helicopter was used to stock the lakes at a cost of $33.38 per lake ($3,604.80 total cost). A total of 32,000 fry were stocked in Sawtooth Wilderness lakes: 4,000 rainbow trout, 3,750 grayling, and 24,250 cutthroat trout (Table 1). In the Challis National Forest, 36,000 fry were stocked: 1,500 rainbow trout, 2,500 grayling, and 32,000 cutthroat trout (Table 2).

Surveys were conducted on eight alpine lakes, including three in the Challis National Forest and five in the Salmon National Forest (Tables 3-10). Each lake was surveyed for use, status of fishery, and fish population parameters.

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Table 1. Sawtooth Wilderness mountain lake fry plants, 1991.

Lake name	Number stocked	Species[a]
Hidden Lake	1,000	C2
Elizabeth Lake	500	C2
Hanson Lake #1	500	C2
Hanson Lake #3	1,000	C2
Hanson Lake 15	250	C2
McGowan Lake 11	500	RB
McGowan Lake 13	500	RB
Iron Creek	500	C2
Iron Creek	500	RB
Goat Creek	500	C2
Goat Creek	500	C2
Goat Creek	500	C2
Goat Creek	1,000	C2
Marshall Lake #2	500	C2
Thompson Cirque Lake	500	C2
Fishhook Creek #2	250	C2
Fishhook Creek #3	250	C2
Stephens Lake	500	C2
Saddleback Lake 11	500	C2
Saddleback Lake #2	500	C2
Upper Redfish Lake #2	500	C2
Upper Redfish Lake 11	1,000	GR
Upper Cramer Lake	1,000	C2
Hell Roaring Lake	2,500	C2
Hell Roaring Lake	750	GR
Decker Lake #1	500	C2
Hell Roaring Lake 11	750	C2
Hell Roaring Lake #2	500	C2
Hell Roaring Lake #15 (Profile)	750	C2
Hell Roaring Lake 114 (Lucille)	750	C2
Imogene Lake 12	500	C2
Imogene Lake #1	2,500	RB
Imogene Lake 13	750	C2
Imogene Lake #4	500	C2
Imogene Lake 15	500	C2
Imogene Lake 16	500	C2
Parks Peak #1	750	C2
Parks Peak #2	500	C2
Alpine Creek #15	250	GR
Alpine Creek #13	250	GR
Alpine Creek Lake #14	250	GR
Alpine Creek Lake #12	250	C2
Alpine Creek Lake 111	500	C2
Alpine Creek Lake #4	1,000	GR

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Table 1. Continued.

Lake name	Number stocked	Species[a]
Alpine Creek Lake #4	500	C2
Small lake immediately west of Alpine Creek Lake #4	500	C2
Alpine Creek Lake #5	250	GR
Alpine Creek Lake #5	500	C2
Alpine Creek Lake #6	500	C2
Alpine Creek Lake #3	500	C2
Alpine Creek Lake #2	500	C2
Rainbow	4,000	
Grayling	3,750	
Cutthroat	24,250	
Total	32,000	

[a]C2=westslope cutthroat trout.
RB=rainbow trout.
GR-grayling.

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Table 2. Challis National Forest mountain lake fry plants, 1991.

Lake name	Number stocked	Species[a]
Lower Valley Creek	500	C2
Valley Creek 11	750	C2
Valley Creek 12	750	C2
Hindman #2	500	C2
Hindman #1	1,000	C2
Cabin Creek Peak Lake 11	250	C2
Cabin Creek Peak Lake #3	500	C2
Cabin Creek Peak Lake #4	500	C2
Cabin Creek Peak Lake #5	500	C2
Crimson Lake	500	C2
Tango Lake 16	750	C2
Tango Lake 15	750	C2
Tango Lake #4	500	C2
Loon Creek Lake #4	500	C2
Knapp Lake 18	500	C2
Knapp Lake 17	500	C2
Knapp Lake 13	500	C2
Knapp Lake 114	500	C2
Fish Lake (Loon #3)	500	C2
Horseshoe Lake	1,000	C2
Loon Creek Lake 110	500	C2
Loon Creek Lake #14	500	C2
Loon Creek Lake 115	1,000	C2
Kidney Lake	500	C2
Cliff Creek Lake #4	500	C2
Cliff Creek Lake 11	500	C2
Elk Lake	500	C2
F-82	1,000	C2
Baldwin Lake	500	C2
Vanity Lake #13	750	GR
Vanity Lake #8	250	C2
Vanity Lake #5	250	C2
Vanity Lake #3	750	C2
Vanity Lake 11	750	C2
Vanity Lake #4	500	C2
Seafoam Lake #2	500	GR
Seafoam Lake #3	500	GR
Seafoam Lake #6	750	GR
Harlan Lake 12	500	C2
Harlan Lake #1	500	C2
Lost Lake	500	C2
Muskeg Lake 11	500	RB
Muskeg Lake 13	500	RB
Soldier Lake #2	500	C2
Soldier Lake 18	500	C2

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Table 2. Continued.

Lake name	Number stocked	Species[a]
Soldier Lake #5	500	C2
Soldier Lake #7	500	C2
Soldier Lake #4	500	C2
Iris Lake #3	500	C2
Iris Lake #1	500	C2
Fall Creek Lake #3	500	C2
Rocky Lake	1,000	C2
Langer Lake	1,250	C2
Lower Island Lake	500	C2
Island Lake	1,000	C2
Ruffneck Lake	1,000	C2
S. Fork Fall Cr. Lake #3 (Driftwood)	250	C2
Collie Lake	1,000	C2
Lola Creek Lake #3	500	C2
Rainbow Lake	500	RB
Rainbow	1,500	
Grayling	2,500	
Cutthroat	32,000	
Total	36,000	

[a]C2=westslope cutthroat trout.
RB=rainbow trout. GR=grayling.

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Table 3. Alpine lake survey data for Pass Lake, 1991.

LAKE LOCATION

Lake name: Pass Lake Survey date: 8-16-91
IDFG catalog no.: 07-1307 Primary drainage: Pahsimeroi River
Secondary drainage: W. Fk. Pahsimeroi River County: Custer
USFS ranger district: Challis Wilderness area: n/a
Section: 20 Township: 9N Range: 23E Elevation(ft): 10,000

USE

No. campsites: 5 No. firepits: 6 Litter: l ____ m X h ____
Trail around lake: complete ____ partial X trampled ____ yes ____ no
Access: good trail(mi) 4 poor trail(mi) ____ cross country(mi) ____
Trailhead location: West Fork Pahsimeroi River

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 2 Hours fished: ? No. fish caught: 0
Fish/hour: ____ Fish abundance: l X m ____ h ____

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
CT									1
TOTAL									1

Stocking History

Year	Species	Number of fish	Comments
1957	CT	3,400	1"
1963	CT	1,600	1.5"
1965	CT	3,750	1"
1977	CT	2,016	0-3"

COMMENTS

No outlet. Two inlets, each with fair to good spawning habitat. Lake is approximately 350 m x 150 m. Single cutthroat trout sampled in two gill nets set overnight (29 hours total). Only one other fish observed in lake. No small fish observed. The lake was also stocked in 1954 (2,600 CT fry).

Table 4. Alpine lake survey data for Merriam Lake, 1991.

LAKE LOCATION

Lake name: Merriam Lake Survey date: 8-15-91
IDFG catalog no.: n/a Primary drainage: Pahsimeroi River
Secondary drainage: West Fork Pahsimeroi R. County: Custer
USFS ranger district: Challis Wilderness area: n/a
Section: 17 Township: 9N Range: 23E Elevation(ft): 9560

USE

No. campsites: 4 No. firepits: 5 Litter: l ____ m X h ____
Trail around lake: complete ____ partial X trampled X yes ____ no
Access: good trail(mi) 1.9 poor trail(mi) ____ cross country(mi) ____
Trailhead location: West Fork Pahsimeroi River

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 3 Hours fished: 6 No. fish caught: 5
Fish/hour: 0.8 Fish abundance: l ____ m ____ h X

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
EBT			1	5	17	3			
TOTAL			1	5	17	3			

Stocking History

Year	Species	Number of fish	Comments

COMMENTS

Depth adequate to prevent winterkill. Trail well marked, steep with loose rock. Two inlets, both with good spawning habitat. Lake approximately 250 m x 100 m. Many juvenile fish observed along shoreline. Fish data result of 1 gill net set for 5 hours (1530 - 2030). Most fish >200 mm appeared mature. No record of stocking brook trout or any other species.

Table 5. Alpine lake survey data for Yellow Lake, 1991.

LAKE LOCATION

Lake name: Yellow Lake Survey date: 7-19-91
IDFG catalog no.: n/a Primary drainage: North Fork Big Creek
Secondary drainage: Lake Fork County: Lemhi
USFS ranger district: Challis Wilderness area: n/a
Section: 7 Township: 15S Range: 25E Elevation(ft): 9550

USE

No. campsites: 0 No. firepits: 5 Litter: l ____ m X h ____
Trail around lake: complete ____ partial X trampled X yes ____ no
Access: good trail(mi) 5.7 poor trail(mi) ____ cross country(mi) ____
Trailhead location: Timber Creek Reservoir

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 1 Hours fished: 4 No. fish caught: 5
Fish/hour: 1.25 Fish abundance: l ____ m X h ____

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
RB					4				
RB/CT					1				
TOTAL					5				

Stocking History

Year	Species	Number of fish	Comments

COMMENTS

No stocking records or documentation in the catch, however golden trout reportedly present. Spawning fish observed in the lower 30 m of the major inlet. Spawning fish also observed in the outlet. Spawning almost completed. Fish from at least three size classes observed in the lake.

Table 6. Alpine lake survey data for North Fork Little Timber Creek Lake, 1991.

LAKE LOCATION

Lake name: North Fork Little Timber Creek Survey date: 7-20-91
IDFG catalog no.: 07-1265 Primary drainage: Big Timber Creek
Secondary drainage: N. Fk. Little Timber Cr. County: Lemhi
USFS ranger district: Leadore Wilderness area: n/a
Section: 32 Township: 14S Range: 25E Elevation(ft): 8400

USE

No. campsites: 0 No. firepits: 0 Litter: l X m ____ h ____
Trail around lake: complete ____ partial X trampled X yes ____ no
Access: good trail(mi) 3 poor trail(mi) ____ cross country(mi) ____
Trailhead location: Timber Creek Reservoir

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 1 Hours fished: 1.5 No. fish caught: 5
Fish/hour: 3.75 Fish abundance: l ____ m X h ____

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
CT			1	1	1	1	1		
TOTAL			1	1	1	1	1		

Stocking History

Year	Species	Number of fish	Comments
1965	CT	3,800	one inch fish
1983	CT	250	fry
1986	CT	250	fry

COMMENTS

Outlet stream percolates through a blockage apparently created by a slide. Good spawning habitat in the inlet stream. Lake is approximately 100 m x 40 m. Larger fish (>350 mm) observed but not caught.

Table 7. Alpine lake survey data for North Fork Little Timber Creek Lake #1, 1991.

LAKE LOCATION

Lake name: North Fork Little Timber Creek #1 Survey date: 7-20-91
IDFG catalog no.: 07-1266 Primary drainage: Timber Creek
Secondary drainage: N. Fk. Little Timber Cr. County: Lemhi
USFS ranger district: Leadore Wilderness area: n/a
Section: 31 Township: 14S Range: 25E Elevation(ft): 9150

USE

No. campsites: 0 No. firepits: 0 Litter: l X m ____ h ____
Trail around lake: complete ____ partial ____ trampled X yes ____ no
Access: good trail(mi) 3 poor trail(mi) ____ cross country(mi) 1
Trailhead location: Timber Creek Reservoir

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 0 Hours fished: ____ No. fish caught: ____
Fish/hour: ____ Fish abundance: l ____ m ____ h ____

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
TOTAL									

Stocking History

Year	Species	Number of fish	Comments

COMMENTS

No fish observed. Lake was shallow and probably winterkills. No spawning habitat in inlet and about 100 m of available spawning habitat in the outlet. Trail around lake appeared to be a game trail. No record of stocking fish.

Table 8. Alpine lake survey data for North Fork Little Timber Creek Lake #2, 1991.

LAKE LOCATION

Lake name: North Fork Little Timber Cr. #2 Survey date: 7-20-91
IDFG catalog no.: 07-1267 Primary drainage: Big Timber Creek
Secondary drainage: N. Fk. Little Timber Cr. County: Lemhi
USFS ranger district: Leadore Wilderness area: n/a
Section: 6 Township: 15S Range: 25E Elevation(ft): 9300

USE

No. campsites: 0 No. firepits: 0 Litter: l X m ____ h ____
Trail around lake: complete X partial ____ trampled X yes ____ no
Access: good trail(mi) 3 poor trail(mi) ____ cross country(mi) 2
Trailhead location: Timber Creek Reservoir

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 0 Hours fished: ____ No. fish caught: ____
Fish/hour: ____ Fish abundance: l ____ m ____ h ____

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
TOTAL									

Stocking History

Year	Species	Number of fish	Comments

COMMENTS

No fish observed. No record of stocking. The lake is shallow (<2 m) and would probably winterkill. Trail around lake was probably game trail. No spawning habitat in the inlet and only about 10 m of poor habitat in the outlet. Amphibians noted in lake.

Table 9. Alpine lake survey data for Geertson (Starr) Lake, 1991.

LAKE LOCATION

Lake name: Geertson Lake (Starr Lake) Survey date: 7-22-91
IDFG catalog no.: 07-1225 Primary drainage: Lemhi River
Secondary drainage: Geertson Creek County: Lemhi
USFS ranger district: Leadore Wilderness area: n/a
Section: 18 Township: 22N Range: 24E Elevation(ft): 8,600

USE

No. campsites: 3 No. firepits: 2 Litter: l ____ m X h ____
Trail around lake: complete X partial ____ trampled ____ yes ____ no
Access: good trail(mi) 0.5 poor trail(mi) ____ cross country(mi) ____
Trailhead location: Geertson Creek (6 miles poor road)

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 2 Hours fished: 4 No. fish caught: 0
Fish/hour: ____ Fish abundance: l ____ m X h ____

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
RB						2	6		
TOTAL						2	6		

Stocking History

Year	Species	Number of fish	Comments
1968	CT	1,000	<3"
1975	CT	1,500	0-3"
1986	CT	500	fry
1989	CT, GR	1,000 CT 500 GR	fry

COMMENTS

Fish collected in 4.5 hours gill net effort (1345-1815). Outlet has a small amount of poor spawning habitat. Lake is approximately 300 m x 50 m. Two smaller size classes of unidentified fish species observed. Cutthroat trout also stocked in 1967 (1,344). Rainbow trout stocked in '57, '63 and '65 (1,000, 1,624 and 1,500 respectively).

Table 10. Alpine lake survey data for Geertson Lake #2 (Upper Starr), 1991.

LAKE LOCATION

Lake name: Geertson Lake #2 (Upper Starr Lake) Survey date: 7-22-91
IDFG catalog no.: 07-1227 Primary drainage: Lemhi River
Secondary drainage: Geertson Creek County: Lemhi
USFS ranger district: Leadore Wilderness area: n/a
Section: 18 Township: 22N Range: 23E Elevation(ft): 8,620

USE

No. campsites: 0 No. firepits: 0 Litter: l X m ____ h ____
Trail around lake: complete ____ partial ____ trampled ____ yes X no
Access: good trail(mi) 0.5 poor trail(mi) ____ cross country(mi) ____
Trailhead location: Geertson Creek (6 miles poor road)

FISHERY AND FISH POPULATIONS

Creel Survey

No. fishermen: 0 Hours fished: ____ No. fish caught: ____
Fish/hour: ____ Fish abundance: l ____ m ____ h ____

Length Frequency

Total Length (mm)

Species	0-49	50-99	100-149	150-199	200-249	250-299	300-349	350-399	>400
TOTAL									

Stocking History

Year	Species	Number of fish	Comments
1983	CT	100	only stocking on record

COMMENTS

Four hours of gill net effort (1400-1800) yielded no fish. No fish observed.

JOB PERFORMANCE REPORT

STATE OF: Idaho

NAME: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO: F-71-R-16

TITLE: Region 7 Lake and Reservoir Investigations

JOB NO: 7-b

PERIOD COVERED: July 1, 1991 to June 30, 1992

ABSTRACT

Alturas Lake

Alturas Lake kokanee density, estimated by trawling, was 593 fish/hectare and the biomass estimate was 6.3 kg/hectare. Growth and condition of Alturas kokanee were the poorest observed in Idaho. Year class strength appears to be extremely variable with few age 0+ or age 1+ fish.

Redfish Lake

Gill nets were used to assess the fish community associated with shoreline habitats in Redfish Lake during July 1991. Gill nets with mesh >1 inch were set near shore to avoid capturing juvenile sockeye/kokanee.

A total of 837 fish were captured in 198 overnight net hours. Suckers *Catostomus spp*. were the most abundant species (75Z) followed by catchable rainbow trout *Oncorhynchus mykiss* (12%).

Williams Lake

Dissolved oxygen levels were less than 5 mg/l below 4 m during January and February and 10 m during July and August 1991. Water quality, primarily low dissolved oxygen levels, may be limiting the amount of trout habitat available in Williams Lake.

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INTRODUCTION

Redfish Lake

Redfish Lake fish populations are managed by the Idaho Department of Fish and Game (IDFG) with several goals. One is to provide a put-and-take fishery for catchable-size (8-12 inches) rainbow trout. Approximately 20,000 catchables were stocked in Redfish Lake between Memorial Day and Labor Day 1991. Potential interactions between catchable rainbow and sockeye were assessed during July 1991 (Schrader 1991).

Williams Lake

Williams Lake, a mesotrophic lake, is located in north-central Lemhi County at 1,600 m elevation. The surface area is 927 hectares, maximum depth is 56 m, and mean depth is 23 m. The main source of inflow is Lake Creek, with some inflow from springs and intermittent streams. Rainbow trout *Oncorhynchus mykiss* and bull trout *Salvelinus confluentus* are the only gamefish species in the lake. Information from anglers suggested that Williams Lake historically produced 2-3 kg rainbow trout. In the early 1960s, Williams Lake was managed as a put-and-take and put-grow-and-take fishery. In 1984, stocking was discontinued and Williams Lake is now managed as a wild trout fishery.

A combination of spawning habitat degradation, caused by logging and road building practices and water quality degradation, caused by nutrient input from eroded sediments and leaching of septic systems, caused a reduction in the number and size of fish harvested from Williams Lake (Davis and Reingold 1988).

In an effort to assess the quantity of trout habitat, dissolved oxygen (DO) levels and temperatures were recorded monthly in Williams Lake during 1991.

