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Jerry M. Conley, Director

FEDERAL AID TO FISH AND WILDLIFE RESTORATION

Job Performance Report

Project F-71-R-6 & F-71-R-7

REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Job VI-a. Region 6 Mountain Lake Investigations
Job VI-b. Region 6 Lowland Lakes Investigations
Job VI-c. Region 6 Stream Investigations
Job VI-d. Region 6 Technical Guidance
Job VI-e. Region 6 Salmon and Steelhead Investigations

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July 1983

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JOB PERFORMANCE REPORT

State of: Idaho Name: REGIONAL FISHERY MANAGEMENT INVESTIGATION

Project No.: F-71-R-6 & 7 Title: Region 6 Mountain Lake Investigation

Job No.: VI-a

Period Covered: 1 January 1982 to 31 December 1982

ABSTRACT

Anglers fished an estimated 3,530 hours to catch 3,981 trout at 1.13 trout/hour from the Palisades Creek drainage from 23 May to 9 September, 1981. Most effort (66%) was concentrated in the upper and lower Palisades Lake areas. Cutthroat trout comprised 99.7% of the catch and had a mean length of 265 mm.

Nez Perce Lake was found to be devoid of fish when surveyed in 1982.

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RECOMMENDATIONS

Manage the Palisades Creek drainage as a wild cutthroat trout fishery.

Monitor the populations to determine if and when restricted kill regulations are needed.

Develop a management plan compatible with a backcountry experience.

OBJECTIVES

To obtain angler use, harvest, and opinion information on upper Palisades Lake, lower Palisades Lake and Palisades Creek.

ACKNOWLEDGEMENTS

Mike Whitfield, district biologist, and Karen Jerger, backcountry ranger from Targhee National Forest, were instrumental in helping develop, organize and conduct this census program. Rand Kunze, Mark Bertram and Jim Hayden, biological aides, assisted at the check station.

TECHNIQUES USED

A creel census was conducted from opening day of the fishing season, May 23, 1981 to September 11, 1981. All anglers leaving the area by the trail along Palisades Creek, which is assumed to be used by almost 100% of all the area users, were interviewed on 20% of the weekdays, 50% of the weekend days, and all holidays within each of 8 two week intervals from 10 am to 9 pm. Effort on opening day and holidays were treated seperately. Anglers were interviewed at the trail head to determine: angler effort, catch rates, tackle use and opinions concerning fish size and fishing regulations. The lengths of harvested fish were measured to determine the mean total length. The study area was divided into four sections (Figure l):

Section 1 - Lower four miles of creek from trail head to lower Palisades Lake.

Section 2 - Lower Palisades Lake to the upper Palisades Lake Trail.

Section 3 - Palisades Creek and all tributaries above the Upper Lake Trail.

Section 4 - Upper Palisades Lake and tributaries.

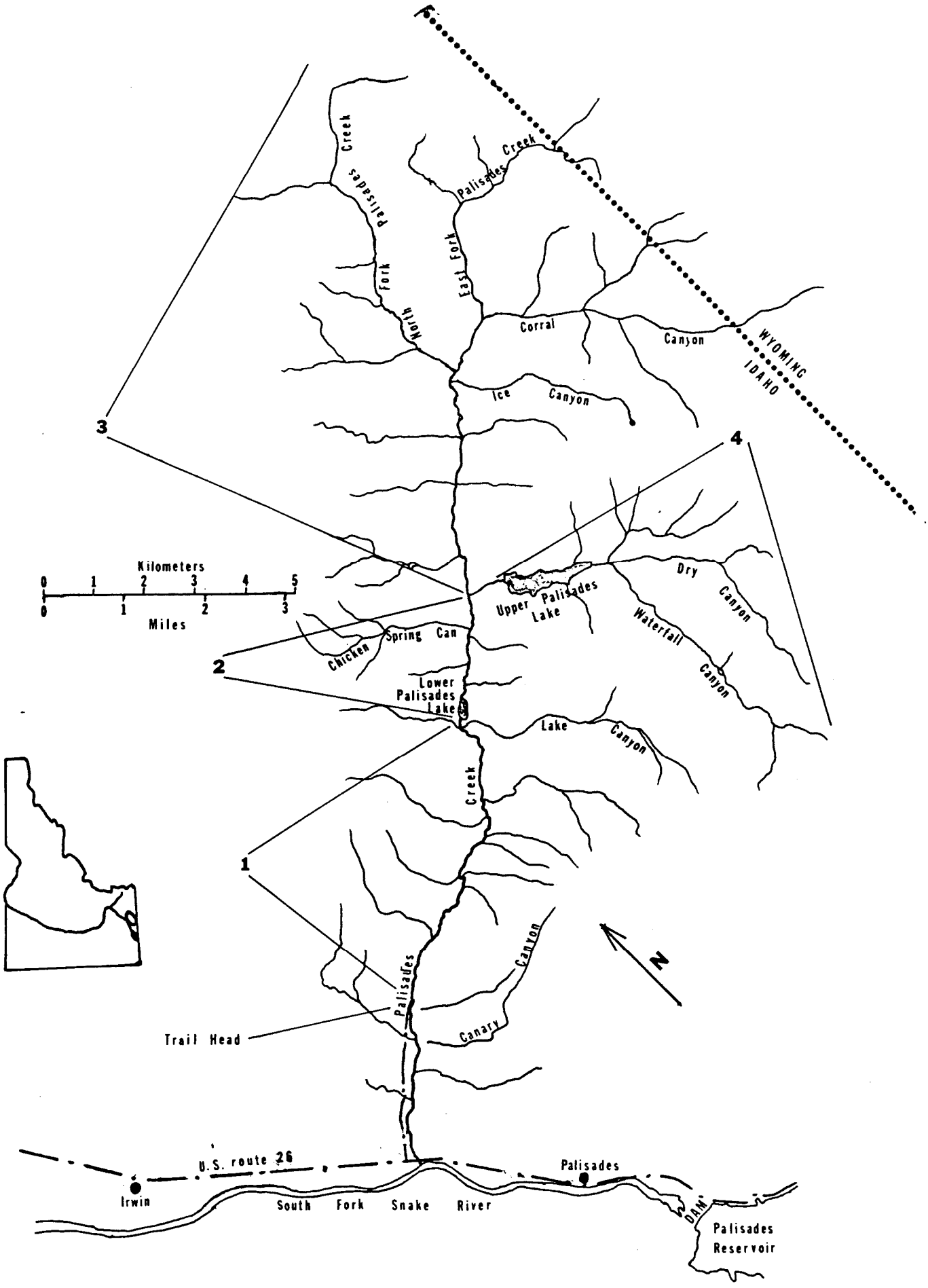

Figure 1. Map of Palisades Creek drainage depicting study sections

Two persons walked the perimeter of Nez Perce Lake angling and visually observing the area for approximately four man-hours.

INTRODUCTION

In the summer of 1981 the United States Forest Service, in cooperation with the Idaho Department of Fish and Game, conducted a backcountry use survey in the Palisades Creek drainage in Southeast Idaho. Fish and Game personnel were responsible for quantifying angler use. This is the first time a quantitative survey of this type has been done on Palisades Creek. The Palisades Creek drainage is the second most heavily used backcountry area in the Targhee National Forest (Proposed Land Management Plan, Targhee National Forest). Concern over the status of the cutthroat fishery lead to initiation of this survey.

Upper Palisades Lake has perennial surface inflow from Dry Canyon and Waterfall Canyon (Figure 1). There is no surface outlet with sub-surface flow emerging from the talus dam to form upper Palisades Lake Creek. Upper Palisades Lake sets at an elevation of 2,022 m with a surface area of 125 acres with an average width of 270 m and a length of 1,840 m. Maximum depth was found to be 43 m with the majority of the lake having depths in excess of 10 m. Water levels are known to fluctuate as much as 8 m. (Jeppson 1973, 1969) Cutthroat trout have been introduced on numerous occasions since 1924, but no plants have been made since 1973 (IFG Hatchery Planting Records), Gammorus were successfully introduced in the 1940's (Hauck 1948) and an unsuccessful introduction of mysis relicta was made in 1965.

Lower Palisades Lake was formed from a rock slide blocking Palisades Creek and covers 18 acres. The Palisades Creek drainage above the lower lake is thought isolated by a barrier at the dam to fish migrating from the South Fork Snake River up the lower 10 Km of Palisades Creek.

Electrofishing shows good populations of cutthroat trout present in the creek both above and below the lower lake (Moore et al. 1981).

FINDINGS

Palisades Lake and Creek - Creel Census

Palisades Creek anglers fished an estimated 3,530 hours (1,312 angler days) during the 16 week study period. An estimated 3,981 trout were caught for a catch rate of 1.13 fish/hour. An estimated 1,851 trout were harvested at a rate of .52 fish/hour. Cutthroat trout made up 99% of the catch. A minor number of rainbow trout were caught in Section 1 (Tables 1 and 2).

Table 1. Estimated harvest (H), catch (C), and effort by Section, Palisades Creek drainage, 23 May 1981 to 11 September 1981.

Section		Cutthroat	Rainbow	Rate of Catch and Harvest	Angler Effort	
					Hours	Days
1	H	497	6	.70	717	266
	C	1,103	18	1.56		
2	H	599		.51	1,166	448
	C	1,314		1.12		
3	H	269		.57	473	121
	C	753		1.59		
4	H	480		.41	1,174	477
	C	793		.68		
TOTAL	H	1,845	6	.52	3,530	1,312
	C	3,963	18	1.13		

H = fish harvested, those fish kept by the angler.
C = all fish caught (all fish hooked and landed), includes fish harvested and released.

Table 2. Estimated harvest (H), catch (C), and effort by interval, Palisades Creek drainage, 23 May 1981 to 11 September 1981.

Interval Date		Cutthroat	Rainbow	Rate of Catch and Harvest	Angler Effort Hours	Angler Effort Days
1. 05/23-06/05	H	87	2	.63		
	C	147	2	1.05	142	87
2. 06/06-06/19	H	194		.27		
	C	373		.52	712	181
3. 06/20-07/03	H	284	4	.84		
	C	453	4	1.33	344	107
4. 07/04-07/17	H	437		.52		
	C	700		.84	833	364
5. 07/18-07/31	H	107		.31		
	C	145		.42	348	156
6. 08/01-08/14	H	202		.52		
	C	606		1.55	391	166
7. 08/15-08/28	H	389	0	.64		
	C	1,181	12	1.95	611	186
8. 08/29-09/11	H	145		.97		
	C	358		2.40	149	65
TOTAL	H	1,845	6	.52		
	C	3,963	18	1.12	3,530	1,312

H = fish harvested, those fish kept by the angler.
C = all fish caught (all fish hooked and landed), includes fish harvested and released.

The effort appears to be most concentrated in Sections 2 and 4, which includes both lakes, with 66% of the total effort occurring in these sections. Multi-night stays in the area were mostly in Section 4 by upper Palisades Lake. While Sections 2 and 4 sustained the most effort, they maintained noticeably lower catch rates (1.12 and .68 fish/hour respectively) than Sections 1 and 3 (1.56 and 1.59 fish/hour respectively) (Table 1). Data from creel spot checks since 1955 (Appendix 1) may indicate improved fishing on the lower lake, declining fishing on the upper lake, and that catch rates are the same on the creek. The percent of fish released after being caught was 52% for the entire drainage. Section 3 and Section 4 had the highest and lowest release percentages, respectively (Appendix 6).

Effort during the study period was highest for the interval from July 4 to July 17. There is noticeable increase in the catch rates during a 6 week period from August 1 to September 11 (1.87 fish/hour) over the earlier 10 week period from July 23 to July 31 (.77 fish/hour) (Table 2).

Appendices 2, 3, 4 and 5 show the estimated hours effort, angler days, catch and harvest, and catch and harvest rates by section and interval.

Fishermen used bait more frequently (50%) than lures (30%) or flies (20%) (Figure 2). Conversely, bait was the least successful tackle (.56 fish/hour), followed by fly (1.58 fish/hour), and lure (2.8 fish/hour) (Table 3). Anglers using flies released a higher percentage of their fish (71%) than lure anglers (69%), bait anglers (16%) or multiple tackle anglers (48%). Appendix 6 shows tackle use frequencies for each section.

Length Frequency

The mean length of all cutthroat trout measured in anglers creels was 265 mm with a range of 150-430 mm (Figure 3). The largest fish were from Section 3 (330 mm) and the smallest from Section 2 (239 mm). The mean length harvested from Section 1 was 282 mm and Section 4 was 263 mm (Figure 4).

Overall, 68% of the anglers were satisfied with fish size, 21% were not satisfied and 11% had no opinion (Figure 5).

Angler Opinion Survey

Anglers were interviewed to determine their preference for fishing regulations on Palisades Creek (Figure 6). Of the 88 responses received, 46 people (52%) favored no regulation change. Three people (3%) favored special size regulations, one of them wanted a combination limit. Six people (7%) favored creel limits, two of them specified higher limits of 10 and 12 fish. Two people (2%) favored regulation of tackle, one of them suggested flies only. Three people (3%), listed under "other",

Table 3. Sampled catch rate and percent of effort by tackle type and section, Palisades Creek drainage, 23 May 1981 to 11 September 1981. Sample size was 1,038 fish and 922 hours.

Section		Fly	Lure	Bait	Multiple	Total
1.	Fish/hr	1.74	14.75	.74	1.02	1.26
	% effort (hr)	14.2	2.4	70.9	12.4	100
2.	Fish/hr	1.42	2.38	.85	1.97	1.49
	% effort (hr)	25.3	9.3	33.3	32.1	100
3.	Fish/hr	1.81		.80		1.46
	% effort (hr)	65.3		34.7		100
	Fish/hr	1.37	1.69	.36	1.79	.76
	% effort (hr)	4.7	7.9	70.2	17.2	100
TOTAL	Fish/hr	1.58	2.8	.56	1.78	1.13
	% effort (hr)	17.4	6.7	56.4	19.5	100

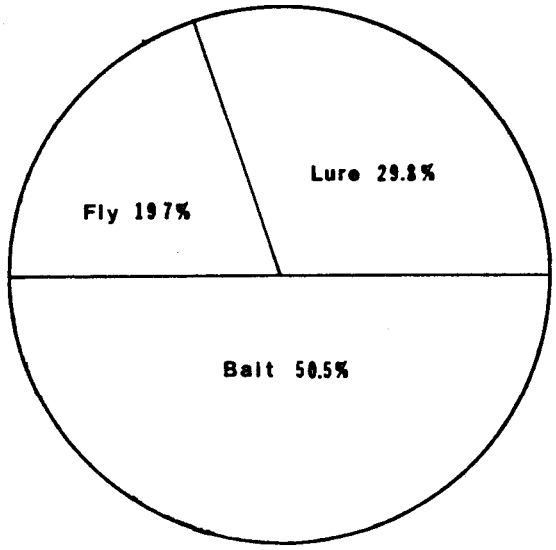

Figure 2. Frequency of tackle use by groups. Palisades Creek drainage, 23 May 1981 to 11 September 1981.

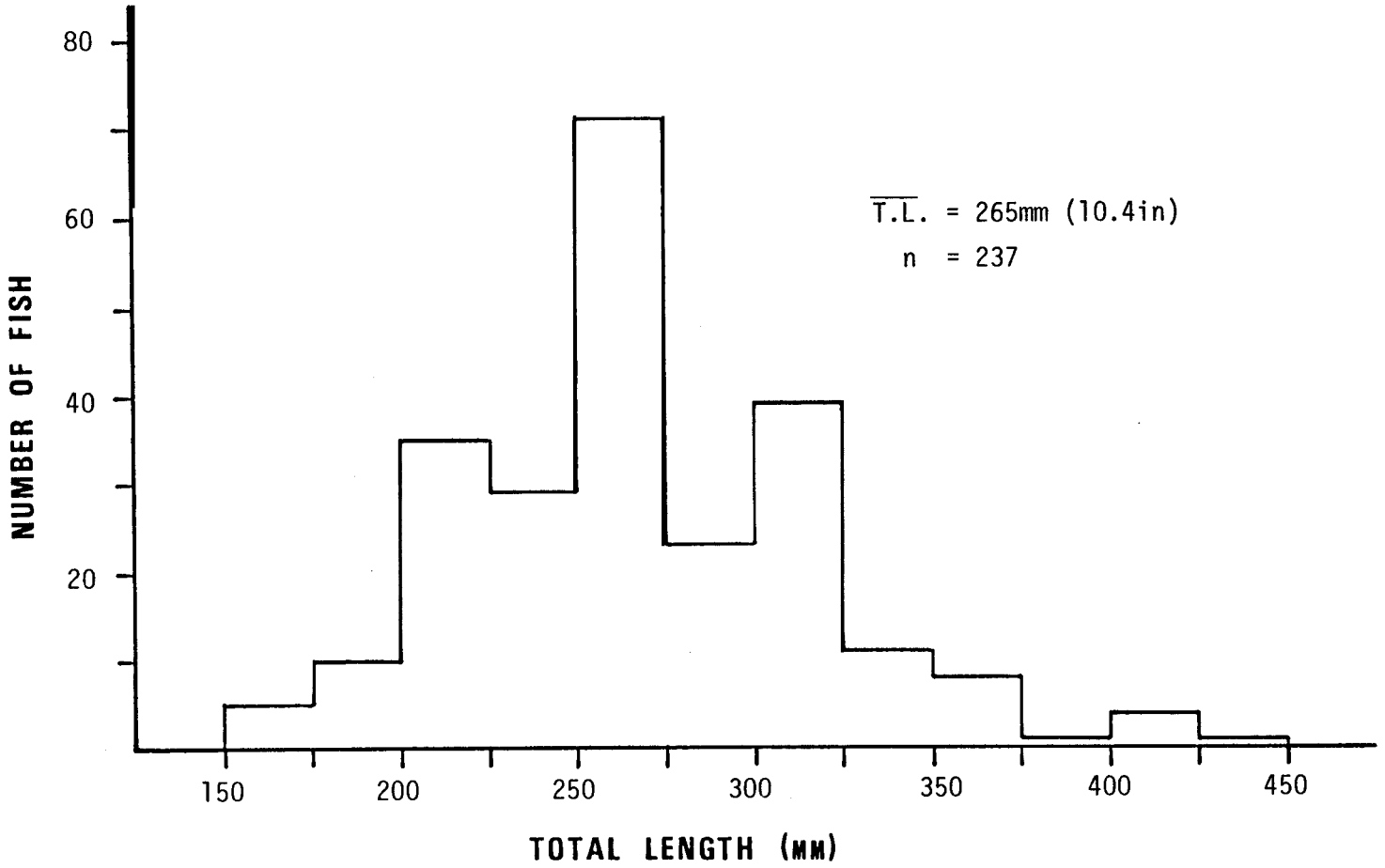

Figure 3. Length frequency of cutthroat trout from angler creels, Palisades Creek, 23 May 1981 to 9 September 1981.

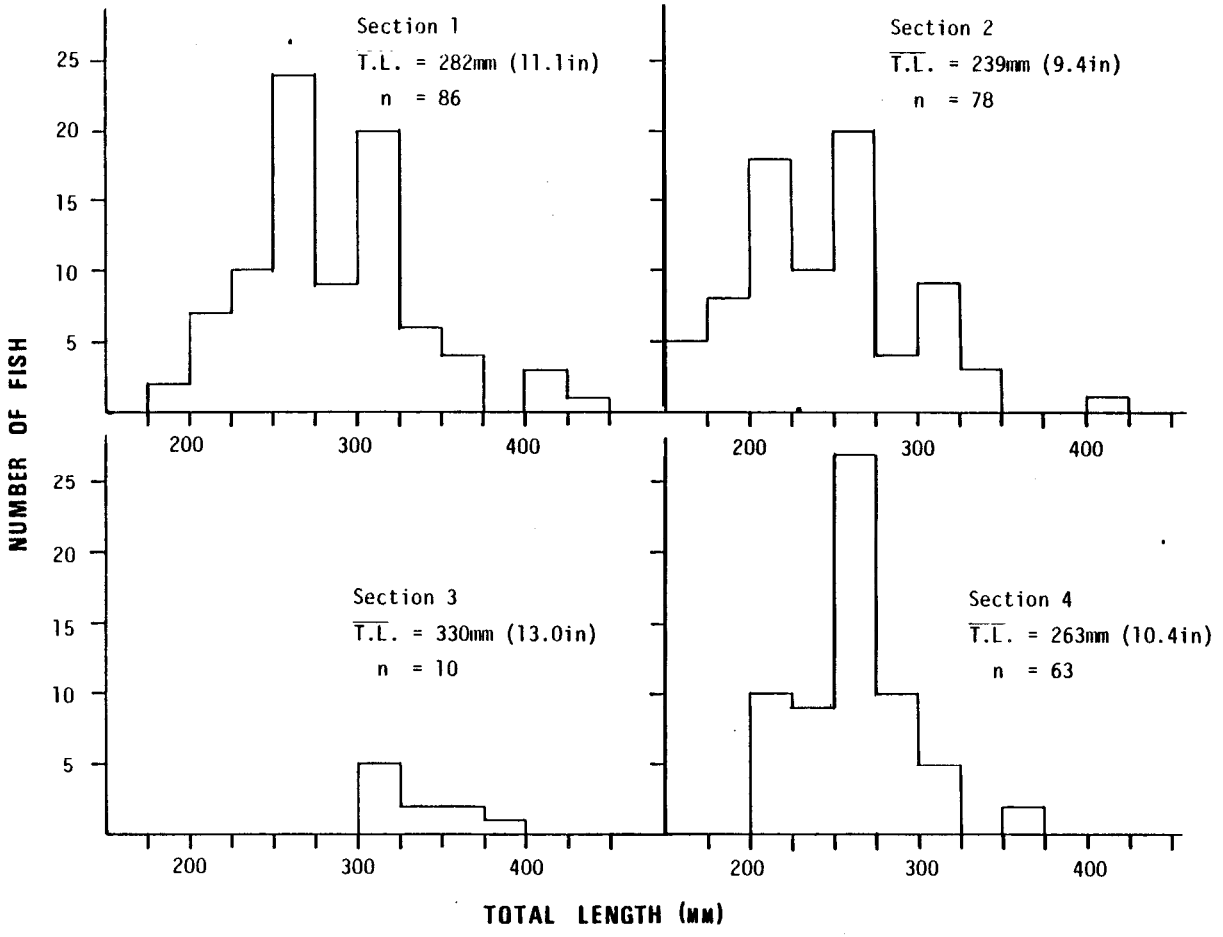

Figure 4. Length frequency by section of cutthroat trout from angler creels, Palisades Creek, 23 May 1981 to 9 September 1981.

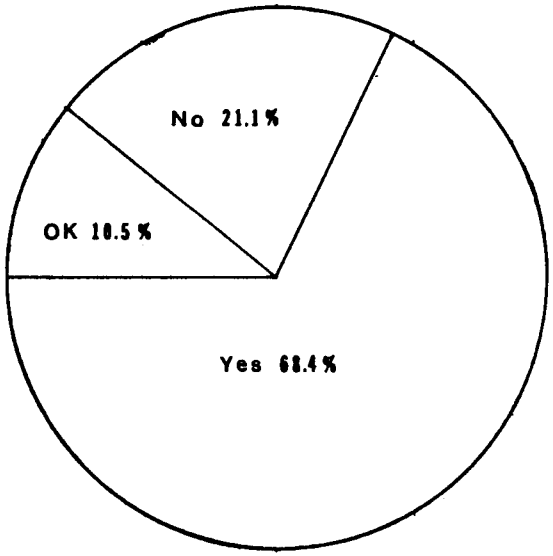

Figure 5. Angler satisfaction with fish size, Palisades Creek drainage, 23 May 1981 to 11 September 1981.

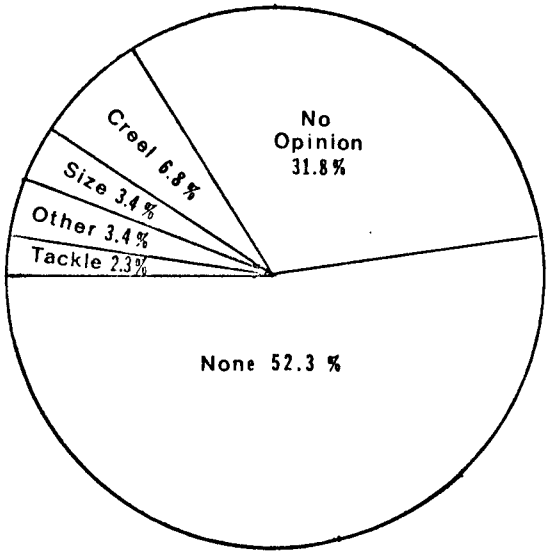

Figure 6. Special regulations favored by anglers, Palisades Creek drainage, 23 May 1981 to 11 September 1981.

thought that the lakes should be stocked. Twenty-eight people (32%) had no opinion for special regulations.

Nez Perce Lake

Nez Perce Lake was found to be devoid of fish when surveyed on July 20, 1982. Water quality appeared excellent and the lake had a dense population of aquatic insects and Gammarus spp. amphipods.

The lake shore indicated the occurrence of large fluctuations in depth estimated as much as 2.5 m. An inlet flow of approximately 2-3 cfs was entering the lake when surveyed. Nez Perce Lake has no surface outlet. However, sub-surface flow emerges from the hillside approximately 300 m below the lake indicating an outlet flow through the lake bottom.

It is known that the lake periodically winter kills although fish populations have survived in the lake for up to several years. Most likely the ability of the lake to sustain fish through the winter months is dependent upon the water-year. In years of low snowpack and/or precipitation the lake outlet flow exceeds the inlet flow and the level falls below the capability of the lake to support fish life during the winter. During years of higher water supply, the level of the lake remains deep enough to prevent oxygen depletion.

The lake is approximately 1.2 hectares in surface area (3 acres) and maximum depth was estimated to fluctuate between 2.4 and 4.3 meters (8-14 feet). It is located **in** the Salmon National Forest on the eastern slope of the southern end of the Lemhi Range in Township 15S, Range 26E, Section 26. Elevation is approximately 2,713 m (8,900 feet) above sea level.

On July 29 approximately 2,000 grayling fry were backpacked to the lake and released. A follow-up investigation of their survival and growth will be conducted in future years.

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APPENDICES

Appendix 1. Summary of creel spot checks since 1955. Palisades Creek drainage. (Data taken from Region 6 files).

Lower Palisades Lake

Year	# Anglers	# Fish	Total Hours	Fish/hr
1963	4	4	15	.27
1964	4	3	8	.38
1967	2	9	1.5	6.00
1968	11	27	14	1.93
1970	19	1	38	.03
1977	6	6	7	.86
1980	3	18	9	2.00
	49	68	92.5	.74

Upper Palisades Lake

Year	# Anglers	# Fish	Total Hours	Fish/hr
1963	8	23	18	1.28
1967	13	105	37	2.84
1968	5	75	27	2.78
1969	7	39	20	1.95
1970	3	4	6	.67
1977	12	29	32	.91
	48	275	140	1.96

Palisades Creek

Year	# Anglers	# Fish	Total	Fish/hr
1955	2	14	12	1.16
1964	7	10	10.5	.95
1967	16	117	57	2.05
1969	9	18	22	.82
1970	7	26	20	1.30
1977	3	18	12	1.50
	44	203	133.5	1.52

Appendix 2. Estimated hours of angling effort by interval and section, Palisades Creek drainage, 23 May 1981 to 11 September 1981.

Section	Interval Starting Date 5/23	6/7	6/20	7/4	7/18	8/1	8/15	9/5	Total
1	86	28	192	147	8	57	128	71	717
2	29	238	130	294	18	47	359	51	1,166
3	---	220	4	217	17	15	---	---	473
4	27	226	18	175	305	272	124	27	1,174
TOTAL	142 '	712	344	833	348	391	611	149	3,530

Appendix 3. Estimated angler days of effort by interval and section, Palisades Creek drainage, 23 May 1981 to 11 September 1981.

Section	Interval Starting Date 5/23	6/7	6/20	7/4	7/18	8/1	8/15	9/5	Total
1	52	12	49	42	6	33	41	31	266
2	25	80	50	154	8	21	87	23	448
3		35	2	70	4	10	---	---	121
4	10	54	6	98	138	102	58	11	477
TOTAL	87	181	107	364	156	166	186	65	1,312

Appendix 4. Estimated harvest and catch by interval and section, Palisades Creek drainage, 23 May 1981 to 11 September 1981.

Section		Interval Starting Date								Total
		5/23	6/7	6/20	7/4	7/18	811	8/15	915	
1. CT	H	49	12	96	102	4	42	77	115	497
	C	49	20	119	141	4	101	385	284	1,103
2. CT	H	19	25	166	90	6	34	241	18	599
	C	41	75	302	174	8	71	582	61	1,314
3. CT	H		20		175	14	60			269
	C		114		315	14	310			753
4. CT	H	19	137	22	70	83	66	71	12	480
	C	57	164	32	70	119	124	214	13	793
TOTAL	H	87	194	284	437	107	202	389	145	1,845
	C	147	373	453	700	145	606	1,181	358	3,963
1. RB	H	2		4				0		6
	C	2		4				12		18

H = fish harvested, those fish caught and kept by the angler.
C = all fish caught (all fish hooked and landed), includes fish harvested and released.

Appendix 5. Estimated rates of harvest and catch (fish/hr) by interval and section, Palisades Creek drainage, 23 May 1981 to 11 September 1981.

Section		Interval Starting Date								Total
		5/23	6/7	6/20	7/4	7/18	8/1	8/15	9/5	
1	H	.59	.43	.52	.70	.50	.74	.60	1.62	.69
	C	.59	.71	.64	.96	.50	1.78	3.10	4.00	1.54
2	H	.66	.10	1.28	.31	.33	.74	.67	.35	.51
	C	1.40	.31	2.32	.59	.43	1.52	1.62	1.21	1.12
3	H		.09		.81	.83	4.00			.57
	C		.52		1.45	.83	20.67			1.59
4	H	.71	.61	1.22	.40	.27	.24	.57	.45	.41
	C	2.14	.73	1.78	.40	.39	.46	1.72	.50	.68
TOTAL	H	.63	.27	.84	.52	.31	.52	.64	.97	.52
	C	1.05	.52	1.33	.84	.42	1.55	1.95	2.41	1.12

H = fish harvested, those fish caught and kept by the angler.
C = all fish caught (all fish hooked and landed), includes fish harvested and released.

Appendix 6. Tackle use frequency by section and percent of fish released by section and tackle type, Palisades Creek drainage, 23 May 1981 to 11 September 1981.