OBJECTIVES

1. To estimate density and biomass of kokanee in Alturas Lake by midwater trawling.

2. To determine relative abundance and size structure of game and nongame fishes in Redfish Lake using gill nets.

3. To evaluate DO levels and water temperature profiles as limiting factors to Williams Lake fish populations.

METHODS

Alturas Lake

The Alturas Lake kokanee population was sampled on September 8-9 with a midwater trawl. Sampling and data summary methodologies are described by Rieman and Meyers (1990). Fish were aged by otolith examination.

Redfish Lake

Gill nets were used to sample fish in Redfish Lake during July 1991. Fourteen horizontal, multifilament, experimental gill nets were fished for at least ten nighttime hours. Each gill net was 7.57 m long, had six panels of mesh that ranged from 1-2.5 inches, and was set perpendicular to shore with the smallest mesh towards shore. Gill nets with mesh >1 inch were set near shore to capture only hatchery rainbow trout and avoid juvenile sockeye/ kokanee.

Williams Lake

Two limnological stations were selected, one near the inlet and a second station at the opposite end of the lake near the outlet. Limnological data collected included Secchi disk depth, temperature, DO and conductivity.

A YSI Model 51 DO meter with a temperature probe was used to measure DO and temperature at 1-m intervals to a depth of 10 m, and at 5-m intervals to 30 m.

Secchi transparencies measurements were made mid-day (0900-1500). Secchi transparency is the mean of the depths at which a Secchi disk dissappears when lowered from the shaded side of a boat and reappears when pulled back up (Wetzel 1983).

RESULTS AND DISCUSSION

Alturas Lake

The total kokanee density estimate for Alturas Lake was 593 fish/hectare. Biomass estimates were high (6.3 kg/hectare) for an ultra-oligotrophic lake. Trawl estimates of biomass did not represent the sexually mature portion of the population. Incorporating the spawning fish may push the biomass estimate to 8.0 kg/hectare (B. Rieman, Idaho Department of Fish and Game, personal communication). These estimates are similiar to those made in 1990 with one notable exception. Year class strength has been extremely variable and there appears to be very few 0+ or 1+ fish (Figure 1).

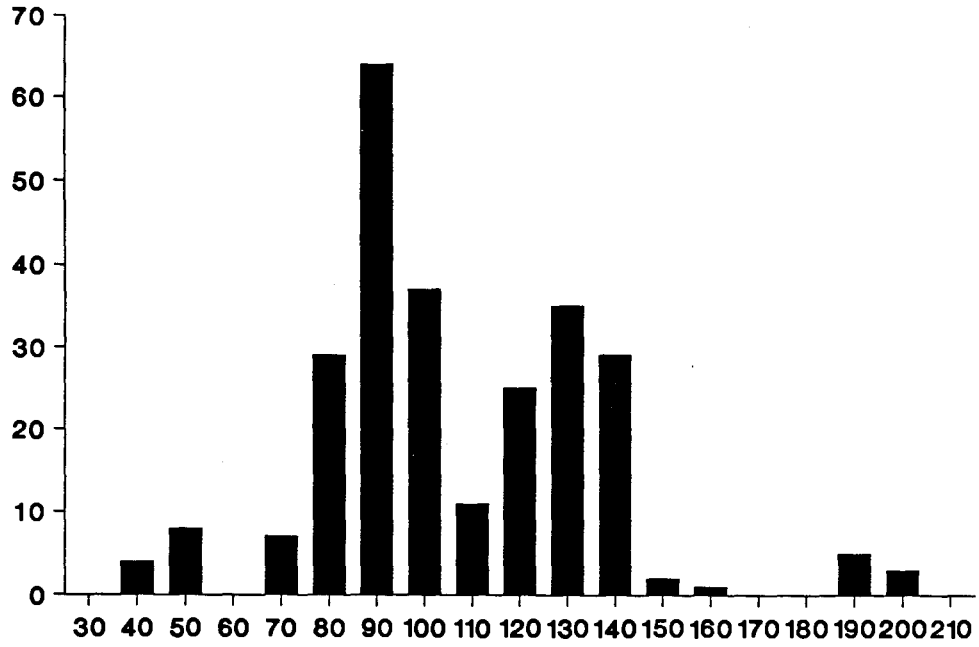

Figure 1. Length frequency of kokanee collected by trawling during September 1991 in Alturas Lake.

Growth and condition of Alturas Lake kokanee was the poorest of seven lakes sampled by Department personnel (Figure 2).

Rieman and Meyers (1990) reported kokanee growth was density dependent and strongly influenced by lake productivity. Through modeling, they found density effects in age 0 and age 1 kokanee appear irrelevant in more productive lakes but significant in unproductive lakes such as Alturas. Because of the slow growth in Alturas Lake, there is little difference in size between adjacent age classes, and interaction among age classes is probably significant (B. Rieman, Idaho Department of Fish and Game, personal communication).

Redfish Lake

A total of 837 fish representing five species were collected by gill nets. Catchable rainbow trout were the most abundant game species captured, comprising 12% of the catch. Bull trout and mountain whitefish *Prosopium williamsoni* were the other game species collected and comprised 6.5 and <1% of the catch respectively (Table 1). Nongame species included northern squawfish *Ptychocheilus oregonensis* and suckers *Catostomus spp*. and comprised 6.5 and 75X, respectively. Using mesh >1 inch, no sockeye or kokanee were captured in 198 overnight net-hours. A total of 104 rainbow trout were captured which averaged 264 mm long (Table 1, Appendix A).

Williams Lake

Secchi disk measurements were taken monthly from April through November except for September (Table 2). Secchi depths ranged from 0.9 m in October to 4.4 m in May. Dissolved oxygen and temperature profiles were recorded monthly, except September (Figure 3). The highest water temperature was recorded in August (19°C). The thermocline began to form in June and was well established by August, with turnover in November (Figure 3).

Dissolved oxygen levels below 5 mg/l were recorded at 4 m during January and February under ice cover and at 10 m during July and August. Low DO levels in Williams Lake, especially during winter, reduce the amount of trout habitat available. Williams Lake has the potential for winterkill, especially if ice cover were to last an extended period of time and snow depth was excessive.

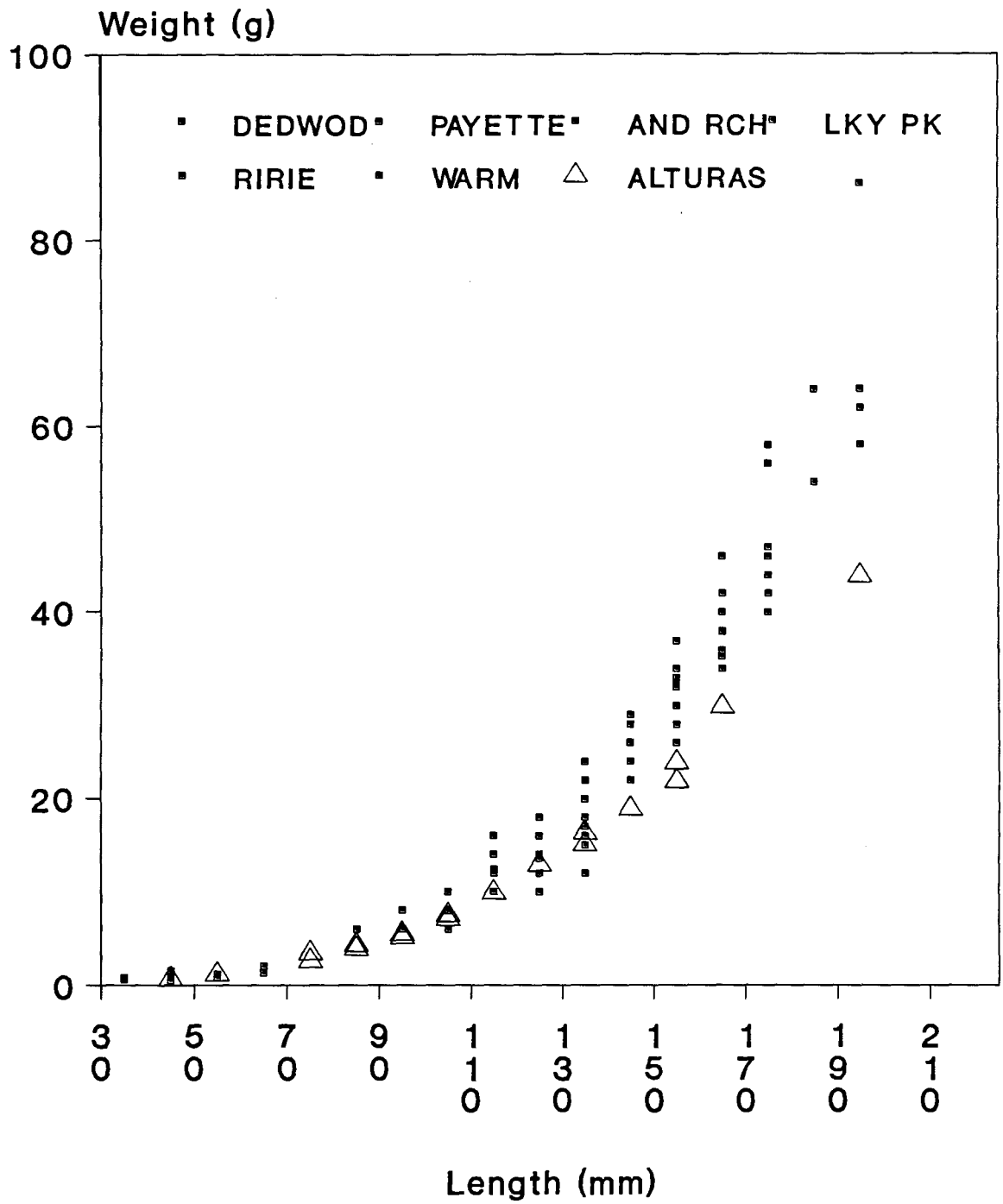

Figure 2. Comparison of length-weight relationships for kokanee populations in Idaho lakes and reservoirs.

Table 1. Number and percent relative abundance of fish captured by gill nets in Redfish Lake during July 1991.

Species	Number caught	Percent
Suckers	628	75.0
Rainbow trout	104	12.0
Northern squawfish	54	6.5
Bull trout	45	5.4
Whitefish	6	<1.0
TOTAL	837	

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Table 2. Secchi depths (m) for Williams Lake 1991.

Month	Station 1	Station 2
January	-	-
February	-	-
March	-	-
April	1.6	1.
May	4.3	4.
June	4.2	4.
July	3.6	3.
August	2.8	2.
September	-	-
October	0.9	0.
November	2.6	2.
December	1	

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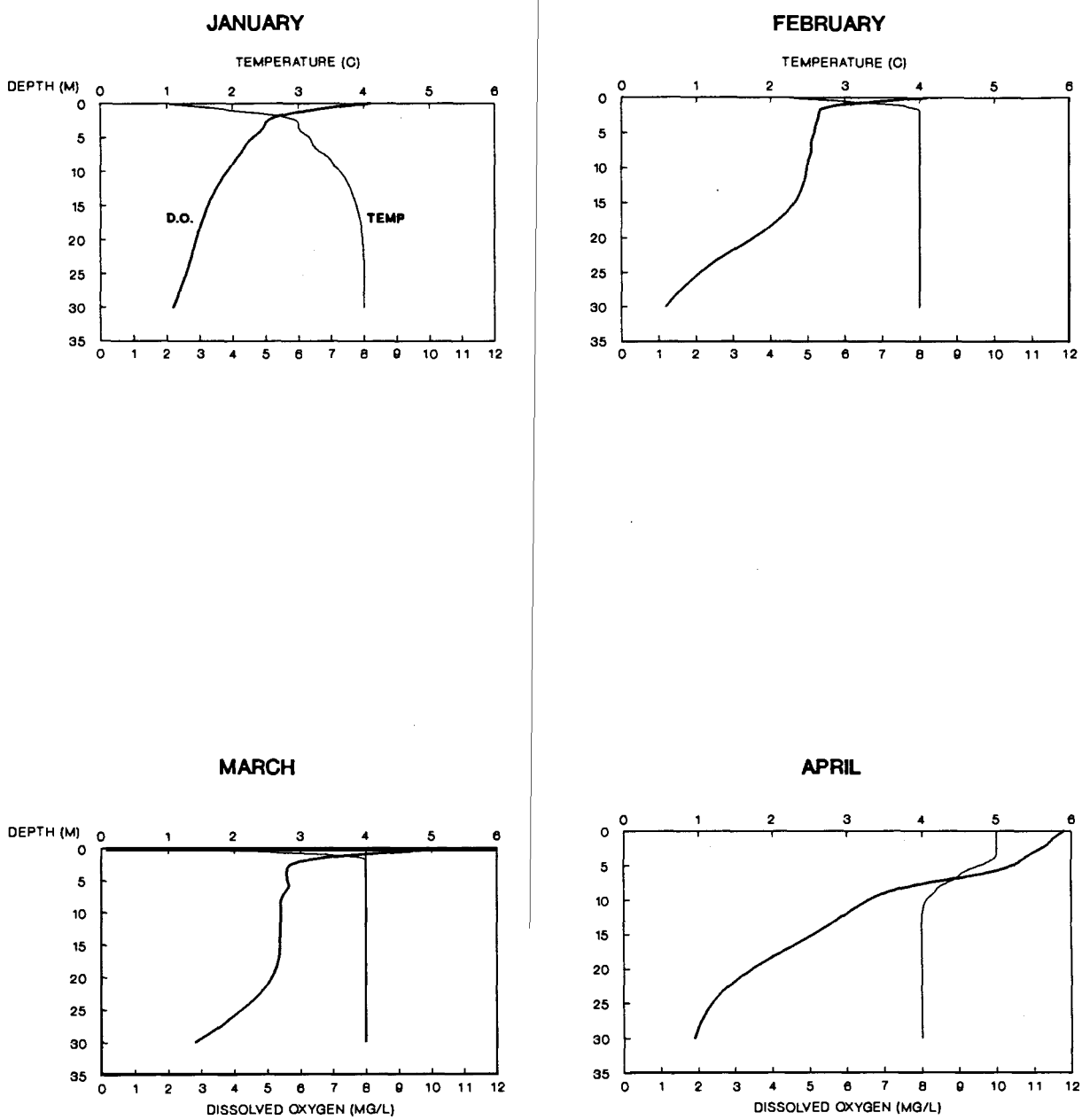

Figure 3. Monthly temperature and dissolved oxygen profiles for Williams Lake, 1991.

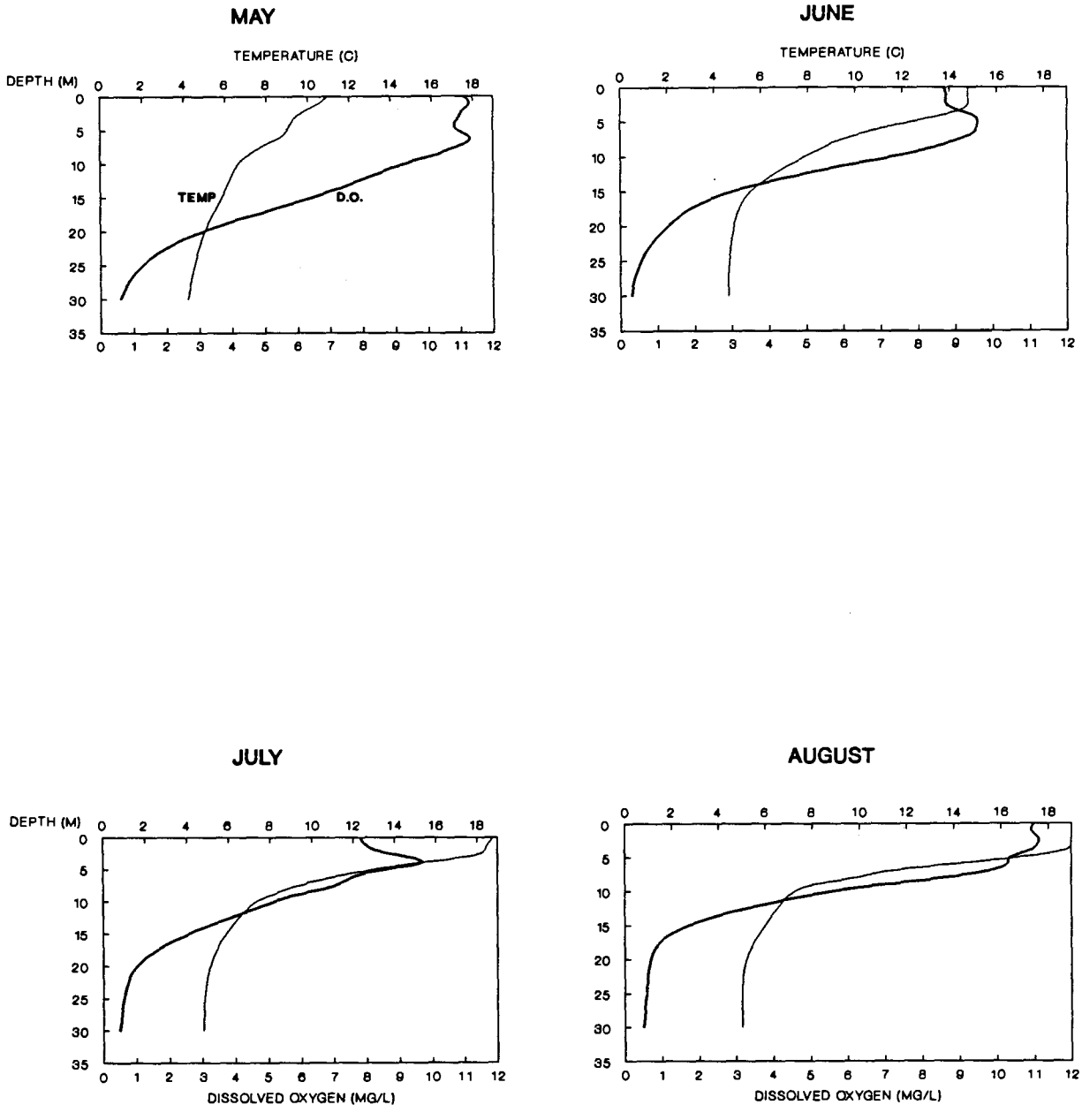

Figure 3. Continued.