	Section					
Tackle	1	2	3	4	Total	Fish Released
Fly	13.6%	20.3%	50%	20.0%	19.7%	71%
Lure	22.0%	39.1%		32.7%	29.8%	69%
Bait	64.4%	40.6%	50%	47.3%	50.5%	16%
	n=59	n=64	n=10	n=55	n=188	
Fish Released	51%	55%	64%	43%		Total % Fish Released 52%

JOB PERFORMANCE REPORT

State of: Idaho Name: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No: F-71-R-6 & 7

Title: Region 6 Lowland Lake Investigations

Job No.: VI-b

Period Covered: 1 January 1982 to 31 December 1982

ABSTRACT

Ririe Reservoir

Anglers fished an estimated 137,017 hours on Ririe Reservoir in 1982, making it one of the most intensively fished impoundments in the state with 225 hours/hectare. Anglers harvested 76,388 salmonids with an additional 3,520 released, for an overall catch rate of .58 salmonids/hour. Composition of the catch was primarily rainbow trout (71%) and coho salmon (28%), with incidental catches of cutthroat trout, brown trout, and chinook salmon. Gill netting in May revealed increasing numbers of nongame species in the reservoir and the proportion of game fish different from those found in the creel. Plankton sampling performed from April through August revealed peak densities of Daphnia and copepods in July.

Island Park Reservoir

Anglers fished an estimated 124,442 hours to catch 28,536 game fish at .23 fish/hour from 28 May to 30 September in Island Park Reservoir. Composition of the catch was 89% rainbow trout, 3% brook trout, 4% kokanee and 4% coho salmon. Return to the creel of fry and fingerling plant was considered good at 8% and poor for catchable rainbow and coho with 15% and .5% return to creel respectively. Low catch rates in 1982 are thought related to the record low drawdown during the fall 1981.

Gill netting revealed that chub and sucker populations have increased substantially since 1980 in Island Park Reservoir but are still much below the densities found in 1979 prior to rehabilitation. Game fish densities based on gill netting are little changed.

Williams Lake

Spring spawning rainbow introduced into Williams Lake in 1979 were averaging 33.3 cm (13 in.) on opening of fishing season 1982 (29 May) and 12.5% of the catch exceeded 40 cm (15.7 in.). However, the catch rate of .34 fish/hour was below the desired goal of 1.0 fish/hour and numbers of fry planted may need to be increased to approach that level.

Roberts Gravel Pit

Gill netting showed low densities of yellow perch, bullhead and crappie present in Roberts Gravel Pit. A few large adult chubs and suckers were found.

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RECOMMENDATIONS

Ririe Reservoir

Initiate introduction and evaluation of small mouth bass and alternate strains of salmonids in Ririe Reservoir **in** order to further diversify the fishery and to control non-game species in Ririe Reservoir.

Maintain catch rates of salmonids **in** Ririe Reservoir at the present level by continuing with an active hatchery program.

Continue to monitor angling effort and success on Ririe Reservoir every other year.

Assess contributions of Willow Creek and tributaries to the Ririe Reservoir fishery by using tagging and marking techniques.

Island Park Reservoir

Quantify the effects of drawdown on catch rates and develop a fishery pool request.

Introduce and evaluate alternate strains of salmonids. Stock one million kokanee annually to reestablish stocks.

Williams Lake

Continue monitoring of the fisheries in Williams Lake, Lemhi County. Check the Williams Lake Inlet stream to see if spring spawning rainbow stocked **in** the lake are ascending the stream to spawn.

Increase spring spawning fry introductions in Williams Lake to 200,000 annually.

Roberts Gravel Pit

Introduce largemouth bass and bluegill to further diversify the warmwater fishery at Roberts Gravel Pit.

Assess use of Christmas tree habitat by spiny ray fishes.

OBJECTIVES

Ririe Reservoir

To obtain angler use and harvest information on Ririe Reservoir.

To evaluate species composition and gather limnological data from Ririe Reservoir.

Island Park Reservoir

To obtain angler use and harvest, growth and relative abundance of fish as a follow-up of non-game fish eradication in 1979 of Island Park Reservoir.

To obtain information concerning the Island Park Reservoir fishery after an extreme drawdown.

Williams Lake

To monitor angler use and harvest and to evaluate stocking levels in Williams Lake.

Roberts Gravel Pit

To assess the status of warmwater fisheries in Region 6.

To improve and increase angling opportunities for spiny ray fish **in** Region 6.

ACKNOWLEDGEMENTS

Randy Kunze, bio aide, conducted the plankton analysis; Curtis Plaster and Mike Olson (CETA) assisted with interviews on Ririe Reservoir. Hatchery Superintendent I, Gene McPherson, assisted with angler counts and interviews on Island Park Reservoir.

TECHNIQUES USED

Ririe Reservoir

Creel census interviews and angler counts were conducted on Ririe Reservoir during the general fishing season, 29 May 1982 to 30 November 1982. The schedule was stratified by angler type, interval of season, day of week, and time of day. Angler counts were conducted on 50% of the weekend days and 20% of the weekdays of each week during the fishing season, which was divided into 13 two-week intervals. Opening day and major holidays (Memorial Day, Independence Day, Labor Day) were always included as census days (Pettit and Lindland 1979). All angler counts were conducted by boat.

A fishing day was considered to be from sunrise to sunset. Mean hours of daylight for each interval were determined using Idaho Falls' sunrise and sunset tables. Each day was divided into four equal time periods, with one count time per time period. The first count time was selected at random within the first time period with counts in subsequent periods spaced evenly apart.

Angler counts were used to calculate mean number of anglers for each day type (weekday, weekend, or holiday). Multiplication of mean number of anglers by mean daylight hours for each 14-day interval by each day type interval results in an estimate of total hours of angler use for each day type. Combining each day type for an interval gives the estimated angling effort for each 14-day interval.

We interviewed as many anglers as possible to document residence, type of angling gear, terminal tackle, type of angler, length and weight of fish, numbers of fish, hours fished, and species creeled. Estimated catch and harvest of each species by each angler type were determined by multiplying catch rates for each species by the estimated effort expended by each angler type.

When conditions permitted, we also recorded angler opinions for the following questions on the Ririe Reservoir fishery:

1. How would you rate the fishing trip? (Excellent, good, fair, poor, no opinion).

2. How would you rate the trend in fishing at Ririe Reservoir? (Up, down, same, no opinion).

3. How often do you fish Ririe Reservoir? (Days/season).

4. Why do you fish Ririe Reservoir? (Location, convenience, catch rates, size of fish, family experience).

5. Are you satisfied with the present . .
   - fish size?
   - catch rate?
   - species?
   - access?

Two experimental gill nets were set overnight 19 May for the purpose of assessing species composition. One net was set near the dam and the other across from the Juniper access (Figure 1).

Plankton samplings and secchi readings were performed on a monthly basis from April through August. Methods and sampling sites were similar to those reported by Jeppson and Ball (1979).

Island Park Reservoir

Creel census angler interviews and counts were conducted from the opener May 29, 1982 through September 30, 1982 for Island Park Reservoir. The count was stratified by month, day of week, time of day and stream section. Angler counts were made for morning and afternoon time periods. Two weekdays and two weekend days, morning and afternoon, were counted each month. Morning and afternoon counts were spaced evenly apart.

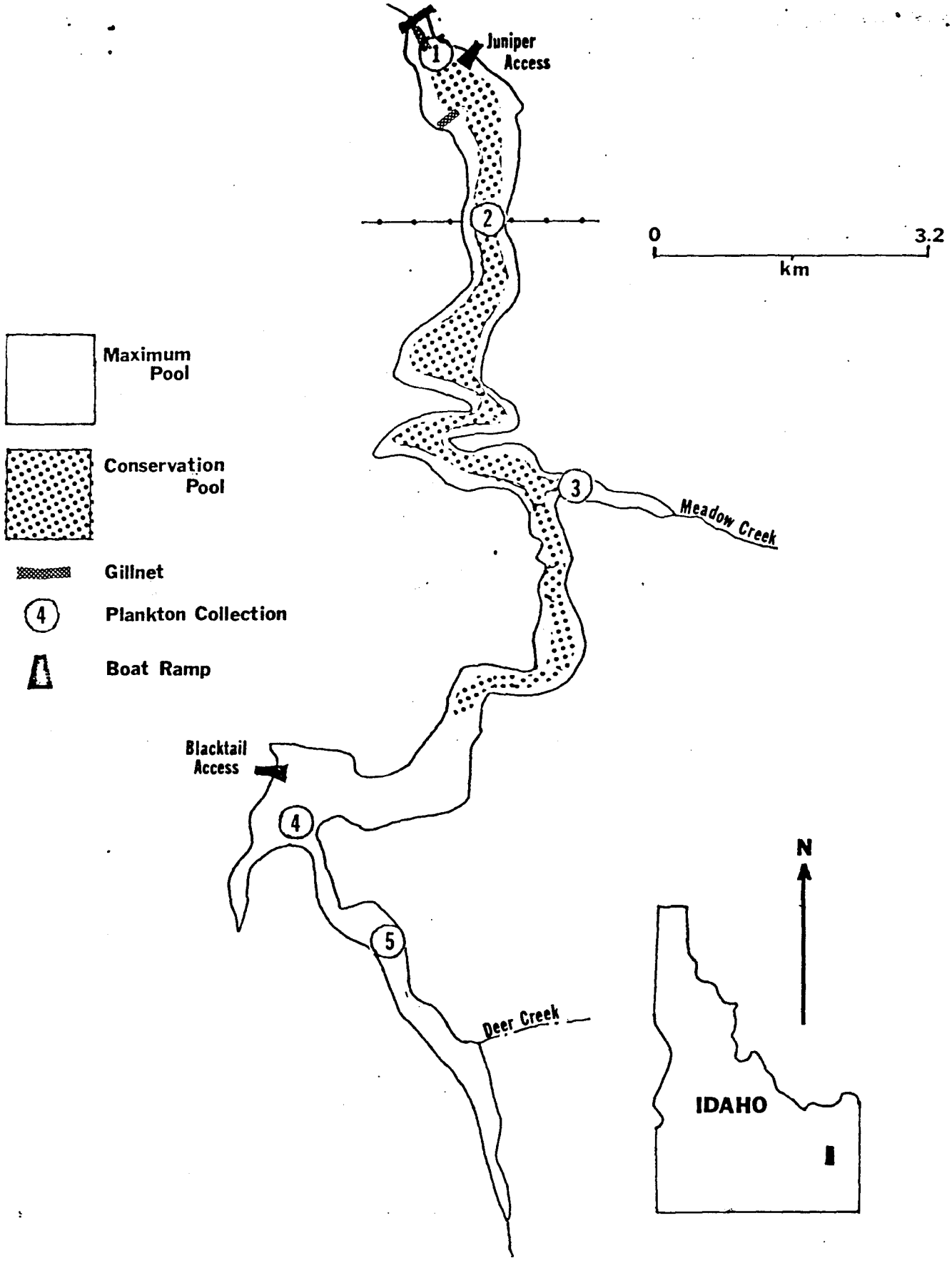

Figure 1 Map of Ririe Reservoir showing location of plankton and gill net samplings.

Counts were also made on holidays which were treated as weekend days for effort estimates. Morning and afternoon counts were generally made on the same day but often were on different days.

We used angler counts to calculate mean number of anglers for each day type (weekend, weekday or holiday). Multiplication of mean number of anglers by mean daylight hours for each 14-day interval by number of each day type in an interval, results in an estimate of total hours of angler use for each day type. Combining each day type for an interval gives the estimated angling effort for each 14-day interval.

We interviewed as many anglers as possible to document residence, license class, type of angling gear, terminal tackle, type of angler, length and weight of fish, number of fish, hours fished and species creel ed.

Catch rate for each interval was determined from angler interviews for each species. This was multiplied by estimated effort to give estimated harvest and catch by species for each interval, section and angler type.

Gill nets were set overnight on Island Park Reservoir 26 May 1983. Three horizontal and one vertical gill net was set in Island Park Reservoir overnight on 26 May 1982. Nets were set at the following locations: 1) West end in bay across from Trude's, 2) Second bay near Bill's Island, 3) East end, and 4) Point off east end of Bill's Island (verticle net).

Williams Lake

We checked angler creels during the winter ice fishing season and on the opening weekend of general fishing season to evaluate the growth and return to the creel of spring spawning rainbow.

Roberts Gravel Pit

Experimental gill nets were set at four locations on 17 September 1982 to assess warmwater fish populations in Roberts Gravel Pit. All four nets were set horizontally and fished overnight.

FINDINGS

Ririe Reservoir - Creel Census

Ririe Reservoir anglers fished an estimated 137.017 hours (39,397 angler days) during the 1982 general fishing season making it the most intensively fished reservoir in the state, with 226 hours of expended effort per hectare (Table 1). Effort was highest on opening weekend and then declined all season, probably due to poor weather conditions, with the exception of a slight peak in the mid-July census period (Figure 2).

Table 1. Comparison of Ririe Reservoir sport fishery in 1982 with other important Idaho reservoirs.

Reservoir	Surface area (hectares)	Catch Rate (fish/hr)	#Salmonids caught	Catch/ hectare	Kg/ hectar	Effort (hr)	Effort/ (hr) hectare	Reservoir elevation (m)	Reference
Dworshak (1979)	6,868	.75	43,513	6.3		57,860	8.4	479	Horton, 1980
Cascade (1975)	11,452	.17	26,654	2.3	.9	158,42	13.8	1,468	Welsh, 1976
Island Park (1968)	2,989[1]	.59	103,25	34.5	12.1	176,00	58.9	1,920	Jeppson, 1969
Blackfoot (1980)	6,475[1]	.16	28,581	4.4	3.4	174,00	26.9	1,863	Thurow, 1981
Coeur d'Alene Lake (1980)	12,725	2.04	578,03	47.7	3.3	282,83	22.2		Rieman and Ward 1981
Palisades (1980)	4,339[1]	.30	59,196	13.4	7.2	197,180	45.4	1,713	Moore, et. 1981
Ririe (1982)	607	.58	79,908	131.6	29.9	137,017	225.7	1,561	Present study

[1]Mean annual surface area.

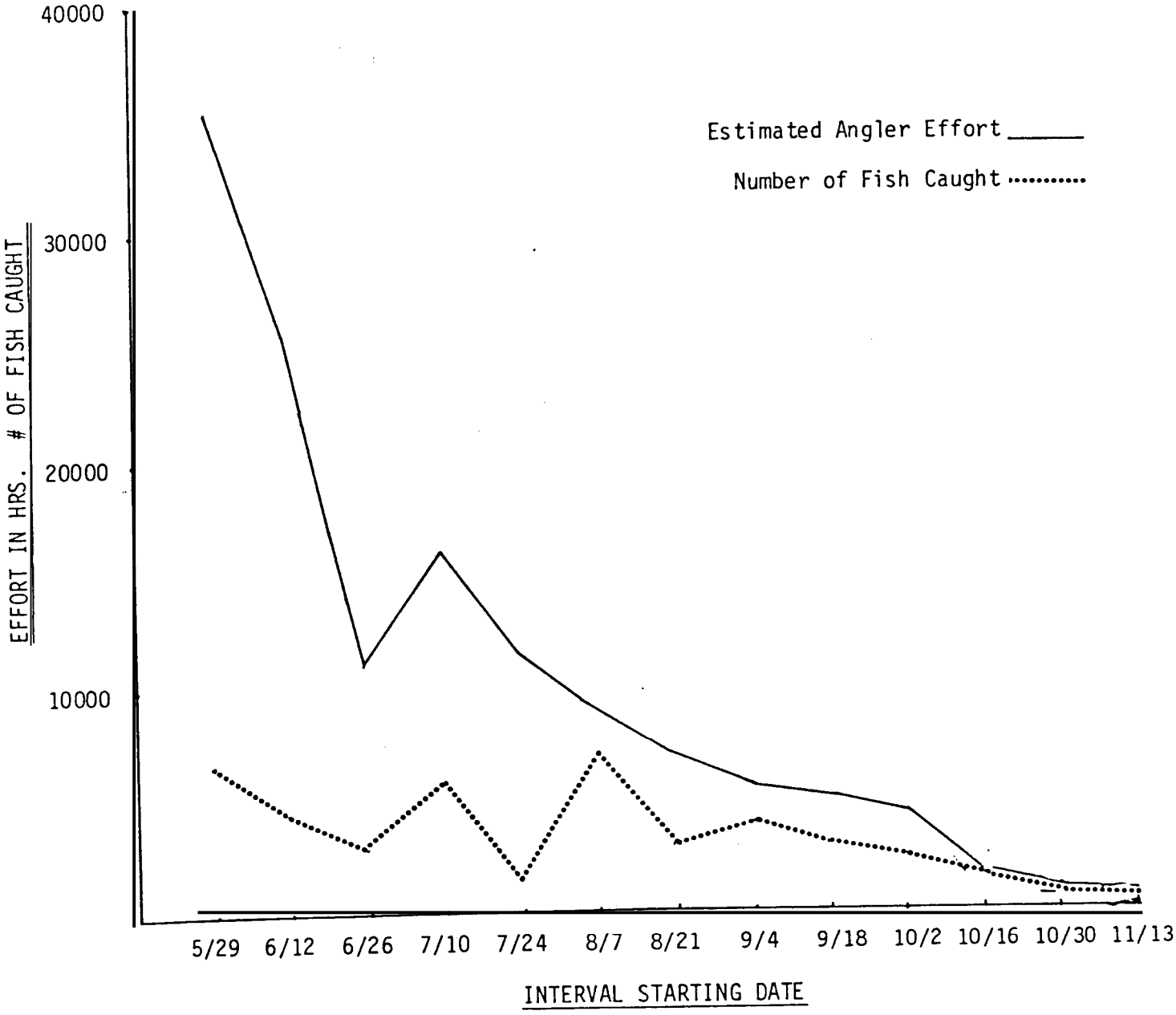

Figure 2. Estimated angler effort and number of fish caught for Ririe Reservoir in 1982.

Total effort expended by bank analers (67,096 hours) was similar to effort expended by boat anglers (69,922 hours). Bank anglers fished an average of 2.9 hours per day while boat anglers fished an average of 4.3 hours per day. Bait fishermen comprised 96% of the bank anglers and 76% of the boat anglers. Boat anglers fished with lures (24%) more than bank anglers (3%), and less than 10% of all fishermen fished with flies.

Overall catch rate at Ririe Reservoir **in** 1982 was estimated from interviews with 6% of the bank anglers and 7% of the boat anglers to be .58 salmonids/hour, similar to catch rates reported by Ball and Jeppson (1978), Jeppson and Ball (1979) and Jeppson (1980) (Table 2). Catch rates were slightly higher for boat anglers (.60 salmonids/hour) than bank anglers (.57 salmonids/hour). Overall catch rate showed a generally increasing trend until mid-October, when they began to decline (Figure 3). Total catch was estimated at 79,908 salmonids, of which 3,520 (4%) were released. Species composition in the creel was 71% rainbow trout and 28% coho salmon, with cutthroat, brown trout, and chinook salmon making up the remainder of the catch (Table 2). An estimated 37% of the catchable sized hatchery rainbow stocked in 1982 were harvested, another 2% were caught and released. Best estimates for the harvest and total catch resulting from the 1981 fingerling plants are 8% and 8.4% respectively. The 1982 catch rate on rainbow planted as catchables in 1982 was .24 fish/hour and .18 fish/hour for rainbow planted as fingerlings in 1981. Estimated cost per fish caught for fingerling plants was $.08/fish caught. Estimates are based on a rearing cost of $1.30/lb for catchables and $1.50/lb for fingerlings (DeGiulio, personnel commission). Mean length of rainbow in the creel resulting from catchable plants was 284 mm and from fingerling plants was 289 mm. Mean length of coho observed in the creel was 251 mm (Table 3), indicating that these were fish planted the previous spring (Jeppson and Ball 1979). 1982 return to the creel for coho planted in 1981 was 21,383 fish (14.5%); an additional 2,285 (1.8%) were released. Since these figures do not include those coho entering the fishery in late 1981, they are probably low estimates. Catch rate on coho in 1982 was .16 fish/hour. Based on a hatchery rearing cost of $1.50/lb for fingerling coho, the estimated cost of the 1981 coho plant was $.11/fish caught.

Few cutthroat trout and brown trout were caught by anglers in 1982. Stocking of these species was discontinued in 1978 (stocking of brown trout fingerlings was resumed in 1982), and catch rates have declined since (Table 2). Mean sizes of brown trout (315 mm) and cutthroat trout (358 mm) observed in the creel, however, were considerably larger than those for rainbow and coho (Table 3).

Table 2 . Ririe Reservoir creel census summary 1977-1982.

Year	Effort	Harvest	Catch Composition (%) Rb	Ct	Brn	Co	Ck	Catch Rate
1977	117,202	80,167	76	11	12	1		.68
1978	133,923	77,598	59	16	2	23		.58
1979	146,280	92,962	75	5	.2	19		.64
1982	137,017	76,388 (79,908)	71	1	.2	28	trace	.56 (.58)

( ). includes fish released by anglers.

Table 3 . Mean total length (mm) of creeled fish, Ririe Reservoir, 1977-1982.

Year	Rb	Ct	Brn	Co
1977	267	323	320	236
1978	277	325	338	251
1979	292	348	305	284
1982	287	358	315	251

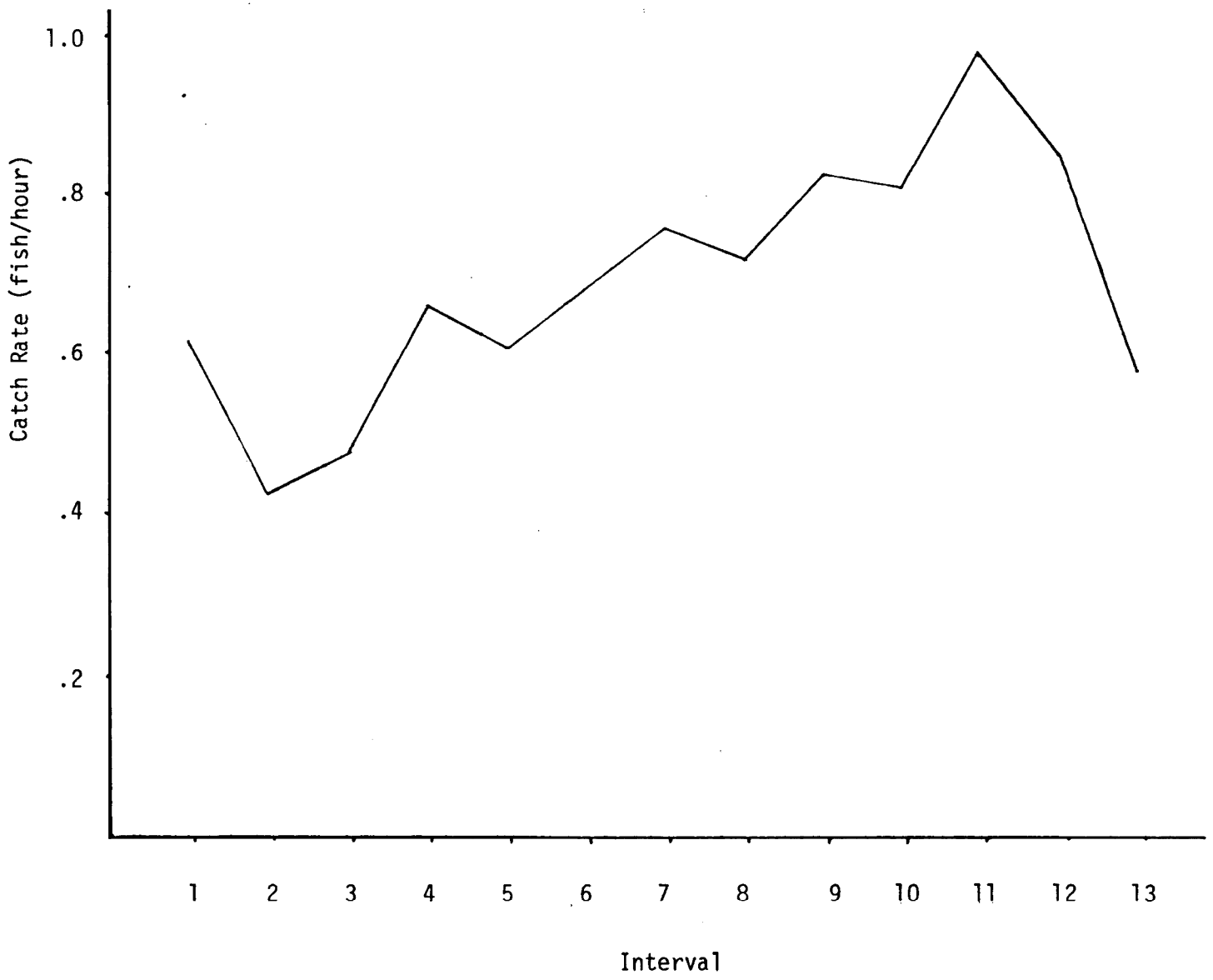

Figure 3. 1982 catch rates by interval, Ririe Reservoir.

Gill Netting

Experimental gill netting in May revealed a change in species composition from previous years, with the number of nongame fish increasing sharply (Table 4). There are no indications that the increase in nongame fish has been detrimental to the sport fishery, as the catch rates and the number of fish caught in 1982 were comparable to previous years. Most rainbow and cutthroat captured were within the 300 to 400 mm size range, whereas the coho were all between 200 to 300 mm in total length. Nine of the eleven brown trout captured were greater than 400 mm in total length and three of these were greater than 600 mm total length. Whether or not the large cutthroat and brown trout are holdovers from the hatchery stockings or fish that have out-migrated from Willow Creek and its tributaries is not presently known. Species composition of game fish in the gill nets did not reflect composition in the creel, with coho comprising 4%, brown trout 18%,cutthroat 24%, and rainbow trout 53% of the gill net catch and 28%, .2%, .8% and 71%, respectively, of the angler catch, a difference significant at P=.001 (Chi Square Test of Homogeneity). Whether this is a function of vulnerability of each species to angling or gill netting placement of the nets, or both, has not been determined.

Limnology

Plankton sampling revealed a decline in copepod density from April to June, followed by a sharp increase in July, when densities peaked (Figure 4). Daphnia exhibited a similar pattern, although April densities were lower and July densities higher than those of the copepods. Transparency was lowest during the May sample due to runoff (Figure 5), indicating that high turbidity probably contributed to the decline in zooplankton densities through June. Total plankton densities for the 1982 sampling period are compared with densities from similar periods for 1977 and 1978 (Jeppson, file date) in Table 5.

Angler Residence and Opinion Survey

Ririe Reservoir is primarily a local fishery, with most of the effort coming from Bonneville County (72%) and Jefferson County (12%). Eleven percent of the anglers were from 13 Idaho counties other than Bonneville and Jefferson. The remaining 5% of the anglers interviewed were nonresidents representing 20 states and one foreign country.

Only 40% of the 245 bank anglers and 51% of the 179 boat anglers asked rated their day's fishing trip good or excellent, while 29% and 19% respectively, rated it poor (Figure 6). This may be a result of the poor weather conditions during the early part of the fishing season. Also, 33% of all the anglers questioned felt that the trend in fishing was down at Ririe, while less than 12% felt that the trend in fishing was up (Figure 7). Despite this, angler satisfaction with the sport fishery was high and not significantly different (P>.05) between bank fishermen and boat fishermen in 1982. Seventy-three percent of the anglers were satisfied with the size of the fish they were catching, 57% with the catch rate, 95% with the species composition, and 89% with the access (Figure 8). Fifty percent of the bank anglers and 55% of

Table 4 . Comparison of gill net catches, Ririe Reservoir, 1976-1982.

Year	Rb	Ct	Brn	Coho	Sucker	Chub	Shiner
1976	15	14	11	0	0	0	0
1977	10	29	30	1	10	0	0
1979	37	23	2	27	2	1	0
1982	33	15	11	3	190	315	3

Table 5. Comparative plankton densities (numbers/liter) for 1982 and 1978 at the five Ririe Reservoir sampling stations.

DATE		1 CLAD.	1 COP.	2 CLAD.	2 COP.	3 CLAD.	3 COPE	4 CLAD.	4 COPE	5 CLAD.	5 COPE
April	1978	.11	5.45	-	-	-	-	-	-	-	-
	1982	5.97	9.96	10.9	74.6	1.85	15.57	3.7	47.8	-	-
May	1978	.88	45.10	-	-	-	-	0.0	.44	-	-
	1982	3.39	17.53	2.3	14.37	.08	.08	0.0	0.0	0.0	0.0
June	1978	38.39	7.59	20.46	14.52	11.11	11.88	6.60	14.52	.33	6.49
	1982	5.94	1.47	.96	.48	1.00	1.40	.43	1.35	.41	1.97
July	1978	1.65	5.39	2.53	10.34	1.10	15.84	10.34	11.00	16.72	11.66
	1982	701.66	52.64	337.10	96.75	461.48	73.72	240.08	90.68	-	-
August	1978	11.11	5.28	7.70	1.98	5.50	15.18	5.94	1.65	24.20	14.96
	1982			5.89	3.58	5.40	17.19	15.67	2.70	7.93	6.72

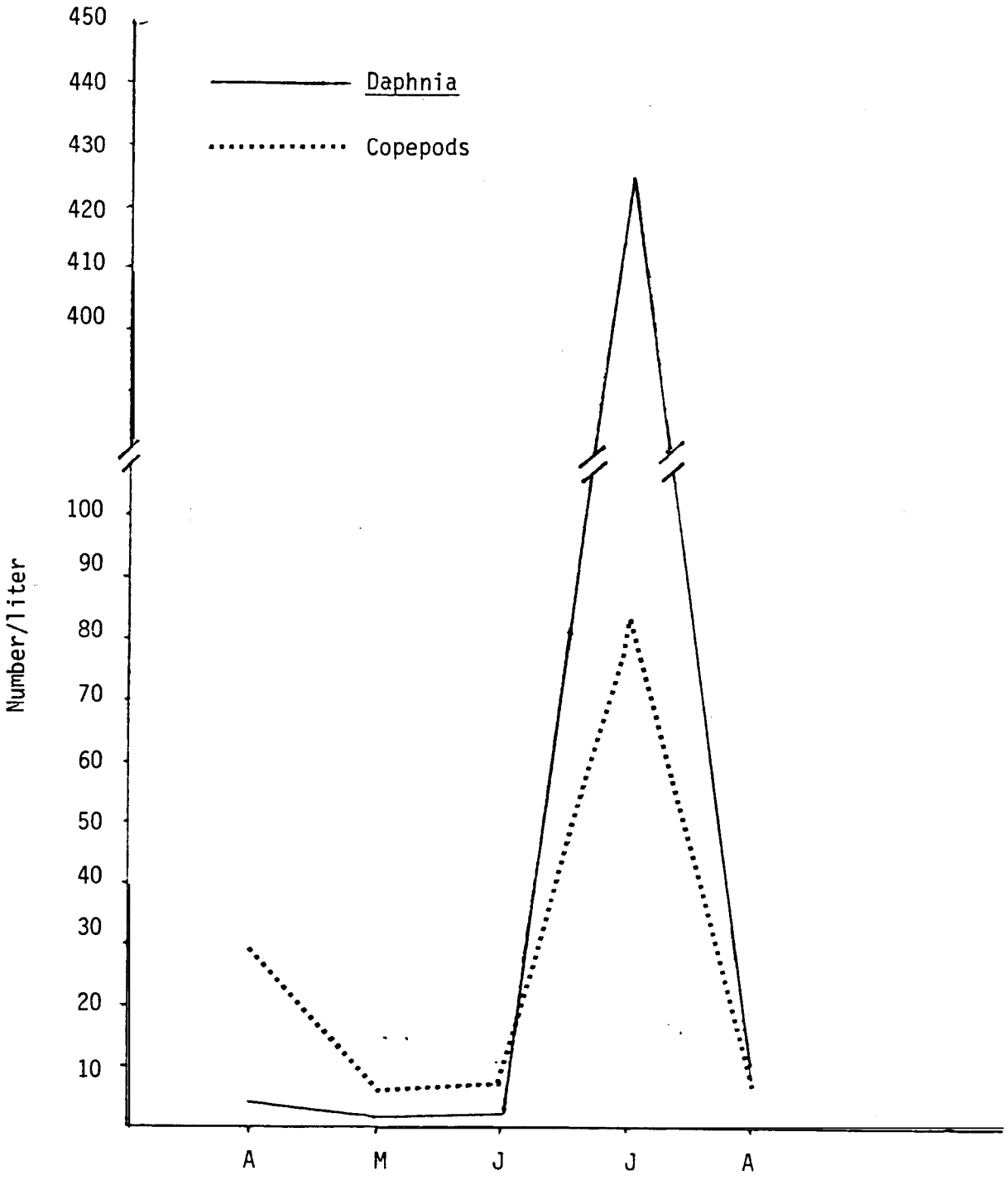

Figure 4. Mean densities (number/liter) of prominent zooplankters, Ririe Reservoir, 1982.