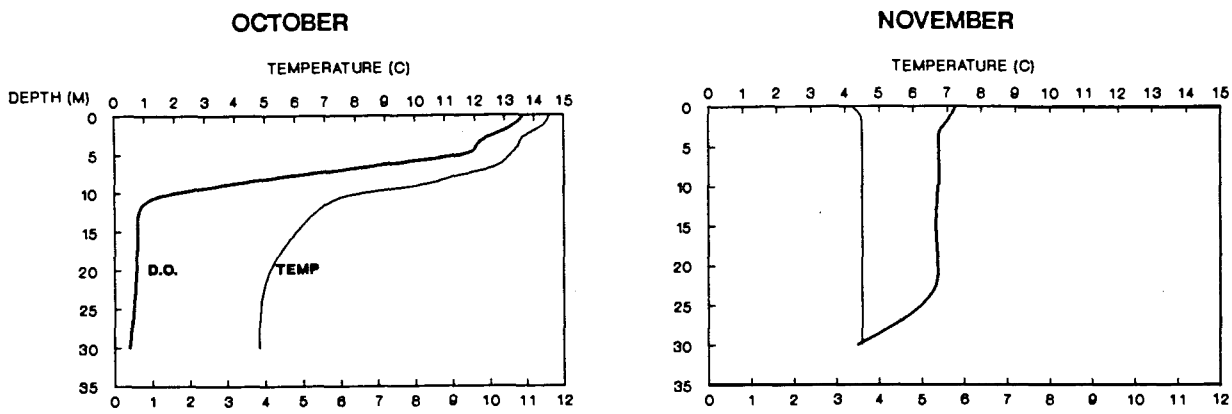

Figure 3. Continued.

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Appendix A. Length frequency distributions of fish captured in gill nets in Redfish Lake, July 1991. Redside shiner and kokanee/sockeye were also present but were not captured.

TL range (mm)	Catostomus spp.	Catchable rainbow trout	Northern squawfish	Bull trout	Whitefish
< 50					
50-59					
60-69					
70-79					
80-89					
90-99					
100-109					
110-119					
120-129					
130-139					
140-149					
150-159					
160-169			2		
170-179			3		
180-189	1		1		
190-199	5		1		
200-209	11		4		
210-219	18	2	4		
220-229	13	5	6		
230-239	5	11	5	2	3
240-249	2	17	4	1	
250-259	4	11	6	4	3
260-269	4	15	5	2	
270-279	4	12	3	3	
280-289	8	19		4	
290-299	7	6	1	1	
300-309	11	3	1	2	
310-319	15	2	2	3	
320-329	25		1	5	
330-339	31	1	2	3	
340-349	56		1	6	
350-359	44			3	
360-369	30			1	
370-379	12			2	
380-389	5			1	
390-399	1		2		
400-409	1				
410-419	3				
420-429	1				
430-439	1			1	
440-449	1				
450-459					
460-469					
470-479					
480-489					
490-499					
> 500				1	

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JOB PERFORMANCE REPORT

STATE OF: Idaho

NAME: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO.: f-71-R-16

TITLE: Region 7 Rivers and Streams Investigations - Salmon and Middle Fork Salmon River Snorkeling Transects and Middle Fork Salmon River Creel Census

JOB NO.: 7-c[1]

PERIOD COVERED: July 1, 1991 to June 30, 1992

ABSTRACT

Mean densities of age 1 and older cutthroat trout, juvenile rainbow/steelhead trout, and juvenile chinook salmon counted in Middle Fork Salmon River transects in 1991 were 0.3, 0.2, and 0.05 fish/100 m^2, respectively. In Middle Fork Salmon River tributary transects, cutthroat trout densities averaged 1.0/100 m^2, rainbow/steelhead averaged 2.4/100 m^2, and chinook 0.1/100 m^2. An estimated 2,324 anglers spent 13,792 days and 42,755 hours fishing the Middle Fork Salmon River in 1991.

In Pahsimeroi River snorkeling transects, we observed an average of 5.5 rainbow/steelhead/100 m^2 and 17.3 chinook salmon/100 m^2. In Salmon River canyon tributaries (Horse, Bargamin, Chamberlain, and Sheep creeks), fish densities were 1.8 cutthroat trout/100 m^2, 7.0 rainbow/steelhead trout/100 m^2, and 0.3 chinook salmon/100 m^2.

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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 central eastern Idaho. All of the mainstem is within the Frank Church River-of-No-Return Wilderness Area. The MFSR originates at the confluence of Bear Valley and Marsh creeks near Cape Horn Mountain. The river flows 171 km to its confluence with the main Salmon River 92 km downstream from Salmon, Idaho (Figure 1).

Road access exists to Dagger Falls and the Salmon River confluence. Headwaters of some tributaries are accessible via primitive roads. The lower 156 km of the MFSR is accessible only by aircraft, float boats, or horse/foot trails. The MFSR is a major recreational river that offers a wide variety of outdoor and backcountry opportunites. The number of people floating the river has increased from 625 in 1962 to 10,166 in 1991 (U.S. Forest Serice data).

The earliest MFSR fishery study was conducted in 1959 and 1960 and evaluated westslope cutthroat trout Oncorhynchus clarki lewisi life history and seasonal movements (Mallet 1963). In 1971, additional studies were initiated to monitor MFSR cutthroat trout abundance and to evaluate catch-and-release regulations which were established in 1972. Similar regulations were adopted for major tributaries in the early and mid-1980s.

Part of the studies initiated in 1971 included establishment of snorkeling transects which were surveyed periodically (Corley 1972; Jeppson and Ball 1977, 1979). In 1981, a project was initiated on the MFSR to evaulate wild steelhead trout Oncorhynchus mykiss (Thurow 1982, 1983, 1985). In 1985, another study was initiated to determine juvenile steelhead, chinook salmon Oncorhynchus tshawytscha, and cutthroat trout densities in the MFSR and its tributaries (Reingold and Davis 1987a, 1987b, 1988; Lukens and Davis 1989; Lukens et al., in press; Lukens and Schrader, in press).

This report is a continuation of the 1985 study and presents data collected in July and August 1991 pertaining to fish densities, angler effort, and catch composition in the MFSR drainage. Also included is fish density data collected from five Salmon River tributaires.

OBJECTIVES

1. To monitor juvenile steelhead trout and chinook salmon densities within the Middle Fork, its tributaries, and Salmon River tributaries.

2. To monitor the effect of catch-and-release regulations on resident fish populations in the MFSR drainage, particularly cutthroat trout.

3. To determine level of angling effort, catch rates, length and species composition of catch and compare with earlier data to indentify changes, particularly in angler effort.

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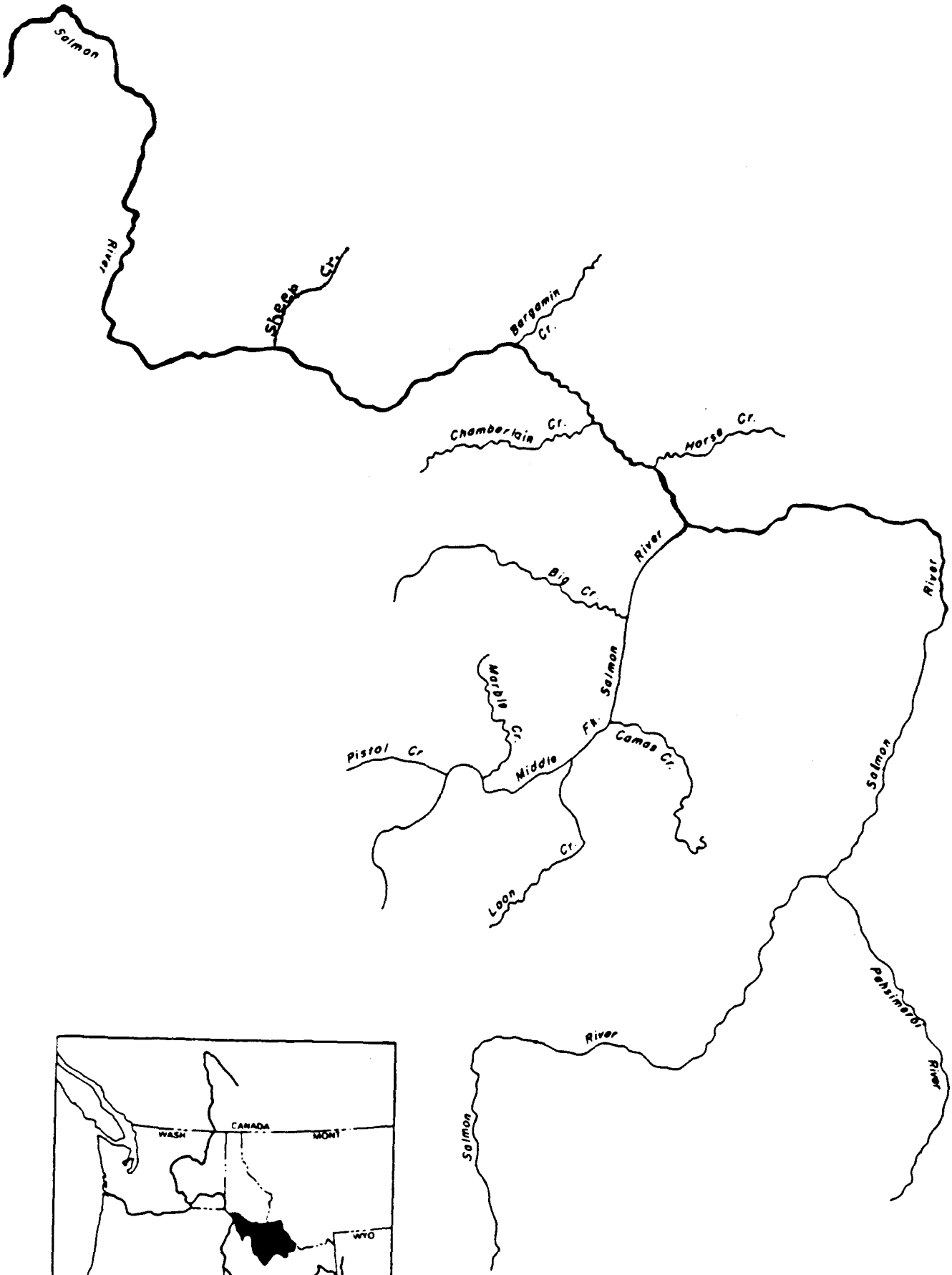

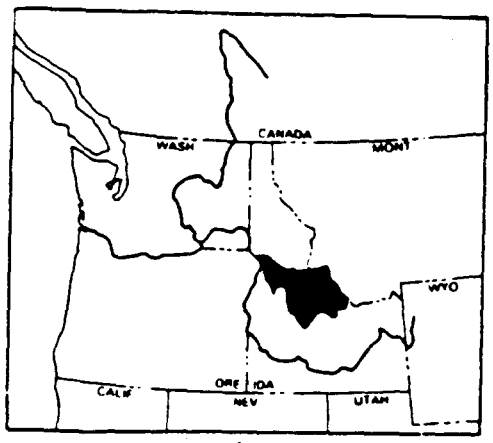

vicinity map

Figure 1. Map of the MFSR, main Salmon River and tributaries where snorkeling surveys are conducted.

METHODS

In 1991, 27 of 29 MFSR transects (Table 1), 7 MFSR tributary transects (Table 2), and 10 Salmon River tributary transects (Table 3) were surveyed via snorkeling. In addition, three nontraditional MFSR transects, located above Boundary Creek, were counted. The traditional MFSR and tributary transects were snorkeled July 16 to 23, the Salmon River tributary transects July 31 to August 7, and the nontraditional MFSR transects on August 8.

The techniques used to survey these transects are described by Reingold and Davis (1987a, 1987b) and Scully et al. (1990).

MFSR floaters were interviewed at the Cache Bar boat ramp (approximately three miles downstream from the MFSR confluence on the main Salmon River) at the completion of their trip. Each party was interviewed for the proportion of anglers, average number of hours fished per day, trip length, and whether anglers fished tributaries. Data was recorded separately for commercial and private groups.

Angler diaries were mailed to selected MFSR outfitters that cater primarily to floaters that fish. The outfitters were asked to distribute the diaries to interested anglers so that species composition of catch and catch rates could be recorded.

Angler data was combined with MFSR use data, compiled yearly by the U.S. Forest Service, Middle Fork Ranger District, to calculate estimates of total angler use for the season.

All data was compared to previous information to identify trends.

RESULTS

Middle Fork Salmon River Snorkeling Transects

The total number of age 1 and older (>70 mm) cutthroat trout, juvenile rainbow/steelhead, and juvenile chinook salmon counted in MFSR transects was 153, 83, and 10, respectively (Table 4). Mean densities were 0.3, 0.2, and 0.05 fish/100 m^2 for cutthroat trout, rainbow/steelhead, and chinook salmon, respectively (Table 5).

Middle Fork Salmon Tributary Snorkeling Transects

Juvenile rainbow/steelhead densities ranged from 0-4.7 fish/100 m^2 and averaged 2.4 (Table 6). Mean juvenile chinook density was 0.1 fish/100 m^2 and ranged from 0-0.5. Cutthroat trout densities averaged 1.0 fish/100 m^2 and ranged from 0.4-2.0.

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Fish type[a]	Location (river km)[b]	Transect name	Length (m)	Visibility (m)	Visible corridor (m)	Area (m^2)	Passes
Ct/Ck	-5.6	Fall[c]	87	3.8	7.6	661	1
Ct/Ck	-4.0	Chicken[c]	36	4.7	9.4	338	1
Ct/Ck	-3.5	Patrol[c]	71	3.4	6.8	483	1
Sh	0.3	Boundary	55	3.2	6.4	352	1
Ch/Ck	4.3	Gardell's Hole	73	3.4	6.8	496	1
Ct/Ck	8.8	Velvet	--	--	--	--	--
Sh	13.6	Elkhorn	96	3.1	6.2	595	1
Sh	21.3	Sheepeater	91	3.0	6.0	546	1
Ct/Ck	24.5	Greyhound	60	3.5	7.0	420	1
Sh	29.6	Rapid River	108	2.6	5.2	562	1
Sh	40.0	Indian	146	3.6	7.2	1,051	1
Ct/Ck	44.3	Pungo	64	5.1	10.2	653	1
Ct/Ck	51.0	Marble Pool	137	3.5	7.0	959	1
Sh	52.3	Ski-jump	80	4.3	8.6	688	1
Ct/Ck	60.6	Lower Jackass	246	3.1	6.2	1,525	1
Sh	64.6	Cougar	96	2.9	5.8	557	1
Ct/Ck	73.9	Whitey Cox	106	3.5	7.0	742	1
Sh	74.1	Rock Island	--	--	--	--	--
Ct/Ck	82.9	Hospital Pool	123	3.6	7.2	886	1
Sh	84.3	Hospital Run	146	3.4	6.8	993	1
Ct/Ck	92.6	Tappan Pool	101	2.8	5.6	566	1
Sh	92.8	Lower Tappan Run	114	2.1	4.2	479	1
Ct/Ck	106.6	Flying B	93	3.5	7.0	651	1
Sh	108.6	Airstrip	102	3.8	7.6	775	1
Sh	119.7	Survey	114	2.9	5.8	661	1
Ct/Ck	124.6	Big Creek Bridge	91	2.7	5.4	491	1
Sh	127.8	Love Bar	82	4.0	8.0	656	1
Ct/Ck	135.8	Ship Island	119	2.8	5.6	666	1
Sh	144.0	Little Ouzel	91	2.8	5.6	510	1
Ct/Ck	144.6	Otter Bar	192	2.5	5.0	960	1
Ct/Ck	151.5	Goat Creek Pool	102	2.1	4.2	428	1
Sh	151.8	Goat Creek Run	63	2.5	5.0	315	1

[a]Sh-steelhead, Ct-cutthroat, Ck-chinook salmon. [b]River km starts at Dagger Falls.
[c]Nontraditional transects added in 1991.

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Table 2. Middle Fork Salmon River tributary transects.

Table 3. Main Salmon River tributary transects.

Transect name	Location
Pistol Creek #1 (lower)	At mile marker 16
Pistol Creek #2 (upper)	Above mile marker 16
Marble Creek	Above pack bridge
Loon Creek #1 (lower)	Below pack bridge
Loon Creek #2 (upper)	400 yards above pack bridge
Camas Creek	From pack bridge downstream
Big Creek	400 yards above mouth
Pahsimeroi River #2 (Dowton Ln.)	Run above + pool below Dowton Bridge

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Transect name	Location
Horse Creek #1 (bridge)	50 yards above bridge
Horse Creek #2	150 yards above bridge
Chamberlain #1 (mouth)	400 yards above mouth
Chamberlain #2 (run)	500 yards above mouth
Bargamin Creek #1	1/4 mile above mouth
Bargamin Creek #2	At **trail flat above** #1
Sheep Creek #1	Below pack bridge
Sheep Creek #2	300 yards above pack bridge
Pahsimeroi River #1 (lower)	100 yards below Dowton Lane

Table 4. Total number of cutthroat trout, rainbow/steelhead and chinook salmon, by length group (mm), and other fish species counted in MFSR transects, July 1991.

	Cutthroat				Rainbow/steelhead					Chinook		Bull	White-	
Transect	75-150	150-	230-300	>300	<75	75-150	150-230	230-300	>300	Age 0	Age I	trout	fish	Other[a]
Fall	0	2	4	3	0	17	12	0	0	9	1	0	21	0
Chicken	0	1	0	0	0	2	3	0	0	0	0	0	7	0
Patrol	0	2	2	0	1	2	2	0	0	0	0	0	19	0
Boundary	0	1	2	3	0	0	1	1	0	0	0	0	2	0
Gardell's Hole	0	0	0	0	0	0	2	0	0	0	0	0	3	0
Velvet	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elkhorn	0	1	2	2	0	1	4	1	0	0	0	1	12	0
Sheepeater	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Greyhound	0	0	1	6	0	0	0	0	0	0	0	0	2	0
Rapid River	0	1	1	2	0	0	4	0	0	0	0	0	7	0
Indian	0	1	4	4	0	0	2	1	0	0	0	0	7	0
Pungo	0	0	3	3	0	0	1	0	0	0	0	0	0	11
Marble Pool	1	9	6	2	0	0	0	0	0	0	0	0	12	0
Ski-jump	0	1	2	1	0	0	0	0	0	0	0	0	21	0
Lower Jackass	0	1	2	1	0	0	0	0	0	0	0	0	6	4
Cougar	0	0	0	0	0	1	2	0	0	0	0	0	3	0
Whitey Cox	0	0	1	0	0	0	0	0	0	0	0	0	3	2
Rock Island	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hospital Pool	0	1	23	7	0	0	4	0	0	0	0	0	8	10
Hospital Run	0	0	1	1	0	1	2	0	0	0	0	0	4	0
Tappan Pool	0	0	0	0	0	0	2	1	0	0	0	0	12	8
L. Tappan Run	0	0	0	1	0	0	3	0	0	0	0	0	4	11
Flying B	0	1	5	1	0	0	0	0	0	0	0	0	0	0
Airstrip	0	0	3	1	0	0	0	0	0	0	0	0	3	16
Survey	0	0	1	0	0	0	0	0	0	0	0	0	1	15
Big Creek Bridge	0	0	1	1	0	0	0	0	0	0	0	0	0	26
Love Bar	2	1	2	0	0	0	0	1	0	0	0	0	2	16
Ship Island	0	1	4	2	0	0	1	3	0	0	0	0	5	18
Little Ouzel	0	2	3	3	0	0	0	1	1	0	0	0	5	11
Otter Bar	3	1	1	0	0	1	0	0	0	0	0	0	3	248
Goat Cr. Pool	0	0	1	0	0	1	1	0	0	0	0	0	2	35
Goat Cr. Run	0	0	1	0	0	0	0	0	0	0	0	0	5	10
Column total	6	27	76	44	1	26	46	9	1	9	1	1	182	441
Grand total		153				83				10		1	182	441

[a]Suckers, squawfish and shiners.

Table 5. Densities of age 1 and older (>70 mm) cutthroat trout, juvenile rainbow/steelhead, and juvenile chinook salmon (fish/100 m^2) in MFSR transects, July 1991.

Transect	Cutthroat	Rainbow/ steelhead	Chinook	Total fish'
Fall	1.4	4.4	1.5	10.4
Chicken	0.3	1.5	0	3.8
Patrol	0.8	1.0	0	5.8
Boundary	1.7	0.6	0	2.8
Gardell's Hole	0	0.4	0	1.0
Velvet	--	--		--
Elkhorn	0.8	1.0	0	4.0
Sheepeater	0	0	0	0.5
Greyhound	1.7	0	0	2.1
Rapid River	0.7	0.7	0	2.7
Indian	0.9	0.3	0	1.8
Pungo	0.9	0.2	0	2.8
Marble Pool	1.9	0	0	3.1
Ski-jump	0.6	0	0	3.6
Lower Jackass	0.3	0	0	0.9
Cougar	0	0.5	0	1.1
Whitey Cox	0.1	0	0	0.8
Rock Island	--	--	--	--
Hospital Pool	3.5	0.5	0	6.0
Hospital Run	0.2	0.3	0	0.9
Tappan Pool	0	0.5	0	4.1
L. Tappan Run	0.2	0.6	0	4.0
Flying B	1.1	0	0	1.1
Airstrip	0.5	0	0	3.0
Survey	0.2	0	0	2.6
Big Cr. Bridge	0.4	0	0	5.7
Love Bar	0.8	0.2	0	3.7
Ship Island	1.1	0.6	0	5.1
Little Ouzel	1.6	0.4	0	5.1
Otter Bar	0.5	0.1	0	26.8
Goat Cr. Pool	0.2	0.5	0	9.3
Goat Cr. Run	0.3	0	0	5.1
Average	0.3	0.2	0.05	2.2

[a]Total fish also includes suckers, squawfish, shiners, whitefish, and bull trout.

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Table 6. Number of rainbow/steelhead and cutthroat trout by length group (mm), juvenile chinook salmon, and miscellaneous species (Wf=whitefish, Bt=bull trout) counted in MFSR tributary transects, July 1991.

Location	Area	Rainbow/steelhead				Cutthroat					Chinook		Wf	Bt
		75-150	150-230	230-300	Rb/100 m^2	75-150	150-230	230-300	>300	Ct/100 m^2	Age 0	Ck/100 m^2		
Pistol Cr. #1 (lower)	255	1	8	3	4.7	0	2	0	0	0.8	1	0.4	4	0
Pistol Cr. #2 (upper)	476	5	9	1	3.2	0	1	1	3	1.1	0	0	8	1
Marble Cr.	522	0	0	0	0	0	1	2	1	0.8	0	0	0	0
Loon Cr. #1 (lower)	400	2	7	3	3.0	0	3	3	2	2.0	2	0.5	7	0
Loon Cr. #2 (upper)	526	3	3	1	1.3	0	2	0	0	0.4	0	0	2	0
Camas Cr.	741	2	9	3	1.9	1	2	0	2	0.7	0	0	9	1
Big Cr.	695	7	7	4	2.6	1	5	1	0	1.0	0	0	9	0
Mean					2.4					1.0		0.1		
Weighted mean					2.2					0.9		0.1		

Salmon River Tributary Transects

The rainbow/steelhead observed in Horse, Chamberlain, Bargamin, and Sheep creeks were predominantly juvenile steelhead. These tributaries may provide spawning and rearing habitat for the only significant numbers of wild upper Salmon River A-strain steelhead. The Pahsimeroi River supports rainbow trout and steelhead, as evidenced by the presence of larger fish (Table 7). Age 1 and older (>70 mm) rainbow/steelhead densities were 6.7 and 4.3 fish/100 m^2 in the Pahsimeroi River transects and ranged from 2.3-13.6 fish/100 m^2 in the other Salmon River tributary transects.

Large numbers of chinook were observed in Pahsimeroi River transects (24.0 and 10.6 fish/100 m^2). Presumably, these fish were the result of releases from Pahsimeroi Hatchery. Chinook densities were low in the remaining tributary transects and ranged from 0-1.3 fish/100 m^2.

No cutthroat were observed in the Pahsimeroi River transects but densities in the other Salmon River tributaries ranged from 0.3-5.8 fish/100 m^2 for fish >70 mm.

Creel Census

Guided anglers expended 290 hours to catch 2,740 fish for an overall catch rate of 9.4 fish/hour. The majority of their catch was comprised of cutthroat trout (80.6X), followed by rainbow/steelhead (17.0X) and bull trout, rainbow/cutthroat hybrids, whitefish, and miscellaneous nongame species (2.4X) (Figure 2).

Idaho Department of Fish and Game project anglers caught 101 fish which were comprised of rainbow/steelhead (53.5%), cutthroat trout (41.6%), and rainbow/cutthroat hybrids and nongame species (4.9%) (Figure 3). The cutthroat trout averaged 276.2 mm and the rainbow/steelhead 174.3 mm.

A total of 550 floaters were interviewed at Cache Bar during June, July, and August, and anglers comprised 27% (Table 8). Considerably more guided floaters (32X) than private (18%) fished. An estimated 2,324 anglers spent 13,792 days floating the MFSR in 1991. Each angler expended an average of 3.1 hours fishing per day for a season estimate of 42,755 hours fished. Few anglers (6%) fished tributaries, and none reported harvesting fish from those tributaries with consumptive regulations.

DISCUSSION

Middle Fork Salmon River Transects

A downward trend in juvenile steelhead densities, which started in 1986, moderated in 1991 (Figure 4). This downward trend has probably been the

Table 7. Number of rainbow/steelhead and cutthroat trout, by length group (mm), juvenile chinook salmon, and miscellaneous species (Bt=bull trout, Wf=whitefish) counted in Salmon River tributary transects, July and August 1991.

		Rainbow/steelhead						Cutthroat					Chinook				
Location	Area (m^2)	<75	75-	150-230	230-300	>300	Rb/100m^2	75-150	150-230	230-300	>300	Ct/100m^2	Age 0	Age 1	Ck/100m^2		Bt
Horse Cr. #1 (bridge)	289	0	10	9	1	0	**6.9**	2	0	2	0	1.4	0	0	0	0	19
Horse Cr. #2	413	2	11	16	4	1	9.0	4	5	1	1	2.7	0	2	0.5	0	2
Chamberlain Cr. #1 (mouth)	348	0	7	5	0	0	3.4	4	2	0	1	2.0	0	1	0.3	1	12
Chamberlain Cr. #2 (run)	305	1	1	5	0	0	2.3	1	0	0	0	0.3	0	0	0	0	4
Bargamin Cr. #1	249	0	11	8	3	0	8.8	0	3	0	0	1.2	0	0	0	0	11
Bargamin Cr. #2	1,057	10	14	8	0	0	3.0	0	3	2	0	0.5	0	0	0	1	10
Sheep Cr. #1	315	1	17	10	0	0	8.9	2	0	0	0	0.6	4	0	1.3	1	11
Sheep Cr. #2	103	0	9	5	0	0	13.6	3	1	1	1	5.8	0	0	0	1	5
Pahsimeroi River #2 (Dowton Lane)	549	0	8	20	3	6	6.7	0	0	0	0	0	117	15	24.0	0	5 7
Pahsimeroi River #1	602	3	6	12	3	2	4.3	0	0	0	0	0	30	34	10.6	0	13
Mean							6.7					1.4			3.7		
Mean, excluding Pahsimeroi							7.0					1.8			0.3		
Weighted mean							5.5					0.9			4.8		
Weighted mean, excluding Pahsimeroi							5.6					1.3			0.2		

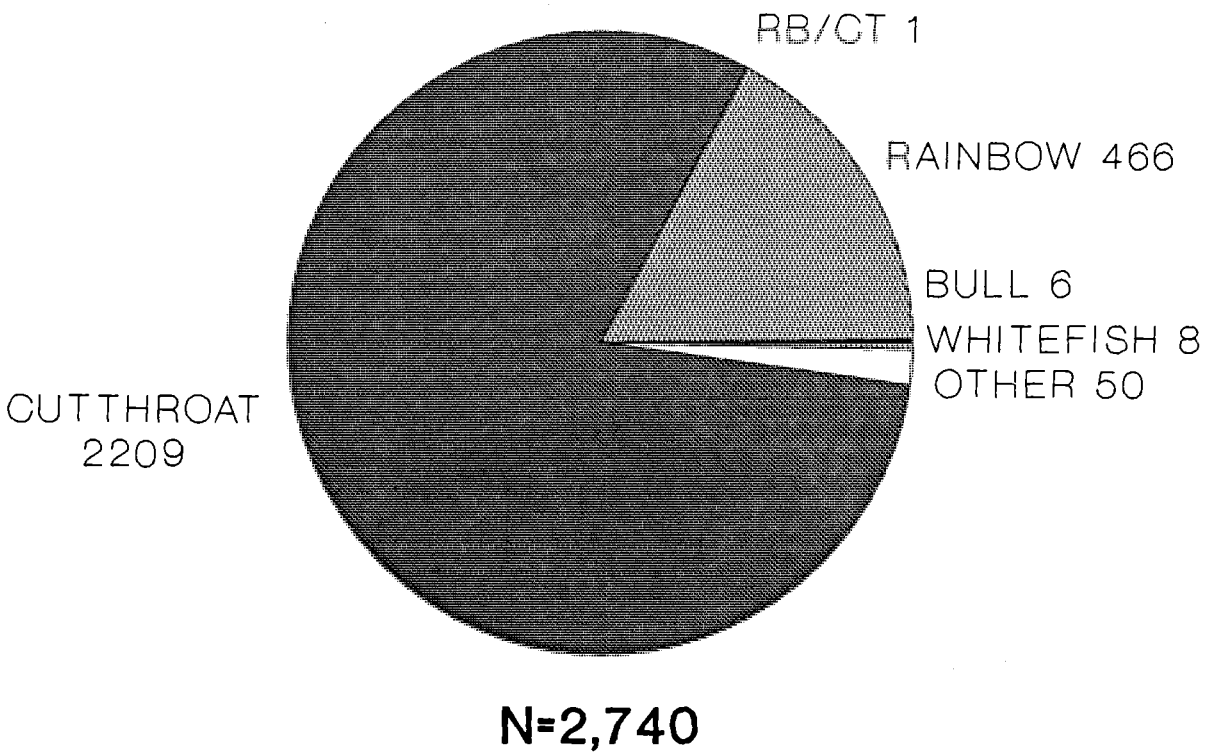

Figure 2. Species composition of fish captured by guided MFSR anglers, June, July, and August 1991.

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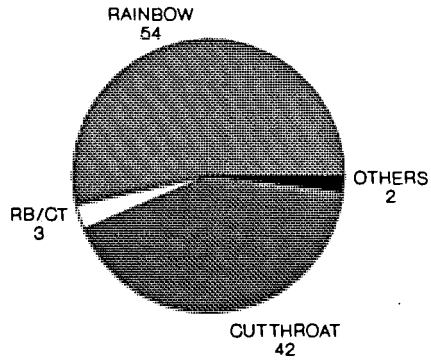

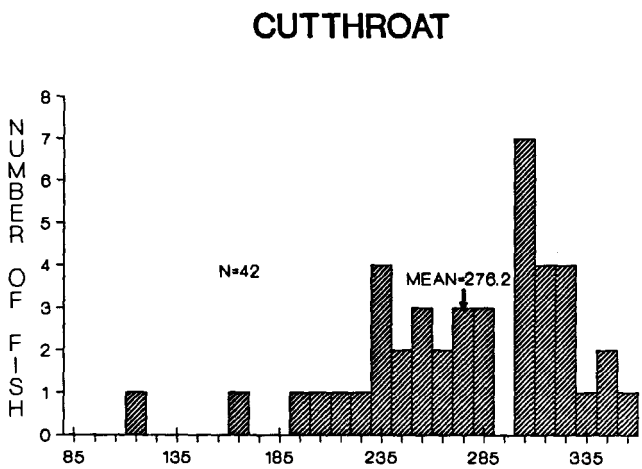

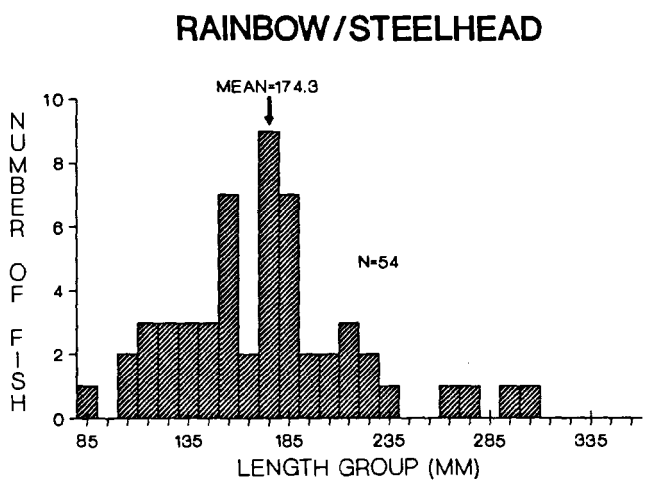

Figure 3. Species composition and length frequency of cutthroat trout and rainbow/steelhead caught by Department project anglers, July 1991.

Table 8. Middle Fork Salmon River float use data (U.S. Forest Service) and estimated angler use data for 1969 (Ortmann 1971), 1985 (Reingold and Davis 1987a), 1990 (Lukens and Schrader, in press), and 1991.

	Year			
	1969	1985	1990	1991
Number of passengers[a]	1,624	6,430	8,366	8,607
Percent passengers that fished	43	33	22	27
Commercial		37	19	32
Private		12	25	18
Total number of anglers	698	2,143	1,841	2,324
Passenger use days		36,672	49,354	51,083
Angler days	3,490[b]	12,102	10,858	13,792
Average hours fished/day	--	--	1.7	3.1
Angler hours	--	--	18,459	42,755
Percent anglers that fished tributaries	--	13	15	6

[a]Excluding commercial boatmen.
[b]Based on an estimated average trip length of 5 days.

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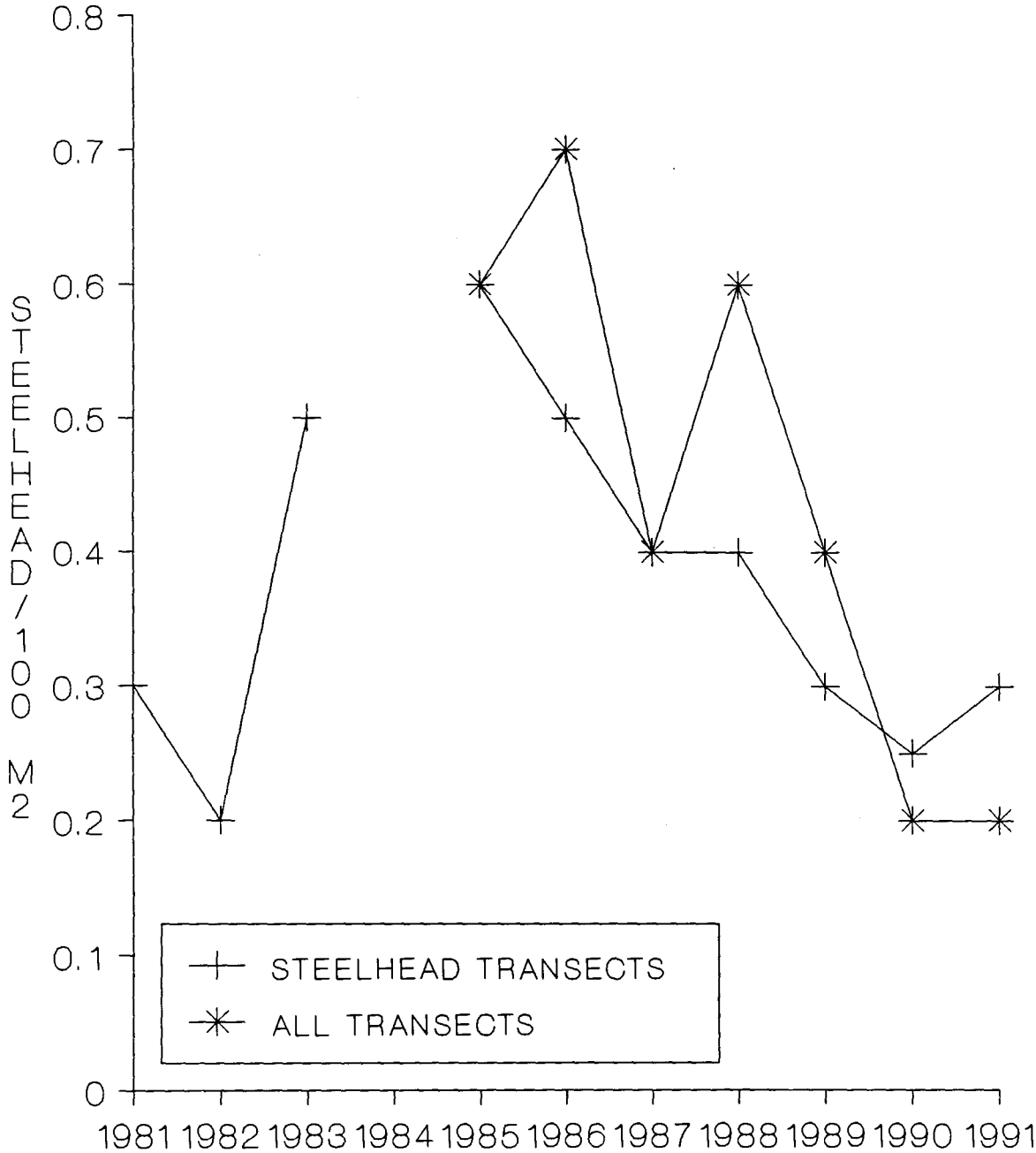


Figure 4. Densities of juvenile steelhead counted in all MFSR snorkeling transects and in steelhead only transects (see Table 1), 1981-91. Data for 1981-83 from Thurow (1982, 1983, 1985).

result of poor downstream smolt survival due to low spring runoff and high mortality in the eight Snake and Columbia river hydroelectric impoundments which has resulted in reduced spawning escapement.