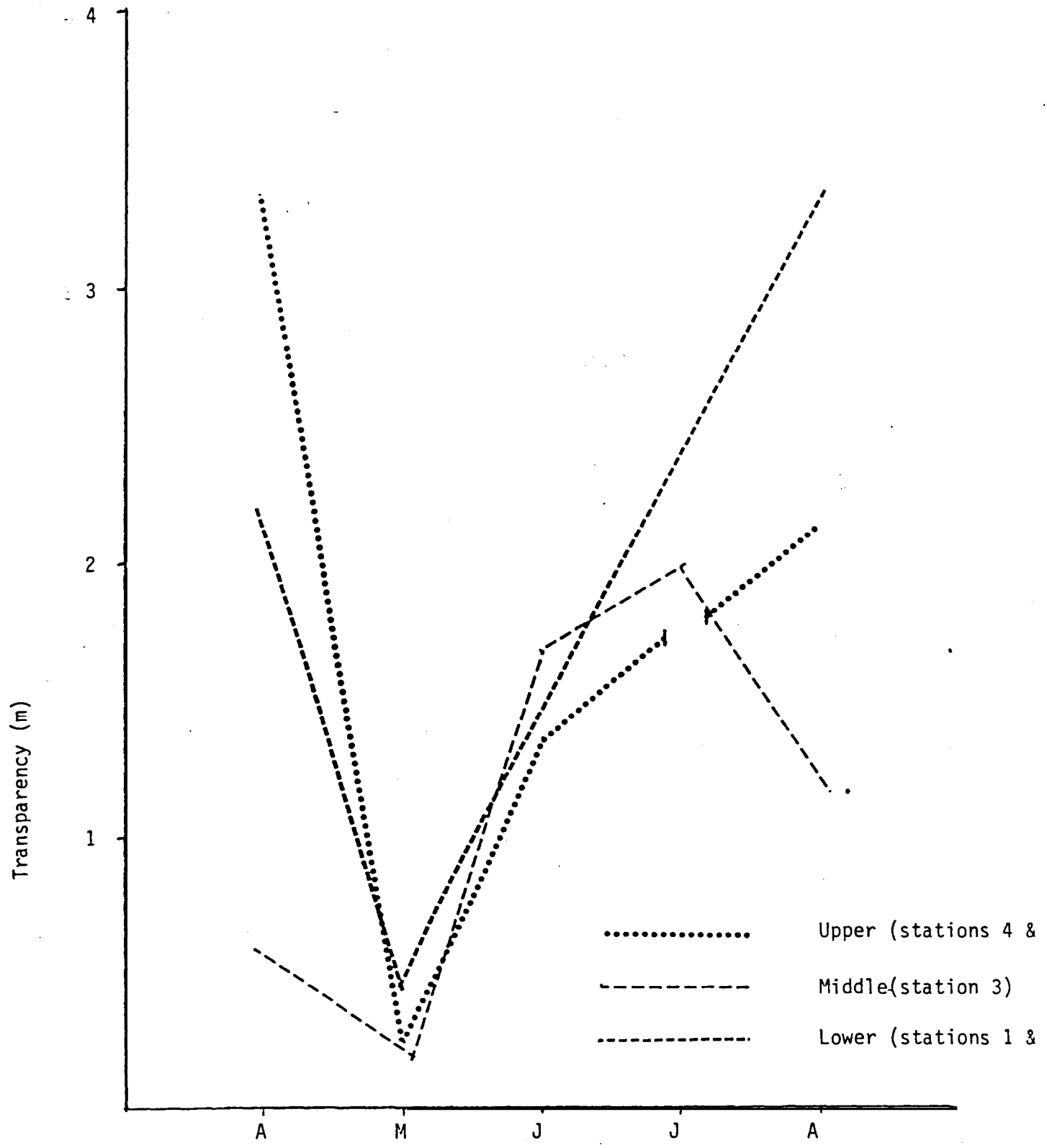

Figure 5. 1982 Ririe Reservoir secchi readings

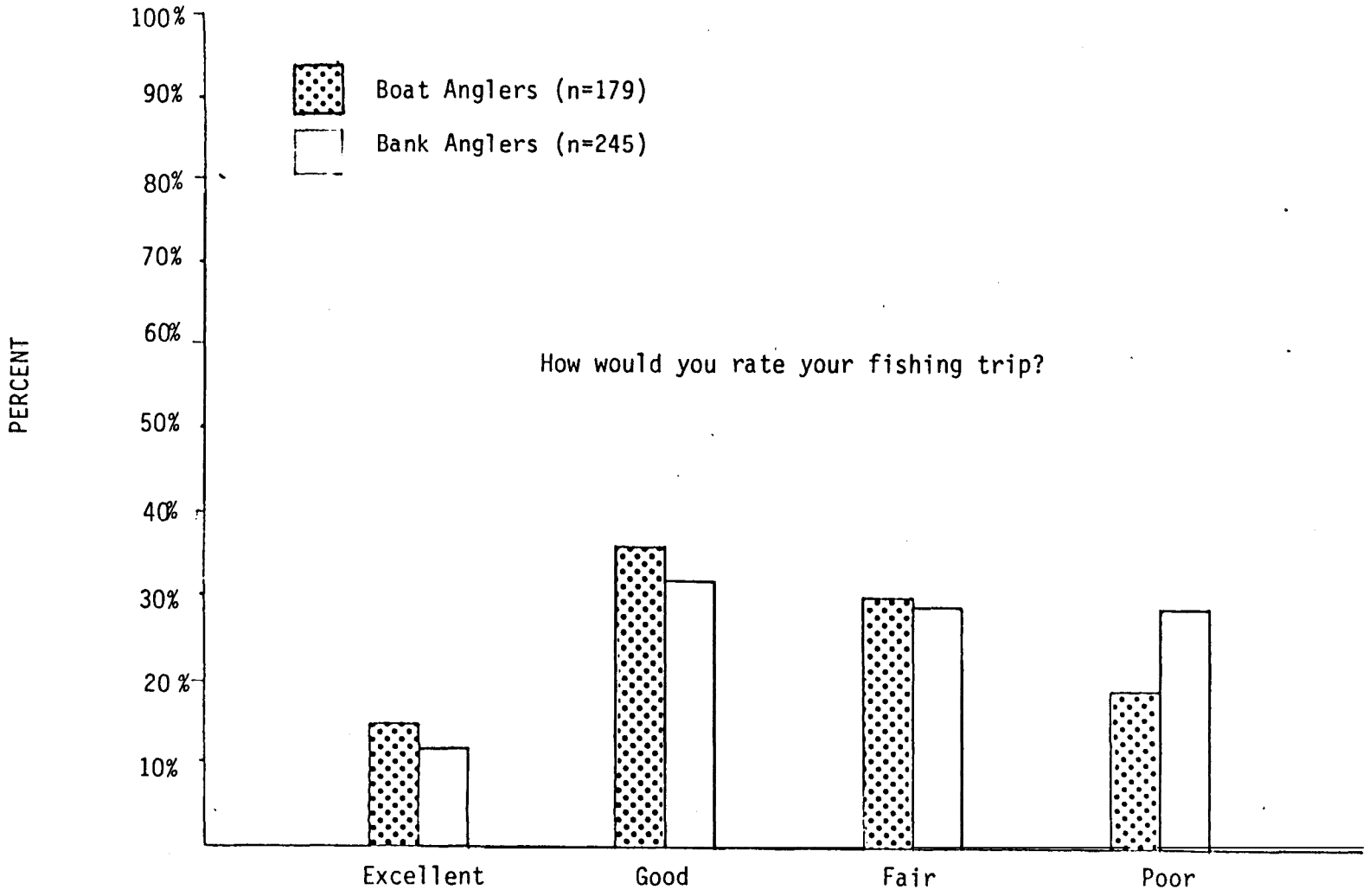

Figure 6. Angler rating of present fishing trip, Ririe Reservoir, 1982.

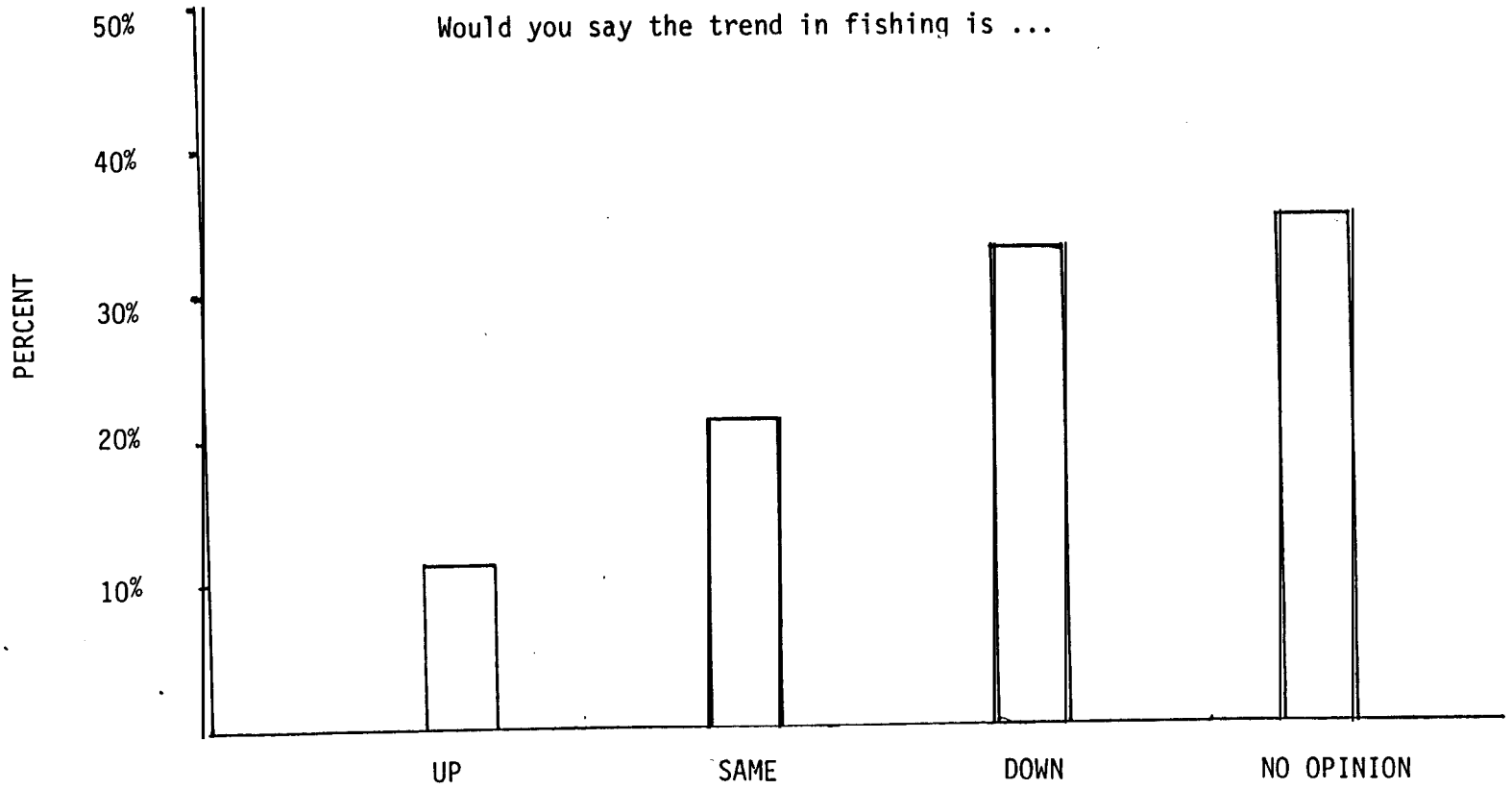

Figure 7. Trend in fishing as rated by anglers, Ririe Reservoir, 1982.