For the first time since 1985, no chinook were observed in traditional MFSR transects (Figure 5). This was despite a slight increase in the number of redds counted in index areas the previous year (Figure 6). Only in one nontraditional transect above Boundary Creek (Fall) were juvenile chinook observed in the mainstem MFSR.

In cutthroat trout transects, the density of cutthroat increased considerably from 1990 to 1991, while densities in all transects remained about the same (Figure 7). The density of cutthroat trout larger than 300 mm has remained fairly stable since 1985.

In 1971, when snorkeling transects were first established and specifically for cutthroat trout, observed numbers were low (Figure 8). Following establishment of catch-and-release regulations for the mainstem MFSR in 1972, cutthroat trout numbers increased and appeared to peak in the early 1980s. Despite good numbers observed in 1987, the trend has been a general decline since. While fishing pressure and resulting hooking mortality in the MFSR probably are not limiting cutthroat abundance (see "Creel Census" section of discussion), other factors may be involved: low snow levels in 1991 resulted in the sixth consecutive year of drought in the Salmon River Basin; despite regulation protection, it is possible that cutthroat are being lost in the main Salmon River overwintering area due to intense catch-and-release pressure by steelhead anglers, noncompliance or inadequacy of the protected area; and regulation noncompliance by anglers fishing the MFSR.

Middle Fork Salmon River Tributary Snorkeling Transects

From 1990 to 1991, cutthroat densities decreased in four of the five tributaries snorkeled (Figure 9). Marble Creek was the exception where densities increased from 0.2 to 0.8 fish/100 m^2. These changes probably reflect no more than normal yearly fluctuations, particularly those which can be detected by the snorkeling techniques utilized. Densities observed in 1991 are similar to those observed in most of the tributaries since 1981.

Chinook densities decreased in three of the tributaries surveyed and remained the same in two. No chinook were observed in Big and Marble creeks; however, chinook have not been observed in Marble Creek since the transects were established in 1985. This is due to the lack of suitable spawning habitat in this stream. Overall, chinook densities in the five tributaries snorkeled in 1991 were the lowest observed since 1981. This has followed the statewide trend of decreasing chinook spawner escapement to Idaho streams.

Steelhead densities decreased in each tributary except Pistol Creek, which increased slightly from 1990 to 1991. No fish were observed in Marble Creek in 1991, but this stream has not been a significant steelhead producer.

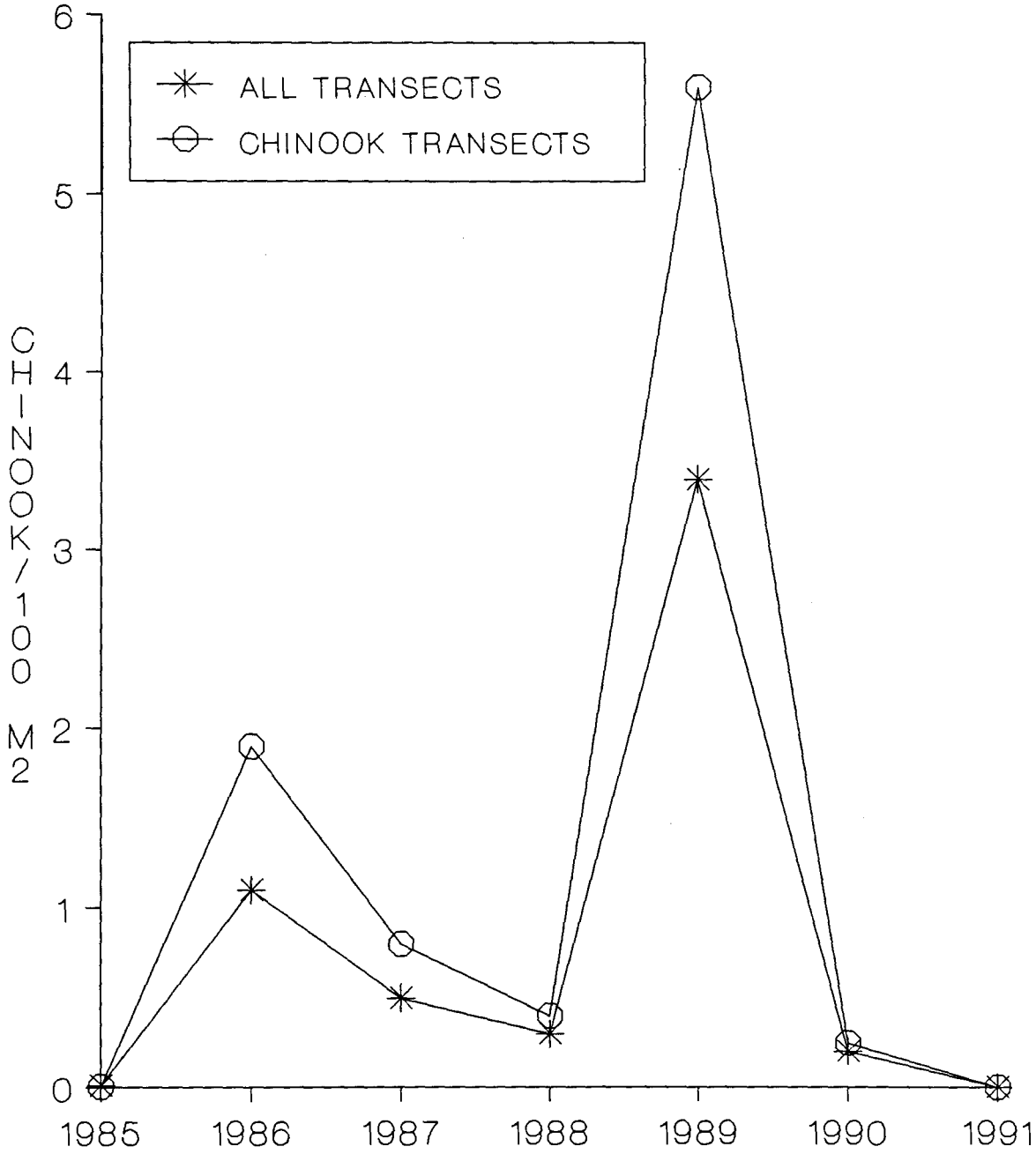


Figure 5. Densities of chinook salmon counted in all MFSR transects and in chinook/cutthroat only transects (see Table 1), 1985-91.

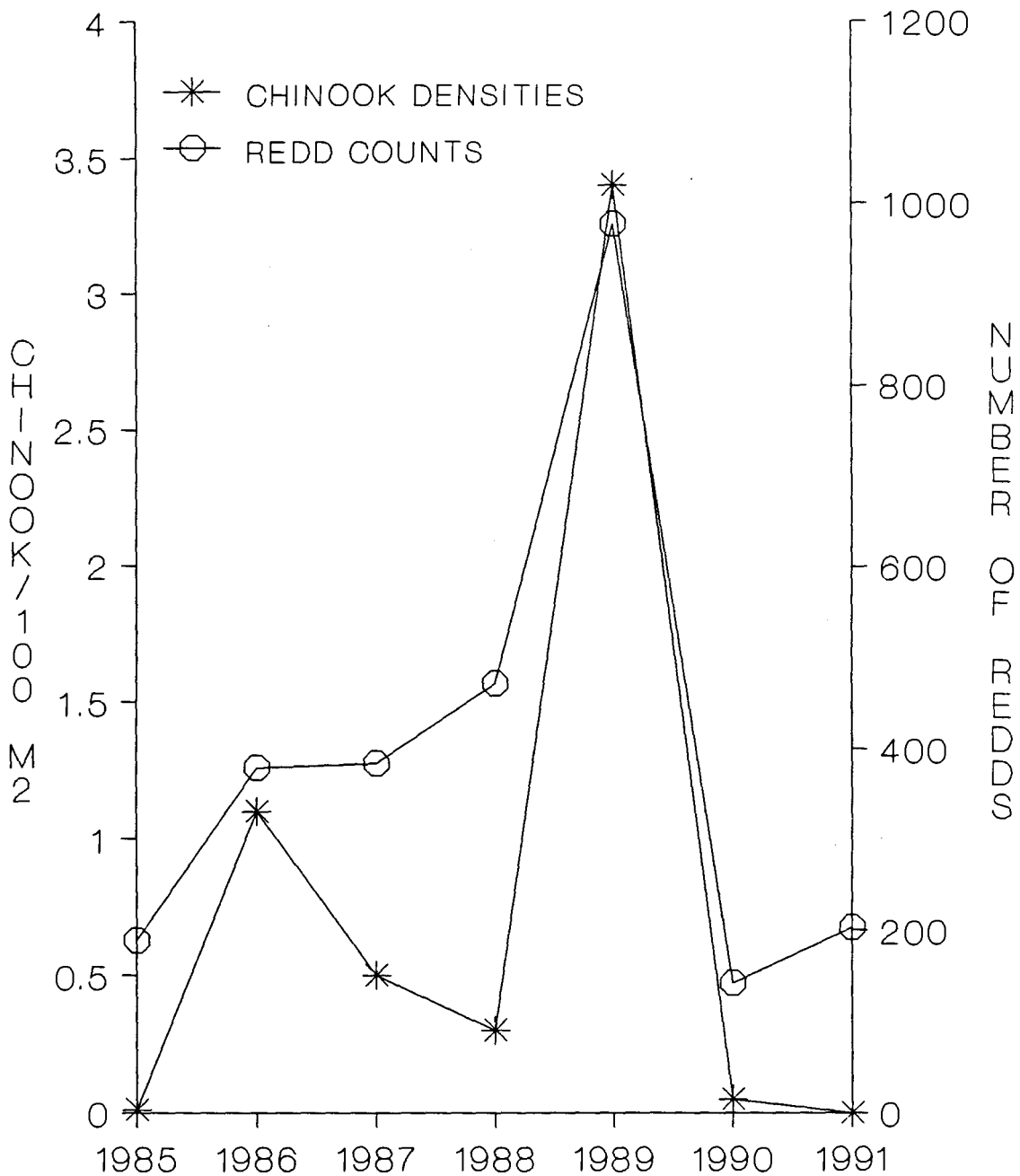


Figure 6. Densities of chinook salmon counted in all MFSR transects, 1985-91 and chinook redd counts in key MFSR tributary index areas for corresponding year classes (White and Cochnauer 1989, Idaho Department of Fish and Game, unpublished data).

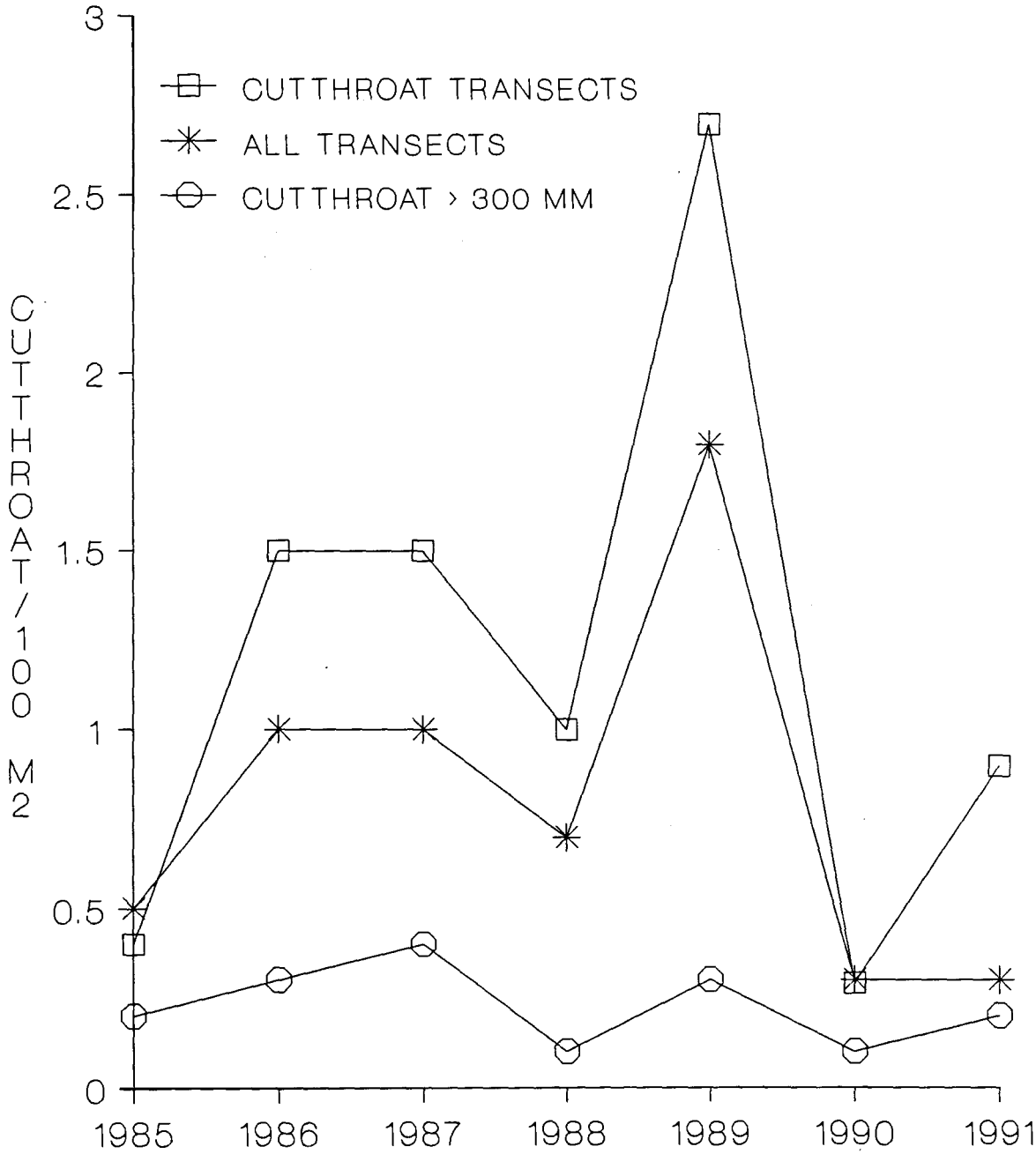


Figure 7. Densities of cutthroat trout counted in all MFSR transects, in cutthroat/chinook only transects (see Table 1) and of cutthroat trout larger than 300 mm in all transects, 1985-91.

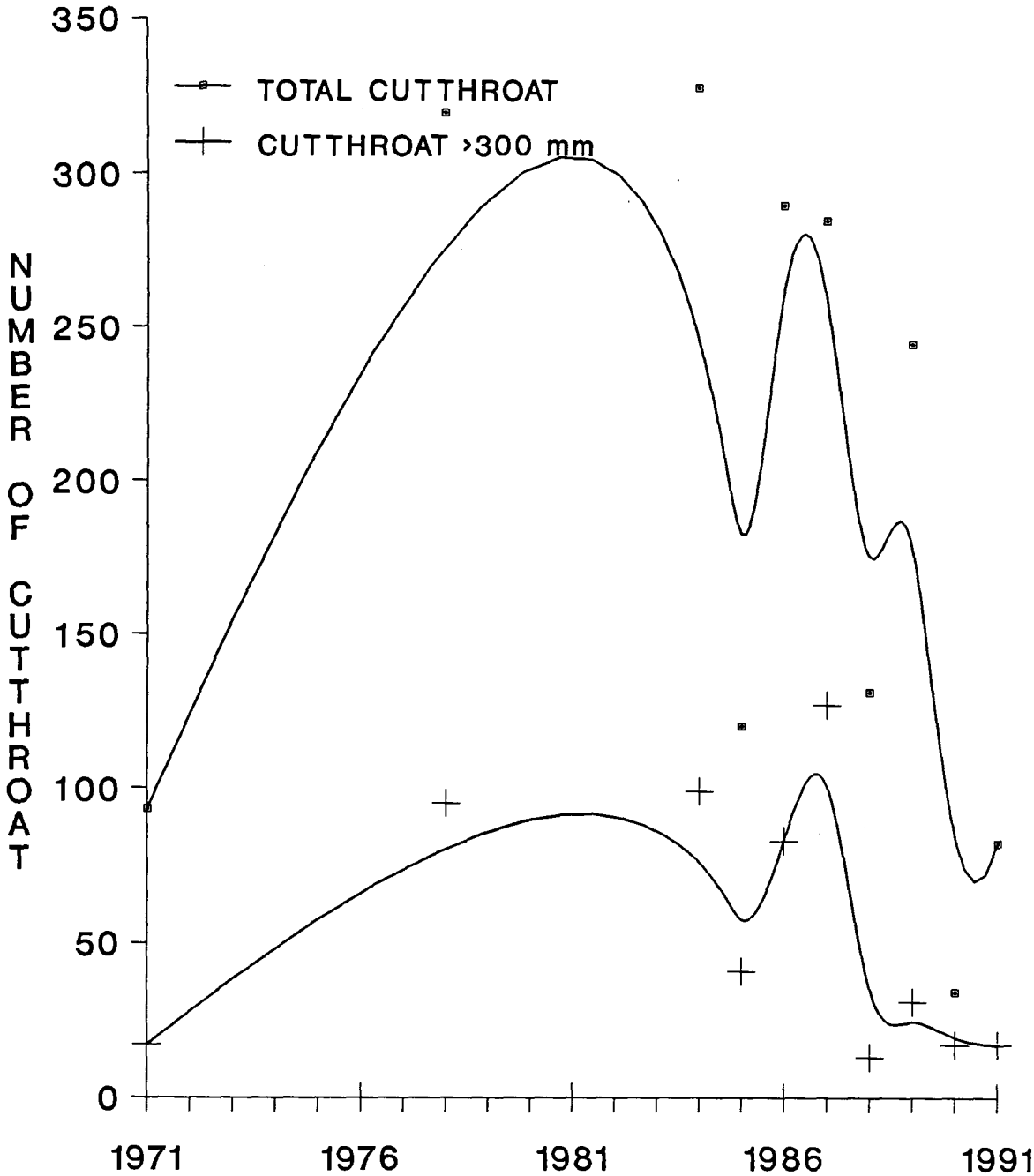


Figure 8. Numbers of cutthroat trout counted in traditional MFSR snorkeling transects (Pungo, Marble Pool, L. Jackass, Whitey Cox, Hospital Pool, Tappan Pool, Flying B, Big Creek Bridge, Ship Island, Otter Bar, and Goat Creek Pool), 1971-91.

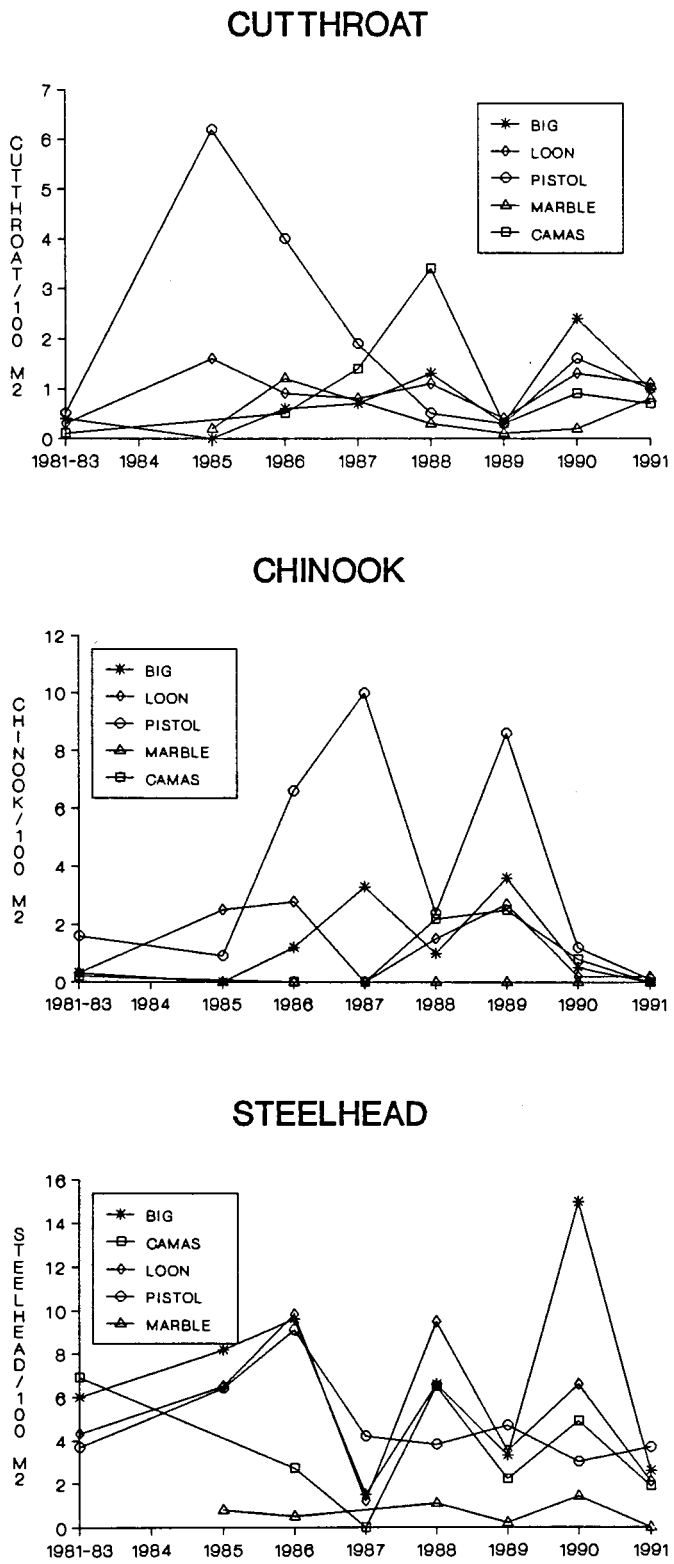


Figure 9. Densities of cutthroat trout, chinook salmon and steelhead in MFSR tributary snorkeling transects, 1981-91. Data for 1981-83 from Thurow (1982, 1983, 1985).

Similar to the situation observed for cutthroat densities, fluctuations in steelhead numbers appear normal and 1991 densities appear average, especially since 1987. Juvenile steelhead densities, like chinook, are heavily influenced by yearly spawner escapement.

Creel Census

The apparent decrease in cutthroat trout abundance, obvious hooking injuries of fish observed while snorkeling, and steadily increasing numbers of floaters (Figure 10) concerned fishery managers that perhaps hooking mortality was limiting population numbers. Despite increases in numbers of floaters, creel census data indicates that the number of anglers has remained fairly constant since 1985 (approximately 2,000 per season) (Table 6). Converting estimates of seasonal angler use from total hours to hours/hectare/season and comparing the MFSR to other wild cutthroat trout fisheries in Idaho shows that angler effort is relatively low (Figure 11). Further, applying literature values for hooking mortality to the estimated population size of MFSR cutthroat trout with current angling effort would produce negligible impacts. Also, these predicted impacts would be indistinguishable with currently employed snorkeling techniques (D. Schill, Idaho Department of Fish and Game, personal communication).

Two other potential mortality factors, yet to be addressed, include noncompliance in the MFSR and loss of fish which overwinter in the main Salmon River.

Salmon River Tributary Snorkeling Transects

The Salmon River tributary transects were established to monitor juvenile steelhead densities. Densities in the Pahsimeroi River transects have exhibited a general downward trend since 1985 with the lowest numbers observed in 1991 (Figure 12). This has coincided with a decreasing trend in wild/natural adult steelhead escapement to the Pahsimeroi River. Also, the Pahsimeroi River supports significant numbers of wild rainbow trout which, as juveniles, are indistinguishable from steelhead.

In the Salmon River canyon tributaries (Horse, Bargamin, Chamberlain, and Sheep creeks) steelhead densities in 1991 were similar to those observed in 1989 (the last year the transects were counted). The rainbow/steelhead observed in these tributaries are predominately steelhead.

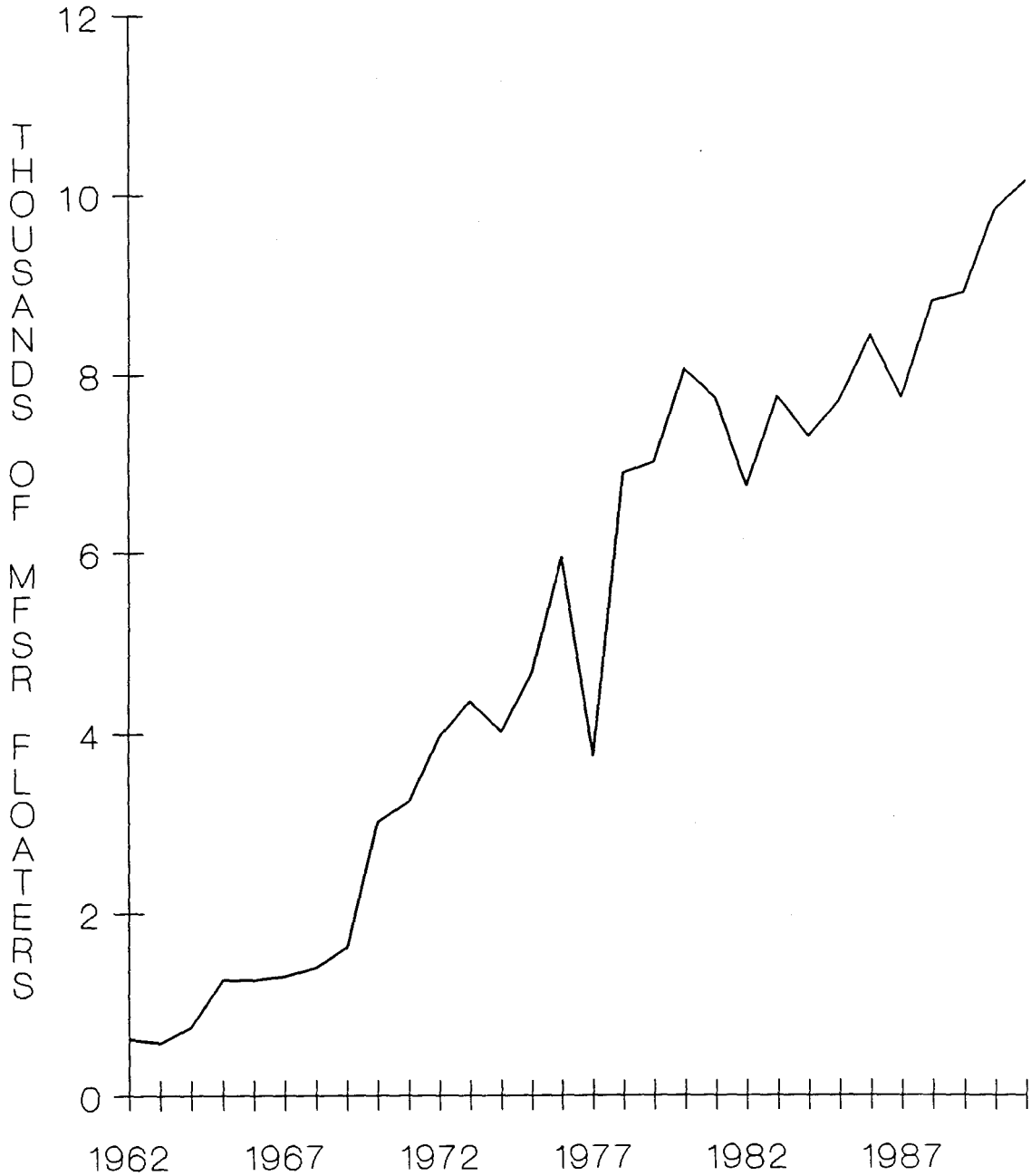


Figure 10. Number of MFSR floaters, 1962-91 (U.S. Forest Service data).

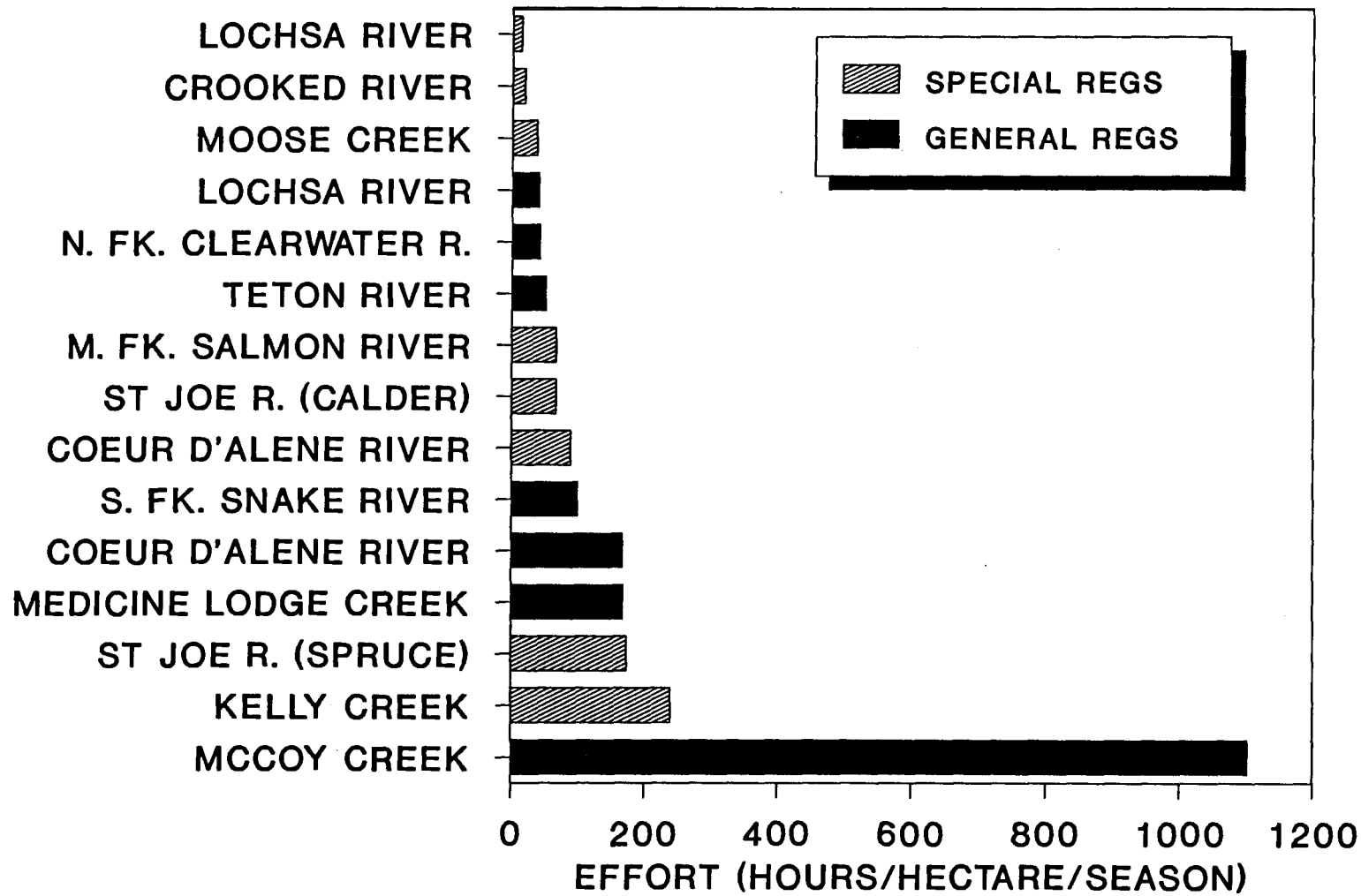
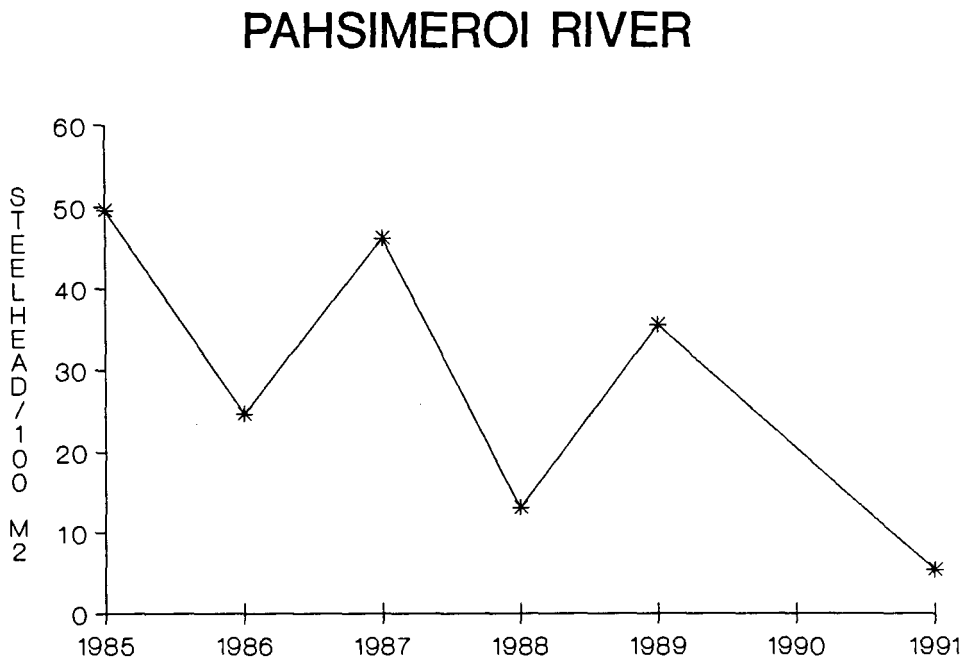


Figure 11. Estimated seasonal angler effort (hours/hectare/season) for wild cutthroat trout fisheries in the MFSR (1991) and various streams throughout Idaho (Dan Shill, Idaho Department of Fish and Game, personal communication).



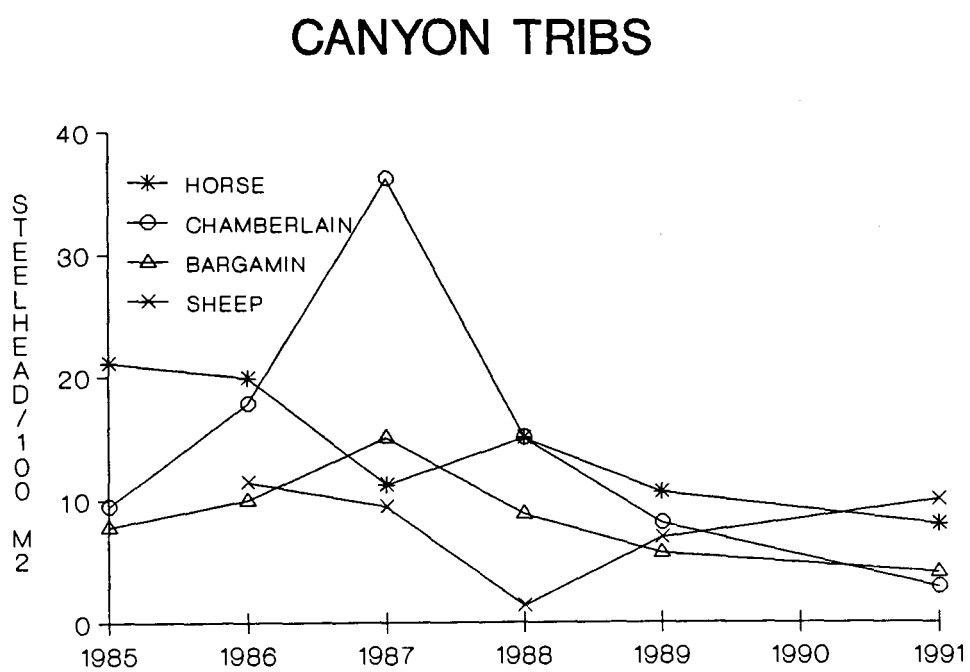


Figure 12. Steelhead densities in Salmon River tributary snorkeling transects, 1985-91.

RECOMMENDATIONS

1. Continue monitoring densities of juvenile steelhead, cutthroat trout, and chinook salmon in the MFSR and tributaries via snorkeling between the second week of July and the third week of August.

2. Determine total annual mortality of cutthroat trout and compare to other westslope cutthroat trout populations.

3. Snorkel additional transects in that portion of the MFSR between the confluence of Marsh and Bear Valley creeks and Dagger Creek and compare to results from downstream transects.

4. Employ techniques to determine level of regulation noncompliance in the MFSR.

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JOB PERFORMANCE REPORT

STATE OF: Idaho

NAME: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO.: F-71-R-16

JOB NO.: 7-c[2]

TITLE: Region 7 Rivers and Streams Investigations - Lemhi and Pahsimeroi River Wild Trout and Habitat Surveys and Salmon River Creel Survey

PERIOD COVERED: July 1, 1991 to June 30, 1992

ABSTRACT

We surveyed the mainstem Pahsimeroi and Lemhi rivers and 14 tributaries during summer 1991 to assess fish populations and habitat conditions. Electrofishing was conducted in two sections of the Pahsimeroi River. Mountain whitefish and rainbow/steelhead were the predominant species collected in the lower section at 52% and 23%, respectively. Other game species captured in the lower section were chinook (21%), brook trout (4%), and bull trout (4%). Bull trout and sculpin were the only species collected in the upper section.