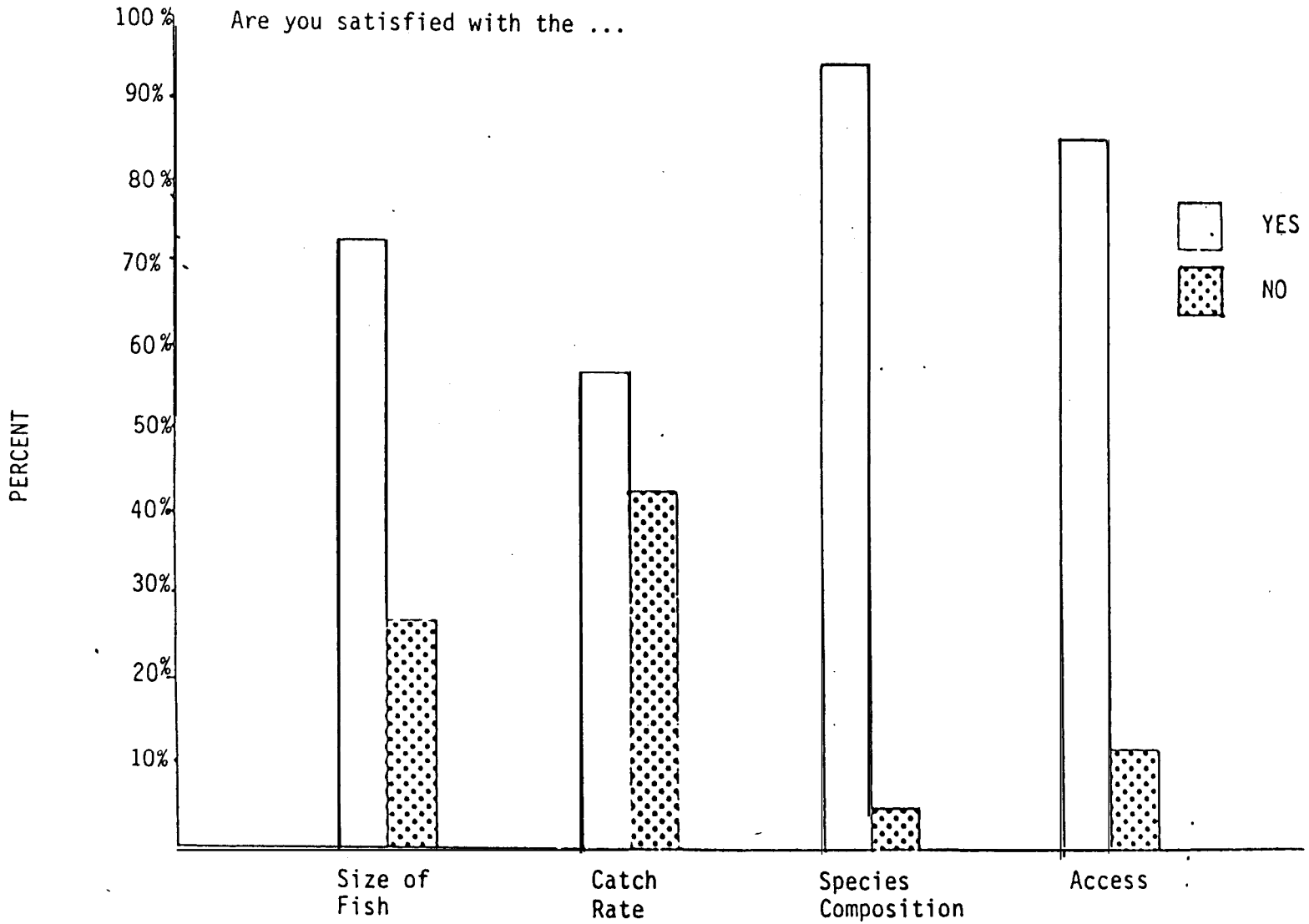

Figure 8. Anglers satisfaction with the Ririe Reservior Fishery, 1982.

the boat anglers were regular visitors to Ririe Reservoir, fishing it more than 10 days per year (Figure 9). This can probably be attributed to the reservoir's proximity to Idaho Falls, as 83% of the bank anglers and 68% of the boat anglers said they fished Ririe because of its location (Figure 10).

Island Park Reservoir - Creel Census

Island Park Reservoir anglers fished an estimated 124,442 hours from 28 May to 30 September 1982 (Table 6). Peak effort occurred during the month of July with 37,578 hours. Boat anglers expended the majority of the effort (71%) as compared to bank anglers with 29% (Table 7). Peak bank angling effort occurred in August but was fairly evenly distributed throughout the summer. No estimate of angler effort was made for October but the past 6 creel censuses show this time period produces an average of 5.4% of the seasons effort. November has never been censused for angler effort. If effort is adjusted for the October period, estimated effort was 130,664 hours for 1982.

Angler effort for 1982 was much higher than the 70,820 hours found in 1981 (Ball et al. 1982), approaching the historical high of 176,008 hours found in 1968 (Table 8, Figure 11). The reason for this increase in effort in 1982 is thought to be the result of the improved catch rate and size of fish taken in 1981 which brought many fishermen back to Island Park Reservoir.

Anglers caught an estimated 28,536 game fish from 28 May to 30 September 1982 (Table 6). Catch rates were .23 fish/hour, 48% lower than the .44 fish/hour found in 1981. Catch rates were lowest in July and highest in May and October. The decline in catch rates over 1981 is thought to be caused by the reservoir level management. Drawdown in the fall of 1981 was very low at 12,100 acre feet resulting in higher catch rates and probably loss of fish from the reservoir (Ball et al. 1982). The relatively small amount of drawdown in 1982 to 73,400 acre feet and the loss of fish in 1981 may have caused the low catch rates in 1982. Average minimum pool for the past 30 years has been 58,476 acre feet. The drawdown level reached in 1981 has only been reached in normal management two times since 1952. The other three extreme drawdowns (1958, 1961, 1979) have been for dam maintenance and were accompanied by fish eradication programs (Ball et al. 1982).

Rainbow trout without deformed fins result from wild fish spawning and fry plants and are classified as wild rainbow. They had a mean total length of 403 mm. Hatchery rainbow, planted as catchables, had a mean total length of 361 mm (Figure 12). This is an increase in mean size over the 1981 catch (Table 9). Based on the length frequency distribution of the fish caught in 1982, the fish were made up of older individuals with the younger and smaller year classes missing. This was especially evident in the "wild rainbow". The catch rate of all rainbow trout larger than 405 mm was .08 fish/hour in 1981 and .09 fish/hour in 1982, perhaps indicating the majority of the fish lost due to drawdown were the smaller fish stocked in 1981. The reasons for this are presently unclear.

Table 6. Estimated effort, catch and catch rate by month and species caught, Island Park Reservoir, 1982.

DATE	EFFORT (hours)	SPECIES							CATCH RATE (fish/hr.)
		WRB	HRB	BRK	KOK	COHO	CT	TOTAL	
5/28 to 5/31	9,887	1251	1828	169	77	131	21	3477	.35
June	32,636	3319	2476	462		517		6774	.21
July	37,578	3377	1970	56	788	169		6360	.17
August	26,251	2537	2033			177		4747	.18
September	18,090	3392	1217		80	80		4769	.26
October	NO COUNTS								.34'
Totals	124,442	13876	9524	687	945	1074	21	26127	.23

' not included in totals

Table 7. Estimated effort, catch and catch rate for bank and boat anglers by month and species, Island Park Reservoir, 1982.

BANK ANGLERS

DATE	EFFORT (hours)	CATCH							CATCH RATE fish/hour
		WRB	HRB	BRK	KOK	COHO	CT	TOTAL	
5/20 to 5/31	2093	403	492	63	13	25		996	.48
June	7100	831	817	107		43		1798	.25
July	9035	393						393	.04
August	9664	928	242			77		1247	.13
September	8144	925	740					1665	.21
Totals	36036	3480	2291	170	13	145	0	6099	.17

BOAT ANGLERS

5/20 to 5/31	7794	848	1336	106	64	106	21	2481	.32
June	25536	2488	1659	335		474		4976	.20
July	28543	2984	1970	56	788	169		5967	.21
August	16587	1609	1791			100		3500	.21
September	9946	2467	477		80	80		3104	.31
Totals	88406	10396	7233	517	932	929	21	20028	.23

Table 8. Summation of catch data, Island Park Reservoir, 1950 to 1982. Catch rate in parentheses (fish/hour).

Year	Salmonids per hour	Angler hours	% Composition of Catch Rb	Bk	Coho	Kok	Ct	Period Covered	Reference
1950	.37	47,737	87	7.0		0.6	5.0	6/4 - 8/26	Hauch and Irving, 1952
1951	.46	70,834	79	5.0		15.0	1.4	6/4 - 10/31	" " " "
1953	.32		89	2.7		7.0	1.7	6/4 - 7/15	Andriano, 1955
1954	.57							July - October	
1958			86	9.0		4.0	1.0	Creel checks	(1)
1960	.82	75,668	99	0.7		0.3	0.1	6/4 - 10/31	Corning, 1961
1961			91	1.0		8.0		Creel checks	(1)
1963	.50		96	0.6		2.6	0.3	592 hrs	(1)
1964	.80		69			26.0		194 hrs	(1)
1965	.43	107,789	84	8.0		7.0	1.0	5/29 - 10/31	Jeppson, 1966
1966	.90		74	12.0		13.0	0.4	1162 hrs	(1)
1967	.54	92,949	93	4.0	3			June - October	Jeppson, 1968
1968	.59	176,008	74	3.0	22			June - October	Jeppson, 1969
1969	.56		43	1.1	39	16.0	0.6	5340 hrs	(1)
1970	.21		54	12.0	20	12.0	2.0	3625 hrs	(1)
1971	.33		54	6.0	19	19.0	0.7	4972 hrs	(1)
1972	.55		44	2.0	24	30.0		4831 hrs	(1)
1973	.36		66	2.0	12	19.0	0.2	2405 hrs	(1)
1974	.54		29	0.3	3	66.0	1.0	1104 hrs	(1)
1975	.23		50	1.0	25	24.0	1.0	674 hrs	(1)
1976	.33		48	10.0	27	15.0		809 hrs	Jeppson & Ball, 1977
1977	.70		41	8.0	40	18.0		820 hrs	Ball & Jeppson, 1978
1978	.15		100					207 hrs	Jeppson & Ball, 1979
1980	.70		100					94	Ball & Jeppson, 1981
1981	.44	70,820	91	1.0	8	.6		5/23 - 10/31	Ball & Jeppson, 1982
1982	.23	124,442	89	3.0	4	4.0	0.1	5/28 - 9/30	Present study

(1) Region 6 files, Idaho Department of Fish and Game, creel spot checks.

Table 9. Mean total length (mm) of game fish measured from anglers creels, Island Park Reservoir, 1961-1982. Sample size in parentheses

	RAINBOW		BROOK	COHO	KOKANEE	REFERENCE
	WILD	HATCHERY				
1982	403	361	350	358	366	Present study
	(187)	(202)	(8)	(18)	(20)	
1981	344		276	3E5	313	Ball et al, 1982
	(1282)		(32)	(153)	(11)	
1972	348		246	296	282	1)
	(89)		(11)	(68)	(79)	
1968	348		315	277	250	Jeppson, 1969
	(1200)		(19)	(440)	(4)	
1967	304		289	211		Jeppson, 1968
	(1090)		(64)	(133)		
1966	348		265	384		Jeppson, 1967
	(44)		(1)	(5)		
1965	326		280	211	361	Jeppson, 1966
	(1676)		(239)	(133)		
1961	320		241		276	1)
	(153)		(1)		(23)	

1) Region 6 file data

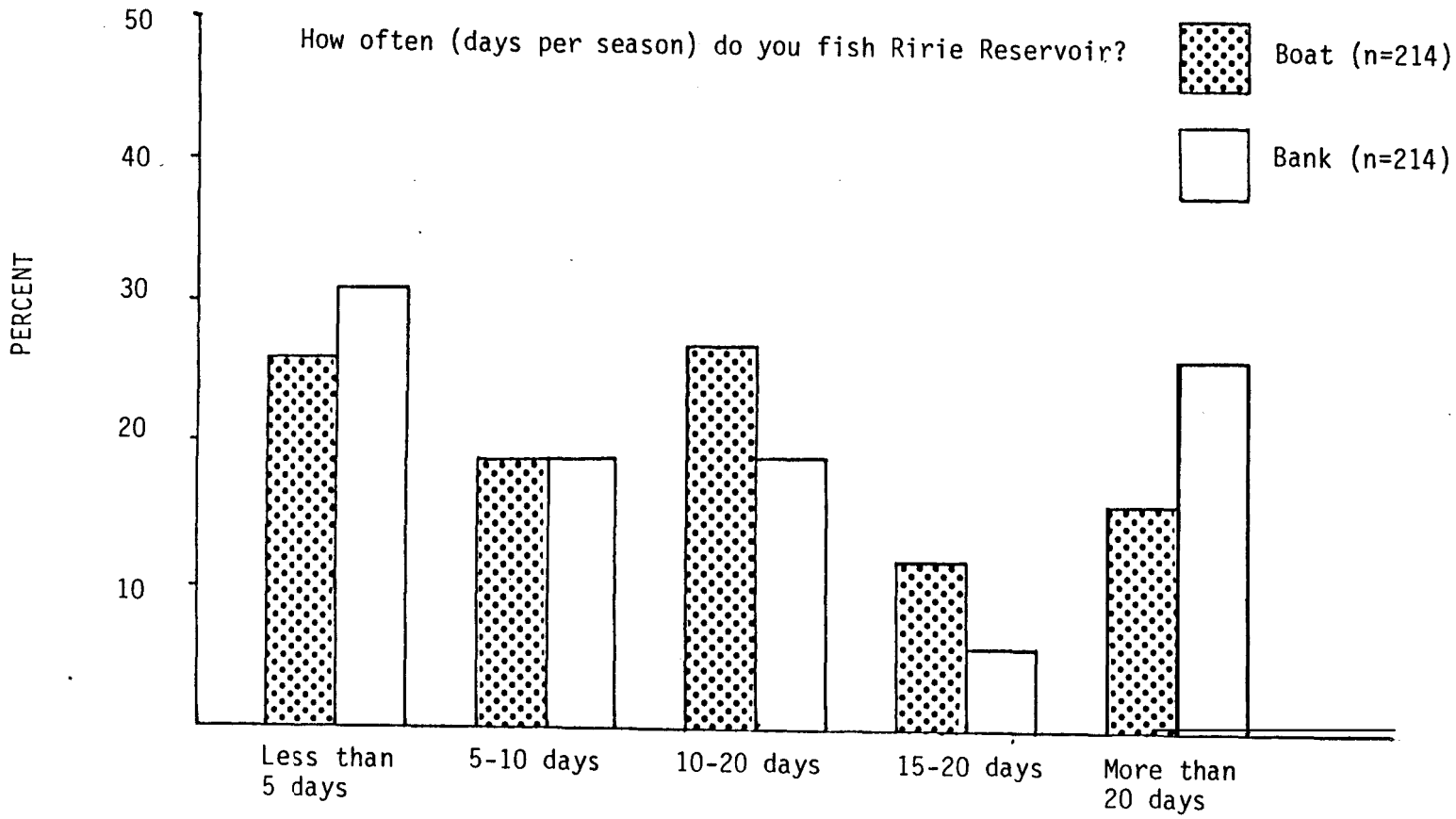

Fig. 9. Angler use of Ririe Reservoir, 1982.

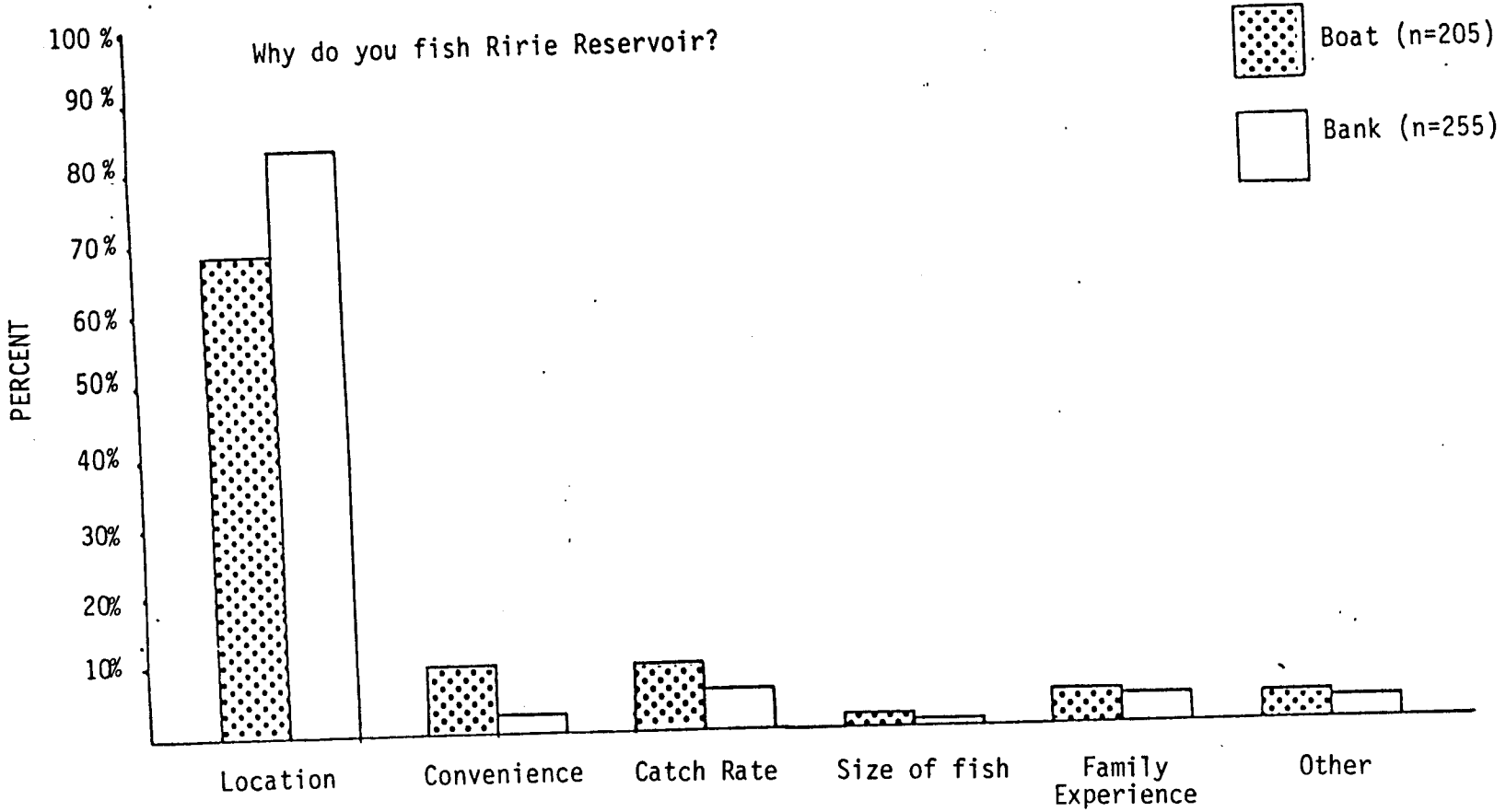

Figure 10. Anglers reasons for fishing Ririe Reservoir, 1982.

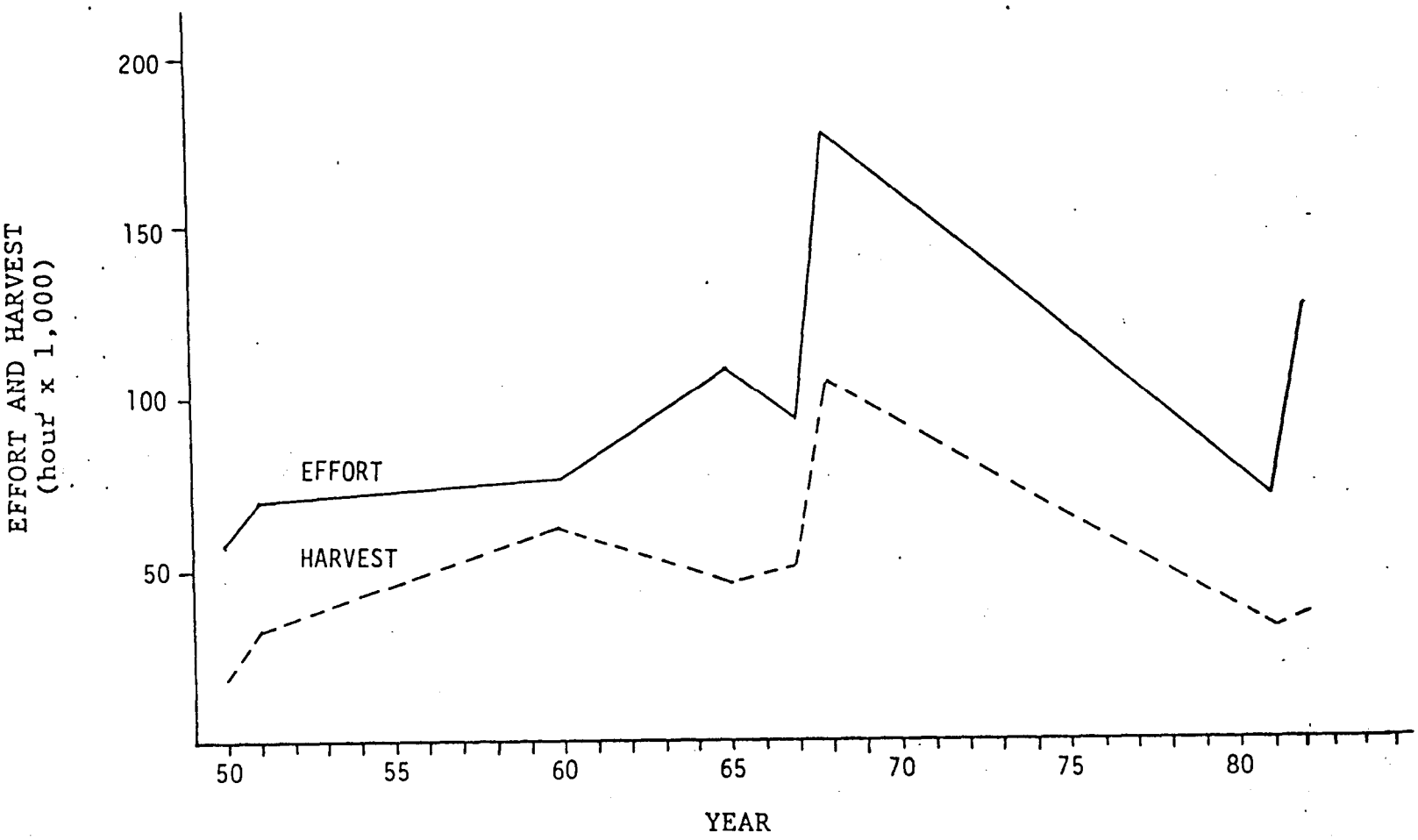

Figure 11. Effort and harvest, Island Park Reservoir 1980-1981. Values for 1950 are adjusted for the shorter census period.

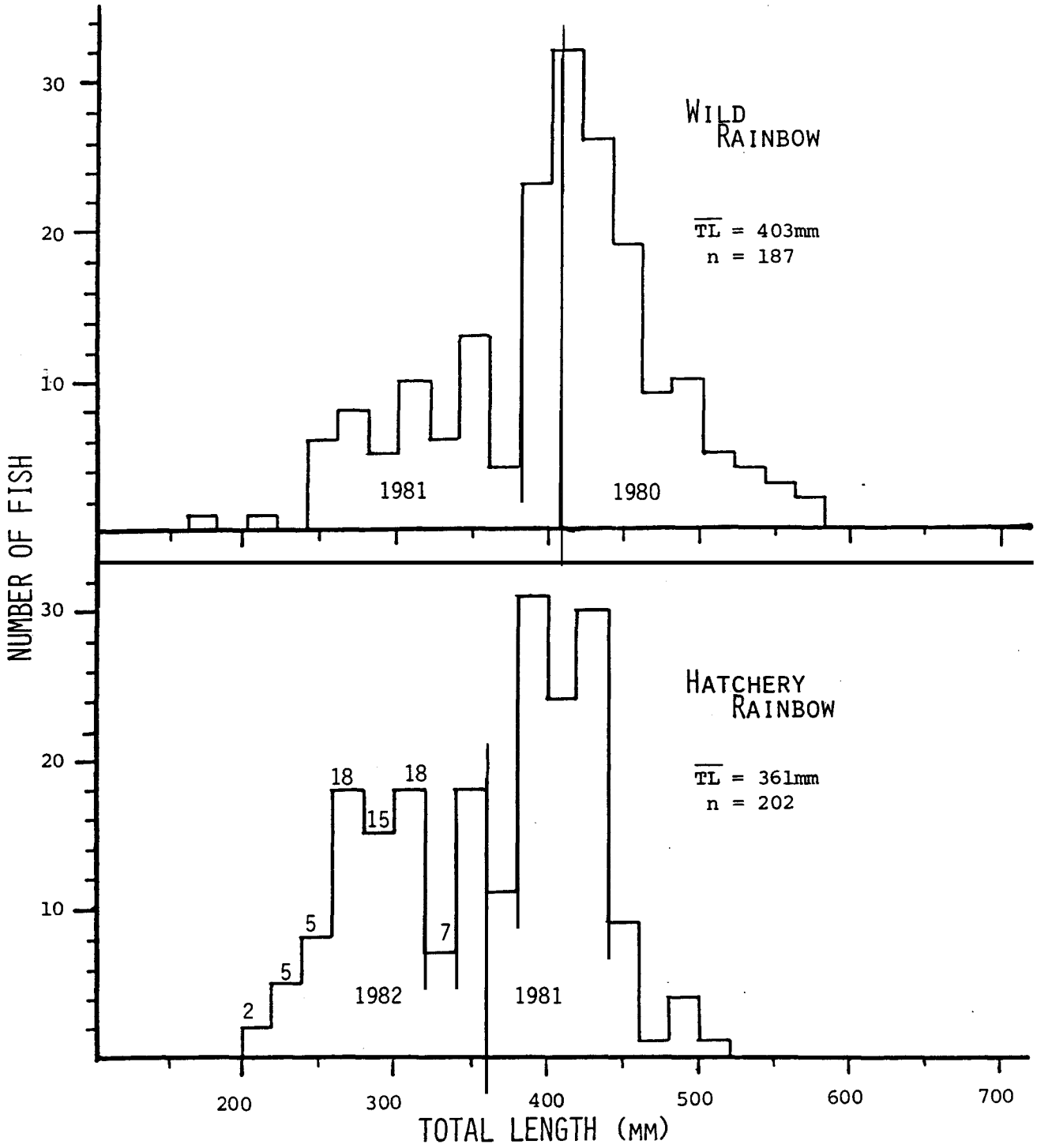

Figure 12. Length frequency of rainbow trout measured from angler creels, Island Park Reservoir, 28 May to 30 September, 1982.

Return to the Creel

Based on the length frequencies found for rainbow (Figure 12) return to the creel of 301,738 fry and fingerlings planted in 1980 and harvested for two years (1981-82) was estimated to be minimum of 8%. "Wild" rainbow made up 53% of the total catch in 1982. These figures assume little or no recruitment of "wild" rainbow to the Island Park Fishery. We assumed similar wild:hatchery ratio for 1981 as found in 1982. No separations of rainbow origin based on fin deformity had been made prior to 1982.

Hatchery rainbow, defined as those fish with deformed fins, had a return to the creel of 15% for 1981 and 1982 from the 1981 planting of 88,835 fish.

Catchable rainbow made up 36% of the game fish in 1982 and are primarily available for the first two years after planting with a third year fish only comprising 3% of the catch in 1982.

Coho comprised 4% of the catch and had a mean total length of 358 mm similar to the 365 mm found in 1981. Coho had poor returns to the creel, 5% for the 1980 plant of 557,750 fish and .2% for the 1981 plant of 553,663 fish. Coho comprised only 3% and 4% of the catch in 1981 and 1982 respectively, whereas, during the period 1968 to 1977, coho made up an average of 23% of the catch (Ball et al. 1982). Coho were found to be readily lost from drawdown at Island Park Reservoir (Jeppson 1968).

Brook trout comprised 3% of the catch and had a mean total length of 350 mm, much larger than sampled in any previous year. Kokanee comprised 4% of the catch and had a mean length of 366 mm (Table 9).

Gill Netting

Gill net catches for 26 May 1983 show a tenfold increase in chub and suckers since 1980. Nongame species comprised 70% of the catch with chubs dominant. Densities are still much lower than found prior to the 1979 poisoning of Island Park Reservoir (Table 10). Game fish numbers are little changed from prior to the poisoning efforts. Rainbow were the dominant species caught (33%) and were in excellent condition having a mean length of 345 mm and weight of 422 g.

Williams Lake

We interviewed 130 anglers during the 30-day ice fishery who fished 360 hours to catch 227 rainbow trout (.63 fish/hour).

During the first weekend of the general season, we interviewed 317 anglers who fished 822 hours to catch 273 rainbow trout and 8 bull trout (.34 fish/hour). We measured 280 rainbow between 29-31 May that averaged 33.3 cm total length (Table 11).

Table 10. Catch per night for 125 foot experimental gill nets set in shallow water, Island Park Reservoir, 1960-1983.

	Chub	Suckers	Non-Game	Rb	Kok	Coho	Broo	CT	WF	Game Fish
1)										
5/20/60`	.7		.7	9.3	2.3		.3			11.9
5/19/61	3.7	.7	4.4	18	4.7			.3		23.0
5/19/63	35		35.0	10.8	12.8		4.5	.2		28.3
5/15/64	113.3	.2	113.6	9.6	16.5		6.8	2.0		34.9
5/22/65	240	2	242	7.3	.7		9.7	.2		17.9
4/26 & 5/19/66	39	1.2	40.2	4.8	2.3		2.3			14.4
1)										
5/02 & 7/22/68	0	0	0	6.5	3.6	7.4	4.1		1	22.6
5/26/71	10		10	53	2	7	9			71.0
4/24/72	94	2	96	65	89	71	6			231.0
6/20/73	21	3	24	21	6	5	7			42.0
6/20 & 8/12/75										
6/23/76	68	67	135	5.5		4	1.5			11.0
6/26/78	87	82	169	5					4	9.0
1)										
8/4/80	1	2	3	10.5			1			11.5
5/26/83	32.		35	5	0	3.7	1	0	2.3	15.0

1) Reservoir poisoned during the fall of 1958, 1966, and 1979.

Table 11. Length-frequency of rainbow trout measured at Williams Lake, 29-31 May 1982.

Length (mm)	Frequency	Length	Frequency
190-199	4	350-359	20
200-209	1	360-369	20
210-219	3	370-379	24
220-229	1	380-389	17
230-239	5	390-399	11
240-249	3	400-409	15
250-259	6	410-419	7
260-269	15	420-429	3
270-279	10	430-439	2
280-289	12	440-441	1
290-299	29	450-459	1
300-309	18	460-469	0
310-319	13	470-479	0
320-329	9	480-489	0
330-339	10	490-499	0
340-349	19	500-509	1

Ave. tot. length = 333 mm N = 280

Table 12. Recent stocking history of rainbow trout in Williams Lake.

Date	Pounds	No. of fish	No. fish/lb	Average length (mm)
6/13/72	400	30,120	75.3	86
6/14/72	465	30,225	65	91
Totals	865	60,345		
6/12/73	566	59,996	106	**76**
7/9/74	800	29,600	37	109
7/10/74	760	30,400	40	107
Totals	1,560	61,000		
6/23/75	550	29,150	:53	97
6/27/75	500	30,500	61	91
Totals	1,050	59,650		
6/23/76	1,100	35,750	32.5	114
6/24/76	850	24,650	29	119
Totals	1,950	60,400		
4/25/77	1,800	70,200	39	107
6/15/78	600	30,600	51	98
6/16/78	650	29,445	45.3	115
Totals	1,250	60,045		
6/18/79	45	61,290	1,362	33
6/24/80	22.6	50,081	2,216	28
6/24/80	425	20,400	48	99
Totals	447.6	70,481		
7/22/81	337	93,349	277	56
7/27/82	190	21,850 (fall)	115	70
7/29/82	500	78,000 (spring)	156	64
8/11/82	500	34,500 (spring)	69	94
Totals	1,190	134,350		

Prior to 1979, the management plan for Williams Lake was to stock 60,000 rainbow fingerlings each June after plankton bloomed (Table 12). These rainbow were from winter spawning brood stock held at Hayspur Hatchery and ranged from 76 to 119 mm total length when released. By the opening of the fishing season the following year, these rainbow averaged 188-258 mm and supported the bulk of the fishery most years.