Bull trout were the predominant species collected in the 11 Pahsimeroi River tributaries sampled. Other trout species captured included rainbow, brook, cutthroat, and rainbow/cutthroat hybrids. Few trout >275 mm total length were captured, and the largest fish collected was a 300 mm bull trout.

Estimated age 1 and older (>70 mm) trout (all species) densities ranged from 1.5-15.5 fish/100 m^2. Four tributaries contained only bull trout, and bull trout were collected in 9 of 11 tributaries sampled. Rainbow/cutthroat hybrids were collected in two tributaries, while brook trout were found in one stream.

In the mainstem Lemhi River near Leadore, juvenile chinook salmon were the predominant species sampled by electrofishing (37%), followed by rainbow/steelhead/cutthroat (33%), mountain whitefish (26%), dace (2%), sculpin (2%), brook trout (4%), and bull trout (4%). The largest rainbow/steelhead/cutthroat sampled was 530 mm (21 in) with 5.6% of this group being >300 mm (12 inches). The mean density for trout (all species) was 4.05 fish/100 m^2 for age 1 and older fish (>70 mm) at the six sites surveyed. Mean age 1 and older (>70 mm) whitefish density was 33 fish/100 m^2.

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Mean water depths for Pahsimeroi River tributaries ranged from dry to 33 cm, while mean widths ranged from 1.01-6.96 m. Water temperatures in July-August ranged from 5-26°C, pool habitats from 0-20X, riffle habitat from 40-80%, and sand/silt substrate from *2-40X.*

Anglers fishing the Salmon River between Bruno's Bridge RK 501.6 and the Shoup Bridge RK 427.7 during July-August 1991 experienced a catch rate of .86 fish/hour with the creel consisting mainly of hatchery and wild rainbow trout.

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OBJECTIVES

1 Determine species composition, relative abundance, and size structure of fish populations in the mainstem Pahsimeroi and Lemhi rivers.

2. Determine species composition, relative abundance, and size structure of fish populations in tributaries of the Pahsimeroi River.

3. Measure physical habitat characteristics and estimate amount of available fish habitat in Pahsimeroi River tributaries.

STUDY AREA AND METHODS

Mainstem Pahsimeroi and Lemhi Rivers

To determine species composition, relative abundance, and size structure of fish populations in the Pahsimeroi River, we electrofished three stations in July 1991. The downstream site consisted of two sampling stations. The first site was located behind the Pahsimeroi Fish Hatchery rearing ponds and the second near the confluence of the Salmon River. The upstream site was located at T11N, R24E, Sec 6 approximately 5 miles east of the Doublespring Ranch. Sampling was conducted on August 20-21, 1991.

To describe the fish community and estimate fish population parameters in the mainstem Lemhi River, we electrofished six stations near Leadore during June 1991. Specific site descriptions and photos for sample all locations are on file in the Region 7 office.

Fish were captured using direct-current (DC) electrofishing equipment (Coffelt VVP-15 powered by a 5,000-watt Honda generator) mounted in an aluminum canoe. We attempted to capture all sizes of game and nongame fish. Two to three electrofishing passes were made at each sampling site. Passes were made going upstream using about 150 volts and 3 amps non-pulsed DC. The second and third passes were made immediately after and with similar effort as the first. Though the station was not blocked at each end, we assumed fish would not move beyond natural habitat boundaries. After capture, fish were identified and measured to the nearest millimeter (total length). Trout species were also anesthetized with tricaine methane-sulfonate (MS-222), weighed to the nearest gram, and examined for marks.

We assumed capture probabilities did not vary with species, and we estimated relative abundance using proportions of all fish captured. Small rainbow could not be distinguished from wild steelhead. Although capture probabilities can vary with fish size, length frequencies were developed from all fish captured. We used the maximum likelihood estimator to estimate abundance and probability of capture (Van Deventer and Platts 1983).

Density estimates were reported as age 1 and older (>70 mm) fish per 100 m^2 of transect surface area.

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Pahsimeroi River Tributaries

To describe fish communities and estimate fish population parameters, we electrofished 11 Pahsimeroi River tributaries in July and August 1991. Specific site locations and photos are on file in the Region 7 office. Fish were captured using backpack direct-current (DC) electrofishing equipment (Coffelt BP-1C powered by a 120 watt generator). We attempted to capture all sizes of game and nongame fish. Two passes were made going upstream, and the second pass was made immediately after and with similar effort to the first. Though electrofishing stations were not blocked at each end, we assumed fish would not move beyond natural habitat boundaries. Stations varied in length from 65 to 127 m.

After capture, fish were anesthetized with tricaine methane-sulfonate (MS-222), identified, weighed to the nearest gram, and measured to the nearest millimeter (total length). Fish from each electrofishing pass were allowed to recover in separate holding pens until capture probabilities were calculated. We assumed capture probabilities did not vary with species, and we estimated relative abundance using all fish captured. We could not distinguish smaller rainbow (<225 mm) from wild steelhead trout. Although capture probabilities can vary with fish size, length frequency distributions were developed from all fish captured. We used the maximum likelihood estimator to estimate abundance and probability of capture (Van Deventer and Platts 1983).

Density estimates were reported as fish sampled per 100 m^2 of transect surface area. Because smaller trout were not efficiently sampled, only fish 70 mm and larger were used in the calculations. Also, all trout species were combined to make each density estimate.

We measured physical habitat characteristics and estimated amount of avilable fish habitat for the same transects that we electrofished. Measurements and estimates were generally made the same day the stream was electrofished. Four or more transects, perpendicular to the thalweg and 20 m apart, were located in each station. Each transect was divided into 1/4, 1/2, and 3/4 intervals. We measured water depth, mean width, habitat type (Bisson et al. 1981), and substrate type (Platts et al. 1983) at each interval.

Salmon River Creel Census

In an effort to begin evaluating kamloop rainbow trout releases in the Salmon River between Bruno's Bridge (RK 501.6) and the Shoup Bridge (RK 427.7) creel checks were conducted randomly in July and August 1991. Information collected included number of boatlshore anglers, state of residence, total hours fished, number of fish kept and released, and total fish caught. Number of each species of fish kept was recorded and rainbow trout were defined as wild or hatchery. Total length of each fish checked was also recorded. Each angler was asked to rate the fishery (excellent, good, fair, or poor).

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RESULTS AND DISCUSSION

Mainstem Pahsimeroi River

At least ten fish species were captured in the lower Pahsimeroi River sample site (Table 1). Mountain whitefish Prosopium williamsoni and rainbow/ steelhead Oncorhynchus mykiss were the predominant species collected, 52% and 23% respectively. Other species included chinook salmon Oncorhynchus tshawytscha, bull trout Salvelinus confluentus, brook trout Salvelinus fontinalis, sculpin Cottus spp., redside shiner Richardsonius balteatus, dace Rhinichthys spp., sucker Catostomus spp., and squawfish Ptychocheilus oregonensis. Bull trout and sculpin were the only species captured in the upper site (Table 1). Bull trout averaged 234 mm long and ranged from 185-336 mm (Appendix A).

Estimated densities of age I and older (>70 mm) trout ranged from 1.5-4.9 fish/100 m^2 (Table 2). Densities of age I and older mountain whitefish ranged from 5.6-7.0 fish/100 m^2 in the downstream sample sites. Estimated densities for young-of-the-year (YOY) whitefish ranged from 0.8-1.4 fish/100 m^2 in these sites.

Rainbow/steelhead ranged in size from 67-468 mm in the two downstream sites and averaged 160.4 mm. A total of 47 rainbow/steelhead were captured with four fish larger than 350 mm (Appendix B). Brook trout ranged from 115-243 mm and averaged 204 mm. Only one bull trout was captured at the lower two Pahsimeroi River sampling sites. No cutthroat trout or rainbow/cutthroat were collected in the mainstem Pahsimeroi River. A total of 143 mountain whitefish were captured at the lower sites which ranged from 85-395 mm and averaged 162 mm. Chinook ranged from 91-196 mm with a mean total length of 108 mm (Appendix B). Chubs, redside shiners, sculpins, dace, suckers, and squawfish were also captured at the lower two Pahsimeroi River sample sites. Sculpin were the only nongame fish species captured at the upstream site. Species composition and size structure were not estimated for nongame species.

Mainstem Lemhi River

At least seven different fish species were captured in the six sample sites during June 1991. In decreasing order of abundance they were: juvenile chinook salmon, rainbow/steelhead/cutthroat trout, mountain whitefish, dace, sculpin, brook and bull trout (Table 3). Rainbow/steelhead/cutthroat trout probably included residualized steelhead trout, as well as rainbow X cutthroat trout hybrids. Although the extent of hybridization is unknown, few fish exhibit red or orange slashes on the underside of the lower jaw. The river is not stocked, and neither hatchery rainbow/steelhead nor adult chinook salmon were observed.

Densities of age 1 and older trout (all species) sampled at six sites ranged from 0.8-6.2 fish/100 m^2 and averaged 4.05 fish/100 m^2 (Table 4). Density estimates for whitefish (all age classes) ranged from 0.94-5.6 fish/100 m^2 and averaged 3.13 fish/100 m^2 (Table 5).

Table 1. Species composition for Pahsimeroi River stations electrofished during August 1991.

	Station	
	Upper[a]	Lower[b]
Date surveyed	8/21	8/20
Sample size	8	277
Relative abundance (X):		
Whitefish	0	52
Rainbow/steelhead	0	23
Brook trout	0	4
Bull trout	100	21
Chinook	0	21
Sculpin	c	c
Redside shiner	0	c
Dace	0	c
Sucker	0	c
Squawfish	0	c

[a]Upper = T12N, R24E, Sec. 6
[b]Lower = Section behind Pahsimeroi Hatchery rearing ponds and section near the confluence of the Salmon River.
[c]Species observed but not enumerated.

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Table 2. Estimates of fish density and capture probability at mainstem Pahsimeroi River sites sampled during August 1991.

Station	Date surveyed	Density (fish/100 m2)	Lower 95% CI	Upper 95% CI	Capture prob (P)	Total captured
Upstream site						
Trout[a]	8/21	1.5	.9	2.2	.70	8
Downstream site 1						
Trout[a]	8/20	2.5	2.4	2.7	.86	30
YOY mountain whitefish[b]		.8	.6	.9	.81	9
Age I and older mountain whitefish		5.6	4.9	6.2	.73	62
Downstream site 2						
Trout[a]	8/20	4.9	4.2	5.6	.73	45
YOY mountain whitefish[b]		1.4	.9	1.9	.68	13
Age I and older mountain whitefish		7.0	5.5	8.4	.63	60

a> 70 mm

b> ≤ 100 mm

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Table 3. Fish species composition and relative abundance estimates for six Lemhi River sample sites surveyed during 1990.

Sample Site	Date surveyed	Sample size	Number captured						
			CK	RB	BT	SC	DV	WF	DC
Stroud Gulch Rd	6/27	86	34	8	0	13	0	31	0
Power Lane	6/26	113	37	33	0	0	0	42	1
Darwin	6/26	95	61	22	1	0	0	11	0
Power house	6/25	236	92	82	0	0	0	62	0
Big Springs	6/25	252	88	107	0	1	0	43	13
L-59	6/26	140	33	48	0	5	1	49	4
Total		922							
Relative Abundance (%)			37	33	1	2	1	26	2

CK = chinook salmon
RB = rainbow/steelhead/cutthroat
BT = brook trout
SC = sculpin
DV = bull trout
WF = mountain whitefish
DC = dace

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Table 4. Estimates of trout densities (all species) and capture probabilities for six Lemhi River sites sampled during June 1991.

Site	Date surveyed	Density (fish/100 m^2)	Lower 95% CI	Upper 95X CI	Capture prob.	Sample size
Stroud Gulch Rd	6/27	.8	--	2.3	.40	8
Power Lane	6/26	5.7	--	11.7	.35	33
Darwin	6/26	1.9	1.8	2.0	.82	22
Power house	6/25	4.2	4.0	4.5	.83	82
Big Springs	6/25	6.2	6.0	6.3	.84	108
L-59	6/26	5.5	5.2	5.7	.87	48

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Table 5. Estimates of whitefish densities and capture probabilities for six Lemhi River sites sampled during June 1991.

Site	Date surveyed	Density (fish/100 m^2)	Lower 95% CI	Upper 95% CI	Capture prob.	Sample size
Stroud Gulch Rd	6/27	2.08	1.9	2.2	.9	31
Power Lane	6/26	4.60	3.7	5.4	.7	42
Darwin	6/26	.94	.86	1.01	.78	11
Power House	6/25	3.13	3.04	3.2	.91	62
Big Springs	6/25	2.45	2.4	2.5	.97	43
L-59	6/26	5.6	5.5	5.62	.98	49

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Pahsimeroi River Tributaries

Mean total lengths of all trout species captured in the 11 Pahsimeroi River tributaries ranged from 88-186 mm (Table 6, Appendices I-S). Few trout larger than 275 mm were captured, and the largest was a 300 mm bull trout collected in Falls Creek. Lukens and Schrader (1991) reported trout >300 mm in one of six Pahsimeroi River tributaries surveyed in 1989.

Bull trout were captured in 9 of 11 tributaries sampled and were the only trout species captured in 4 streams. Brook trout were found in one stream (Table 7).

Densities of age I and older (>70 mm) trout ranged from 1.5 fish/100 m^2 in Goldburg Creek to 15.5 fish/100 m^2 in Morse Creek (Table 8).

Average water depths ranged from 6.2-33 cm in July/August 1991 (Table 9). Pool habitat ranged from 0-202, riffle habitat ranged from 33-80%, and run habitat ranged from 0-502 in the tributaries surveyed (Table 3).

Sand/silt substrate ranged from *2-402,* cobble from 8-362, and boulder from 5-582 (Table 10).

Salmon River Creel Census

During July-August 1991, 16 anglers were interviewed (Table 11). They had fished for 22.5 hours and caught 18 fish for a catch ratio of .86 fish/hour. Total fish caught include fish harvested (22%) and fish released (78%). Anglers were asked to subjectively evaluate the fishery. Of a total of six party responses, 672 thought the Salmon River resident trout fishing was poor, while the remaining 33% rated it as fair.

RECOMMENDATIONS

1. Continue stocking marked kamloop trout fingerlings in September at Shoup and Bruno bridges.

2. Continue and expand complete creel census on Salmon River between Shoup and Bruno bridges to evaluate kamloop rainbow trout releases.

3. Evaluate kamloop rainbow trout and relative abundance of all species by electrofishing.

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Table 6. Minimum, maximum, and mean total length (TL) of trout (all species) captured in Pahsimeroi tributaries during July and August 1991.

Tributary	Date Surveyed	Min TL (mm)	Max TL (mm)	Mean TL (mm)	Sample Size
Goldburg Cr.	7/10	65	240	168.8	6
Big Gulch Cr.	7/10	116	173	144.5	2
Sulphur Cr.	7/09	101	178	139.5	2
N. Fk. Lawson Cr.	7/08	77	125	88.1	7
N. Fk. Big Cr.	7/25	64	225	119.2	20
Tater Cr.	7/24	124	254	168.3	11
Patterson Cr.	7/25	115	222	186.0	12
Morse Cr.	7/30	76	260	147.8	67
Morgan Cr.	7/30	62	236	154.0	27
S. Fk. Big Cr.	8/05	65	278	137.2	19
Falls Cr.	7/30	84	300	179.0	45

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Table 7. Species composition and relative abundance estimates for Pahsimeroi River tributaries surveyed during July and August 1991.

Stream	Date surveyed	Sample size	RB/CT	Relative abundance (X) RB	CT	DV	BT
Goldburg Cr.	7/10	6				17	83
Big Gulch Cr.	7/10	2				100	
Sulphur Cr.	7/09	2		100			
N. Fk. Lawson Cr.	7/08	7		100			
N. Fk. Big Cr.	7/25	20	50			50	
Tater Cr.	7/24	11				100	
Patterson Cr.	7/25	12				100	
Morse Cr.	7/30	63			13	87	
Morgan Cr.	7/30	27			89	11	
S. Fk. Big Cr.	8/05	19	79			21	
Falls Cr.	7/30	45				100	

RB = rainbow trout
CT = cutthroat trout
DV = bull trout
BT = brook trout
RB/CT = hybrid

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Table 8. Estimates of trout densities (all species) and capture probabilities in Pahsimeroi River tributaries sampled during July and August 1991. Estimates are for trout (all species) >70 mm total length only.

Tributary	Date surveyed	Density (fish/100 m2)	Lower 95% CI	Upper 95% CI	Capture probability (P)	Sample size (>7+ cm)
Morse Cr.	7/30	15.5	11.9	19.0	.60	63
Morgan Cr.	7/30	7.0	6.5	7.6	.84	27
S. Fk. Big Cr.	8/05	3.8	3.3	4.4	.81	17
Falls Cr.	7/30	--			--	45
Patterson Cr.	7/25	2.0	1.9	2.2	.92	12
Sulphur Cr.	7/09	2.3	2.3	7.2	.83	2
N. Fk. Big Cr.	7/25	4.2	2.8	8.5	.42	19
N. Fk. Lawson Cr.	7/08	6.4	5.6	12.4	.58	8
Goldburg Cr.	7/10	1.5	1.5	1.6	.92	5
Big Gulch Cr.	7/10	2.3	2.3	7.2	.83	2
Tater Cr.	7/24	--			--	11

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Table 9. Mean depths and widths for Pahsimeroi River tributaries sampled during July and August 1991.

Stream	Date surveyed	Mean depth (cm)	Mean width (m)
Goldburg Cr.	7/10	30.4	4.3
Big Gulch Cr.	7/10	13.1	1.5
Sulphur Cr.	7/09	9.3	1.0
N. Fk. Lawson Cr.	7/08	6.2	1.2
N. Fk. Big Cr.	7/25	29.5	6.9
Patterson Cr.	7/25	31.7	6.1
Morse Cr.	7/30	24.8	4.6
Morgan Cr.	7/30	33.0	4.3
S. Fk. Big Cr.	8/05	21.3	4.9
Falls Cr.	7/30	25.5	5.2
Double Spring Cr.	7/10	dry	--
Mill Cr.	7/09	15.0	1.3
Meadow Cr.	7/09	dry	--

Table 10. Estimates of habitat and substrate types in Pahsimeroi River tributaries 1991.

Stream	Date surveyed	Habitat type (%)			Substrate type			
		Pool	Run	Riffle	Sand/ silt	Gravel	Cobble	Boulder
Goldburg Cr.	7/10	20	40	40	29	18	28	26
Big Gulch Cr.	7/10	20	0	80	10	22	30	38
Sulphur Cr.	7/09	0	29	71	40	47	8	5
N. Fk. Lawson Cr.	7/08	20	20	60	25	50	15	10
N. Fk. Big Cr.	7/25	17	50	33	2	9	15	74
Patterson Cr.	7/25	0	20	80	7	21	24	48
Morse Cr.	7/30	20	40	40	15	50	20	15
Morgan Cr.	7/30	20	20	60	6	8	29	58
S. Fk. Big Cr.	8/05	0	20	80	15	23	36	26
Falls Cr.	7/30	0	20	80	6	25	35	34
Mill Cr.	7/09	0	25	75	20	64	8	8
Meadow Cr.	7/09							

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Table 11. Salmon River creel survey data summary July 1991. C/R = catch rate (fish/hour).

# Shore anglers	I Boat anglers	Total hours	I Fish kept	I Fish released	Total fish caught (C/R)	ID resident Yes	ID resident No
10	6	22.5	4	14	.86	9	14

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A P P E N D I C E S

Appendix A. Length frequency distribution of fish captured in the upstream Pahsimeroi River site during August 1991.

TL range (mm)	Bull trout (8)
< 50	
50-59	
60-69	
70-79	
80-89	
90-99	
100-109	
110-119	
120-129	
130-139	
140-149	
150-159	
160-169	
170-179	
180-189	
190-199	
200-209	2
210-219	
220-229	
230-239	2
240-249	
250-259	
260-269	
270-279	
280-289	
290-299	
300-309	
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

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Appendix B. Length frequency distribution of fish captured in the downstream Pahsimeroi River sites (2) during August 1991.

TL range (mm)	Wild rainbow steelhead (47)	Hatchery steelhead (16)	Chinook (63)	Brook trout (11)	Bull trout (1)	Whitefish (143)
< 50						
50-59						
60-69	9					
70-79	5					
80-89						3
6						
90-99	1		12			16
100-109			31			36
110-119			8	1		34
120-129	1		10			5
130-139	2		1			
140-149	1	1				
150-159	1					
160-169	5					
170-179	2	2		1		
180-189	2			1		4
190-199	4	2	1	1		2
200-209	3	2		1		3
210-219	1	2		1		1
220-229	1			3		
230-239		2			1	2
240-249		2		2		
250-259		1				2
260-269		1				3
270-279	1	1				1
280-289	1					6
290-299						3
300-309						5
310-319						5
320-329						3
330-339						1
340-349						1
350-359	1					1
360-369						
370-379						2
380-389	2					
390-399						1
400-409						
410-419						
420-429						
430-439						
440-449						
450-459						
460-469	1					
470-479						
480-489						
490-499						
> 500						

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Appendix C. Length frequency distribution of fish captured at the Lemhi River Stroud Gulch site during June 1991.

TL range (mm)	Rainbow/ Steelhead/ Cutthroat	Chinook	Whitefish	Sculpi
< 50	2			
50-59		3	1	3
60-69		7	2	
70-79		16		3
80-89		6		
90-99		2		
100-109				4
110-119				
120-129				
130-139				
140-149	1			
150-159				
160-169	1			
170-179				
180-189				
190-199	1		1	
200-209				
210-219				
220-229	1			
230-239				
240-249				
250-259				
260-269				
270-279			1	
280-289				
290-299			1	
300-309			1	
310-319			1	
320-329			1	
330-339			2	
340-349			2	
350-359			2	
360-369			6	
370-379			3	
380-389			4	
390-399			1	
400-409			1	
410-419			1	
420-429	1			
430-439				
440-449				
450-459				
460-469	1			
470-479				
480-489				
490-499				
> 500				

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Appendix D. Length frequency distribution of fish captured at the Lemhi River Power Lane site during June 1991.

TL range (mm)	Rainbow/ Steelhead/ Cutthroat	Chinook	Whitefish	Dace
< 50	3			
50-59	1		2	4
60-69		12	5	
70-79		17		
80-89			4	
90-99		1		
100-109	2			
	1			
110-119	5		1	
120-129	3			
130-139	5			
140-149	3			
150-159	5			
160-169	5			
170-179	1			2
180-189	1			4
190-199			3	
200-209				
210-219				
220-229				
230-239				
240-249				
250-259				
260-269				
270-279				
280-289				
290-299				
300-309				
310-319				
320-329				
330-339				
340-349				
350-359				
360-369				
370-379				
380-389				
390-399				
400-409				
410-419				
420-429				
430-439				
440-449				
450-459				
460-469		470-479		480-489
490-499				
> 500				

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Appendix E. Length frequency distribution of fish captured at the Lemhi River site during June 1991.

TL range (mm)	Rainbow/ Steelhead/ Cutthroat	Chinook	Whitefish
< 50			
50-59	1	7	3
60-69		18	
70-79	1	15	
80-89		13	
90-99			
100-109	6	7	
110-119		1	
120-129	5		
130-139			
140-149			
150-159	2		
160-169			
170-179	2		
180-189			
190-199			
200-209			
210-219			
220-229			
230-239			
240-249			
250-259			1
260-269			
270-279			
280-289			
290-299			
300-309			
310-319			
320-329	1		1
330-339			
340-349			
350-359			1
360-369			
370-379	1		5
380-389			
390-399			
400-409			1
410-419			
420-429			
430-439			
440-449			
450-459			
460-469			
470-479			
480-489			
490-499			
> 500			

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Appendix F. Length frequency distribution of fish captured at the Lemhi River Power House site during June 1991.

TL range (mm)	Rainbow/ Steelhead/ Cutthroat	Chinook	Whitefish
< 50	1	1	
50-59	2	35	10
60-69		19	
70-79	2	23	
80-89		8	
90-99		5	
100-109	20		
110-119	9		
120-129	23		
130-139	10		
140-149	4		
150-159	8	1	
160-169			
170-179			2
180-189			
190-199			
200-209	1		1
210-219	1		
220-229			2
230-239			
240-249			1
250-259			
260-269			
270-279			
280-289			
290-299			
300-309			20
310-319			23
320-329			3
330-339			
340-349			
350-359			
360-369			
370-379	1		
380-389			
390-399			
400-409			
410-419			
420-429			
430-439			
440-449			
450-459			
460-469	1		
470-479			
480-489			
490-499			
> 500			

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Appendix G. Length frequency distribution of fish captured at the Lemhi River Big Springs site during June 1991.

TL range (mm)	Rainbow/ Steelhead/ Cutthroat	Chinook	Whitefish	Dace	Sculpin
< 50	2			1	
50-59	9	2	1		
60-69	5	3	2		
70-79	1	13		2	
80-89		11		6	
90-99		2		2	
100-109	4	2		1	1
110-119	2				
120-129	7				1
130-139	12				
140-149	7				
150-159	7				
160-169	4		1		
170-179	7		2		
180-189	4				
190-199	1				
200-209			1		
210-219	1				
220-229					
230-239					
240-249					
250-259					
260-269					
270-279					
280-289					
290-299	1				
300-309					
310-319			3		
320-329			2		
330-339			1		
340-349	1		3		
350-359	1		4		
360-369			1		
370-379	1		4		
380-389			6		
390-399			3		
400-409			5		
410-419			3		
420-429			1		
430-439					
440-449					
450-459	1				
460-469	2				
470-479					
480-489					
490-499					
> 500	2				

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Appendix H. Length frequency distribution of fish captured at the Lemhi River L-59 site during June 1991.

TL range (mm)	Rainbow/ Steelhead/ Cutthroat	Chinook	Whitefish	Dace	Sculpin
< 50					
50-59			3		
60-69		2	10		1
70-79		9	1		
80-89		12			1
90-99		8			1
100-109	3	2		2	1
110-119	5			2	
120-129	4				
130-139	5				
140-149	6				
150-159	8				
160-169	8				
170-179					
180-189	2				
190-199			1		
200-209					
210-219					
220-229					
230-239					
240-249					
250-259			1		
260-269	1		4		
270-279	1				
280-289	1		1		
290-299	1		2		
300-309			4		
310-319			6		
320-329			4		
330-339			4		
340-349			4		
350-359			3		
360-369					
370-379					
380-389					
390-399					
400-409	2				
410-419					
420-429					
430-439					
440-449	1				
450-459					
460-469					
470-479					
480-489					
490-499					
> 500					

SAL91DJ9

Appendix I. Length frequency distribution of fish captured at the Pahsimeroi River Goldburg Creek site during August 1991.

TL range (mm)	Brook trout	Bull trout
< 50		
50-59		
60-69	1	
70-79	1	
80-89		
90-99		
100-109		
110-119		
120-129		
130-139		
140-149		
150-159		
160-169		
170-179		
180-189		
190-199		
200-209	1	1
210-219		
220-229		
230-239	1	
240-249	1	
250-259		
260-269		
270-279		
280-289		
290-299		
300-309		
310-319		
320-329		
330-339		
340-349		
350-359		
360-369		
370-379		
380-389		
390-399		
400-409		
410-419		
420-429		
430-439		
440-449		
450-459		
460-469		
470-479		
480-489		
490-499		
> 500		

SAL91DJ9

Appendix J. Length frequency distribution of fish captured at the Pahsimeroi River Big Gulch site during August 1991.

TL range (mm)	Bull trout
< 50	
50-59	
60-69	
70-79	
80-89	
90-99	
100-109	
110-119	1
120-129	
130-139	
140-149	
150-159	
160-169	
170-179	1
180-189	
190-199	
200-209	
210-219	
220-229	
230-239	
240-249	
250-259	
260-269	
270-279	
280-289	
290-299	
300-309	
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

SAL91DJ9

Appendix K. Length frequency distribution of fish captured at the Pahsimeroi River Sulfur Creek site during August 1991.

TL range (mm)	Rainbow trout
< 50	
50-59	
60-69	
70-79	
80-89	
90-99	
100-109	1
110-119	
120-129	
130-139	
140-149	
150-159	
160-169	
170-179	1
180-189	
190-199	
200-209	
210-219	
220-229	
230-239	
240-249	
250-259	
260-269	
270-279	
280-289	
290-299	
300-309	
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

SAL91DJ9

Appendix L. Length frequency distribution of fish captured at the Pahsimeroi River N. Fork of Lawson Creek site during August 1991.

TL range (mm)	Rainbow trout
< 50	
50-59	
60-69	
70-79	3
80-89	3
90-99	
100-109	
110-119	
120-129	1
130-139	
140-149	
150-159	
160-169	
170-179	
180-189	
190-199	
200-209	
210-219	
220-229	
230-239	
240-249	
250-259	
260-269	
270-279	
280-289	
290-299	
300-309	
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

SAL91DJ9

Appendix M. Length frequency distribution of fish captured at the Pahsimeroi River N. Fork Big Creek site during August 1991.

TL range (mm)	Bull trout	Rainbow/Cutthroat trout
< 50		
50-59		
60-69	1	
70-79		2
80-89	2	1
90-99	3	
100-109	2	
110-119		1
120-129		1
130-139		
140-149		1
150-159		1
160-169	1	1
170-179	1	1
180-189		
190-199		
200-209		
210-219		
220-229		1
230-239		
240-249		
250-259		
260-269		
270-279		
280-289		
290-299		
300-309		
310-319		
320-329		
330-339		
340-349		
350-359		
360-369		
370-379		
380-389		
390-399		
400-409		
410-419		
420-429		
430-439		
440-449		
450-459		
460-469		
470-479		
480-489		
490-499		
> 500		

SAL91DJ9

Appendix N. Length frequency distribution of fish captured at the Pahsimeroi River Tater Creek site during August 1991.

TL range (mm)	Bull trout
< 50	
50-59	
60-69	
70-79	
80-89	
90-99	
100-109	
110-119	
120-129	1
130-139	2
140-149	3
150-159	
160-169	
170-179	1
180-189	2
190-199	
200-209	
210-219	1
220-229	
230-239	
240-249	
250-259	1
260-269	
270-279	
280-289	
290-299	
300-309	
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

SAL91DJ9

Appendix O. Length frequency distribution of fish captured at the Pahsimeroi River Patterson Creek site during August 1991.

TL range (mm)	Bull trout
< 50	
50-59	
60-69	
70-79	
80-89	
90-99	
100-109	
110-119	
120-129	
130-139	
140-149	
150-159	
160-169	
170-179	
180-189	
190-199	2
200-209	
210-219	3
220-229	2
230-239	
240-249	
250-259	
260-269	
270-279	
280-289	
290-299	
300-309	
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

SAL91DJ9

Appendix P. Length frequency distribution of fish captured at Pahsimeroi River Morse Creek site during August 1991.

TL range (mm)	Bull trout	Cutthroat trout
< 50		
50-59		
60-69		
70-79	3	
80-89	7	
90-99	1	1
100-109	1	
110-119	4	
120-129	6	2
130-139	7	
140-149	2	
150-159	3	
160-169	4	
170-179	3	1
180-189	5	
190-199	3	1
200-209	1	1
210-219	3	
220-229	1	1
230-239		1
240-249		
250-259		
260-269	1	
270-279		
280-289		
290-299		
300-309		
310-319		
320-329		
330-339		
340-349		
350-359		
360-369		
370-379		
380-389		
390-399		
400-409		
410-419		
420-429		
430-439		
440-449		
450-459		
460-469		
470-479		
480-489		
490-499		
> 500		

SAL91DJ9

Appendix Q. Length frequency distribution of fish captured at the Pahsimeroi River Morgan Creek site during August 1991.

TL range (mm)	Cutthroat trout	Bull trout
< 50		
50-59		
60-69	1	
70-79	2	
80-89		
90-99	1	
100-109	1	
110-119	1	
120-129	1	
130-139	4	
140-149	3	
150-159	1	
160-169	1	
170-179		
180-189	2	
190-199		
200-209	3	
210-219	1	
220-229	1	
230-239	1	
240-249		
250-259		
260-269		
270-279		
280-289		
290-299		
300-309		
310-319		
320-329		
330-339		
340-349		
350-359		
360-369		
370-379		
380-389		
390-399		
400-409		
410-419		
420-429		
430-439		
440-449		
450-459		
460-469		
470-479		
480-489		
490-499		
> 500		

SAL91DJ9

Appendix R. Length frequency distribution of fish captured at the Pahsimeroi River S. Fork of Big Creek site during August 1991.

TL range (mm)	Rainbow/Cutthroat trout	Bull trout
< 50		
50-59		
60-69	2	
70-79	4	
80-89	1	
90-99		
100-109		1
110-119		
120-129		
130-139	2	
140-149	1	1
150-159		
160-169	1	1
170-179		
180-189		
190-199	1	1
200-209		
210-219	1	
220-229		
230-239	1	
240-249		
250-259		
260-269		
270-279	1	
280-289		
290-299		
300-309		
310-319		
320-329		
330-339		
340-349		
350-359		
360-369		
370-379		
380-389		
390-399		
400-409		
410-419		
420-429		
430-439		
440-449		
450-459		
460-469		
470-479		
480-489		
490-499		
> 500		

SAL91DJ9

Appendix S. Length frequency distribution of fish captured at Pahsimerio River Falls Creek site during August 1991.

TL range (mm)	Bull trout
< 50	
50-59	
60-69	
70-79	
80-89	2
90-99	1
100-109	
110-119	4
120-129	3
130-139	3
140-149	2
150-159	4
160-169	5
170-179	2
180-189	1
190-199	1
200-209	1
210-219	5
220-229	3
230-239	
240-249	1
250-259	2
260-269	1
270-279	1
280-289	1
290-299	1
300-309	1
310-319	
320-329	
330-339	
340-349	
350-359	
360-369	
370-379	
380-389	
390-399	
400-409	
410-419	
420-429	
430-439	
440-449	
450-459	
460-469	
470-479	
480-489	
490-499	
> 500	

SAL91DJ9

JOB PERFORMANCE REPORT

STATE OF: Idaho

NAME: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

PROJECT NO: F-71-R-16

TITLE: Region 7 Technical Guidance

JOB NO.: 7-d

PERIOD COVERED: July 1, 1991 to June 30, 1992

ABSTRACT

During 1991, technical assistance was provided to all state and federal agencies upon request. Comments were submitted to various agencies and private entities concerning stream alterations, bank stabilizations, mining operations and reclamation plans, fish rearing proposals, private ponds, water right applications, gravel removal projects, grazing allotments, timber sales, highway reconstruction, habitat improvements, bridge construction, and hydropower projects. On-site inspections of proposed, on-going, and completed projects were conducted.

Also, we responded to the general public in person, by telephone, and by mail to inquiries about fishing opportunities, techniques, regulations, and area specifics.

Authors:

James R. Lukens
Regional Fishery Manager

Mark Liter
Regional Fishery Biologist

SAL91DJ8

OBJECTIVES

1. To assist the Department of Water Resources, the Department of Lands, the U.S. 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. To recommend procedures that minimize adverse effects of stream course alterations on aquatic habitat and fish.

3. To provide information on all aspects of fisheries and aquatic habitat as requested.

METHODS

We responded to all requests for data, expertise, and recommendations from individuals, government agencies, and corporations. Meetings were attended, field inspections conducted, and responses generated as appropriate.

RESULTS

During 1991, we responded in writing to requests for technical assistance or comments on various water and fishery-related matters as follows:

Agency	Number of requests
U.S. Forest Service	10
Idaho Department of Water Resources	39
U.S. Department of Transportation	2
Private and Miscellaneous	23
Corps of Engineers	2
Custer/Lemhi County Commissioners	2
Shoshone-Bannock Tribe	1

Telephone communication was the major mode of inter-agency contact. Commonly, we responded to stream alteration proposals by meeting with the applicant on-site, determining the nature of the situation and sending written 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 (by telephone, letter and in person) about when, where and how to participate in various fisheries in the region, ranging from steelhead angling to alpine lake fishing.

We reported weekly steelhead fishing results on the local radio station throughout the season.

SAL91DJ8

JOB PERFORMANCE REPORT

NAME: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

STATE OF: Idaho PROJECT

TITLE: Region 7 Salmon and Steelhead Investigations

NO.: F-71-R-16

JOB NO: 7-e

PERIOD COVERED: July 1, 1991 to June 30, 1992

ABSTRACT

Juvenile anadromous fish density counts were conducted in the Middle Fork Salmon River and mainstem Salmon River in July and August 1991. This information is covered in a previous section of this report (see Job 7-c[1]).

We also conducted annual salmon redd counts in the Marsh Creek drainage, Salmon River, Lemhi River, East Fork Salmon River, and the Yankee Fork Salmon River. This data is included in the annual salmon spawning ground surveys report.

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SAL91DJ7

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IDAHO DEPARTMENT OF FISH AND GAME

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