Although Williams Lake has the capacity to produce large trout, and did historically, the winter spawning fingerling stock rarely exceeded 35 cm. In 1979, spring spawning fingerling were also introduced. By the summer 1981, these fish were averaging about 34 cm after two years of growth and the average size trout in the anglers creel on opening day 1981 was 31.2 cm. This average size increased to 33.3 cm in 1982 and 12.5% of the catch exceeded 40 cm (Table 13).

However, as seen in 1981, although the spring spawning rainbow have grown well; the catch rate has continued to drop and averaged .34 fish/hour on opening weekend 1982 (Table 13). The level of stocking used **in** 1982 (110,000 spring spawning fry) may need to be increased to reach the goal of 1.0 fish/hour. Field creel checks made 9-13 June showed a slightly increased catch rate of .52 fish/hour.

Roberts Gravel Pit

Gill netting in Roberts Gravel Pit resulted in a catch of 90 fish over 100 mm in length, of which 48 (53.3%) were yellow perch, 33 (36.7%) were brown bullheads, 2 (2.2%) were black crappie, 5 (5.6%) were Utah chubs, and 2 (2.2%) were Utah suckers. Perch greater than 100 mm in total length had a mean total length of 163 mm; one perch fry of 70 mm was also captured (Figure 13). Bullheads had a mean total length of 166 mm. One large crappie (290 mm) was observed. Chubs had a mean total length of 298 mm; no chubs smaller than 285 mm were observed, perhaps indicating no reproduction of this species. Neither of the two suckers observed had a total length of less than 440 mm, also indicating a lack of reproduction. All fish sampled appeared to be in good body condition. Perch scales are presently being analyzed to assess growth and age class structure.

The Jefferson County Sportsman's Club provided Christmas trees for placement in the pond to provide habitat for spiny ray fishes.

Table 13 Catch statistics for opening weekends at Williams Lake, 1973-82.

Year	Fish/hr	% Rainbow	Average length (run)	% Age I	Average length Age I (mm)
1973	1.5	97	278	61.3	252
1974	1.2	96.6	267	18.0	188
1975	1.7	96.7	246	90.2	241
1976	0.7	98.6	284	44.1	249
1977	1.9	99.3	264	80.3	241
1978	1.8	100	290	49.5	258
1979	0.7	99	247	87.5	237
1980	0.8	99	310	35.9	253
1981	0.8	99.7	312	68.1	293
1982	0.34	97.2	333	46.1	283

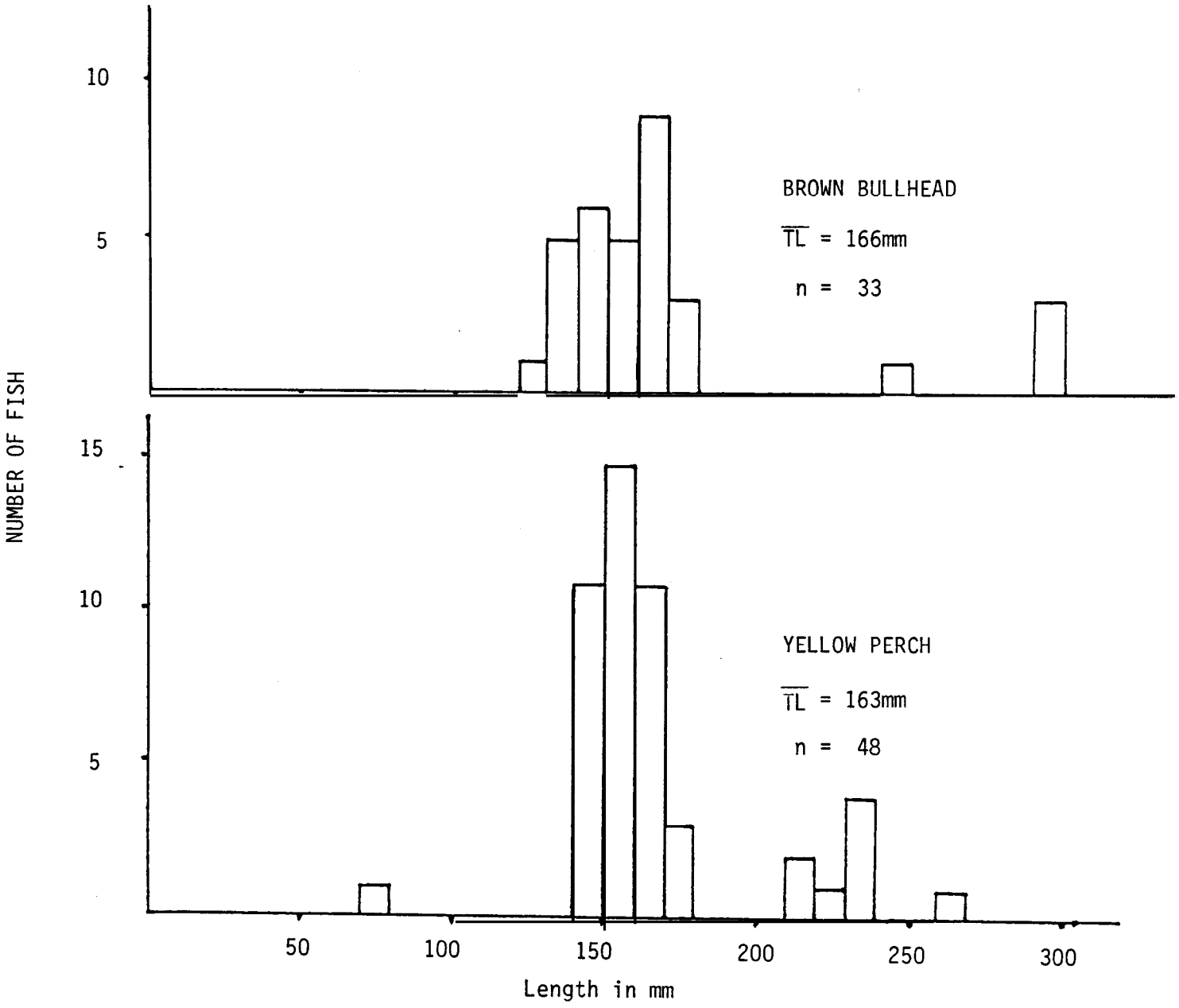

Figure 13. Length frequency of yellow perch and brown bullhead taken in gill nets at Roberts Gravel Pit.

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JOB PERFORMANCE REPORT

State of: Idaho Name: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No.: F-71-R-7 Title: Region 6 Stream Investigations

Job No.: VI-c

Period Covered: 1 January 1982 to 31 December 1982

ABSTRACT

Willow Creek Inventory

Fish populations were inventoried in several tributaries of the Willow Creek drainage. Sawmill Creek and Corral Creek were found to support dense populations of small, wild cutthroat trout. Homer Creek and Cranes Creek support high densities of wild brook and brown trout. Moderate densities of brown trout and cutthroat trout were found in Cellars Creek; Hell Creek had low densities of these species. Tex Creek supports moderate densities of cutthroat trout and brook trout. Other game fish in the drainage include: rainbow trout, coho and chinook salmon, and mountain whitefish, all of which are present below Ririe Dam. Rainbow trout (primarily hatchery catchables) are found above the reservoir, but are not common. Nongame species **in** the drainage include: mottled and Piute sculpins, longnose and speckled dace, redside shiners, Utah and bluehead suckers, and Utah chubs.

Lengths were recorded for all game fish captured and for nongame fish as time allowed. Twenty-five cutthroat were sacrificed from both Cellars Creek and Corral Creek for electrophoretic analysis.

Birch Creek

Anglers fished as estimated 25,444 hours to catch 21,851 trout at .93 fish/hour with 57% of these released in Birch Creek. The composition of the catch was 46% wild rainbow, 53% hatchery rainbow and 1% brook trout. Mean length of wild rainbow was 217 mm and for hatchery rainbow was 251 mm.

Medicine Lodge Creek

Anglers fished an estimated 5,323 hours to catch 5,742 trout at 1.08 fish/hour. Wild rainbow comprised 73% of the catch followed by hatchery rainbow 21% and brook trout 6%. Mean length of wild rainbow was 233 mm compared to 247 mm of hatchery rainbow and 196 mm for brook trout.

Electrofishing showed good wild populations of rainbow brook trout and cutthroat in the tributaries of Medicine Lodge Creek. Birch Creek was found to have only good densities of wild rainbow present in the lower 1 Km; an area proposed for hydro development. Wild rainbow were found in Mud Creek, but no fish were sampled in Crooked Creek.

Middle Fork Salmon River

Due to exceptionally high flows in 1982, only 6 of 21 established snorkel transects were counted. The limited data collected indicated that while numbers of cutthroat may be stabilizing in the Middle Fork, the percent of older age (larger) fish increased over the 1978 survey.

Average size of cutthroat captured by angling was also larger in 1982 than in 1978. The proportion of cutthroat greater than 300 mm was 49.4% in 1982 compared to 44.3% in 1978 and 19% in 1969 prior to catch-and-release regulations.

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RECOMMENDATIONS

Willow Creek

Cease introductions of rainbow trout in tributaries of Willow Creek until status of the cutthroat has been determined.

Birch Creek

Continue to stock Birch Creek with hatchery rainbow to maintain catch rate of 1.0 fish/hour.

Determine status of trout populations in Willow, Mud and Rocky Canyon Creeks.

Medicine Lodge Creek

Cease introductions of hatchery catchables in the Medicine Lodge Creek drainage; manage as a wild trout fishery.

Develop an enchancement plant for the indigenous cutthroat trout.

OBJECTIVES

Willow Creek Drainage

Inventory fish populations in the Willow Creek drainage with regards to species composition and abundance, age and growth, movement and habitat structure.

Determine the relationship of the Willow Creek fishery to Ririe Reservoir.

Birch Creek and Medicine Lodge Creek

Monitor angler use and harvest.

Determine use of hatchery rainbow.

Inventory tributary streams.

Middle Fork Salmon River

To evaluate the relative abundance, sizes and population structure of cutthroat trout in the Middle Fork Salmon River.

To assess the effects of regulations and management regimes to formulate recommendations for the management of stream fisheries in Region 6.

ACKNOWLEDGEMENTS

Kurtis Plaster, Bio-Aide, and Mike Olsen assisted in gathering creel census information on Birch Creek and Medicine Lodge Creek. Pat Cudmore, Senior Conservation Officer, was instrumental in initiating the Willow Creek Inventory and helping with sampling. We would like to thank all these people for their help.

The Bureau of Reclamation provided funds to hire personnel for the Willow Creek Inventory.

TECHNIQUES USED

Willow Creek Drainage

We electrofished several tributaries in the Willow Creek drainage using a gasoline powered backpack shocking unit (Coffelt BP-1). Game fish population estimates were derived by using a successive removal estimator (Sebar and LeCren 1967, Zippin 1958). Estimated numbers of age 1+ and older trout for each transect were converted to trout per 100 m for comparison. Test angling was also performed to determine species presence. Total lengths were recorded in millimeters for all salmonids captured and for nongame species when time permitted.

Twenty-five immature cutthroat were sacrificed from both Cellars Creek and Corral Creek for genetic analysis at the Idaho State Univeristy laboratory using techniques modified from Clayton and Tretiak (1972), Wishard, et. al. (1980), and Bower (personal communication). Electrophoresis will be completed in spring 1983.

Birch and Medicine Lodge Creeks

Birch Creek was divided into two sections to correspond to past creel census activities (Jeppson 1971, Andriano 1955). Section one was 7.5 miles in length and ran from the Reno Ditch Diversion (Sec. 3, R30E, T9N) to Skull Canyon (Sec. 32, R30E, T8N). Section two was 10 miles in length and ran from Skull Canyon to above Kaufman Guard Station (Sec. 26, R29E, T11N).

For the purposes of creel census, Medicine Lodge Creek was divided into two sections. Section one was from the mouth of the canyon at Indian Creek to the Small Cabin (Sec. 12, R33E, T11N) and was 5 miles in length. Section two ran from the Small Cabin to the beginning of Medicine Lodge Creek at the confluence of Warm and Divide Creeks and was 7 miles in length.

Creel census anglers interviews and counts were conducted from the opener May 29, 1982 through September 30, 1982. The count schedule was stratified by month, day of week, time of day and stream section. Angler counts were made for the morning and afternoon time periods.

Two weekdays and two weekend days, morning and afternoons, were counted each month. Morning and afternoon counts were spaced evenly apart. Counts were also made on holidays which were treated as weekend days for the effort estimates. Morning and afternoon counts were generally made on the same day but often were on different days. A check station was used for the opening weekend in May.

We used angler counts to calculate mean number of anglers for each day type (weekend, weekday or holiday). Multiplication of mean number of anglers by mean daylight hours for each 14-day interval by number of each day type, in an interval, results in an estimate of total hours of angler use for each day type. Combining each day type for an interval gives the estimated angling effort for each 14-day interval.

We interviewed as many anglers as possible to document residence, license class, type of angling gear, terminal tackle, type of angler, length and weight of fish, number of fish, hours fished and species creel ed.

Catch rate for each interval was determined from angler interviews for each species. This was multiplied by estimated effort to give estimated harvest and catch by species for each interval, section and angler type. Anglers were counted primarily from the road by truck or motorcycle.

Species composition and densities of trout **in** the Medicine Lodge Creek drainage were evaluated in 1981 and 1982. Medicine Lodge, Warm, Divide, Irving, East Fork Irving, Edie, and Fritz Creeks were all electrofished. A portable battery or generator powered electrofisher was used to sample stream sections from 100 m to 200 m in length. Population estimates were made using either the DeLury successive removal techniques (Braten 1969) or the two pass method described by Serber and LeCren (1967). Due to time contraints, the capture efficiency was often used to estimate populations in areas where only one pass was made (Serber and LeCren 1967).

Middle Fork Salmon River

Due to the exceptionally high flows in 1982, the planned snorkel transect counts of cutthroat trout were not conducted **in** their entirety. Counts through 6 of 21 established transects were conducted by Fish and Game personnel in conjunction with other Middle Fork research work. River level was approximately 1 foot higher than during prior years' counts and it was felt that fish numbers might not be comparable due to differences in available habitat.

Personnel also angled for cutthroat as in past years using the standard barbless terminal gear (Mepps spinners and grasshopper flies) established by Ortman (1971). All cutthroat were measured in millimeters total length and returned unharmed to the river.

INTRODUCTION

The Willow Creek drainage is located in Bonneville, Bingham, and Caribou counties in Eastern Idaho (Figure 1). Total area of the drainages is 2,418 Km^2, most of which is grain producing dry farms and heavily grazed rangeland. Ririe Dam, maintained by the Bureau of Reclamation, was completed in 1975 and created a 19.2 Km long reservoir on Willow Creek at river kilometer 23.8. Approximately two-thirds of the drainage (1,612 Km^4) is above the dam site. U.S. Geological Survey flow records for the drainage have been recorded near Ririe continuously since 1962 and occasionally since 1903 (USGS 1983). Stream flows ranged from .2 m^3/sec to 117 m^3/sec at the Ririe gauging station prior to construction of the dam. Spring runoff occurs between mid-April and mid-June and lasts from one to six weeks.

Willow Creek and its tributaries above Ririe Dam are subject to heavy siltation as a result of the extensive agricultural use in the area (U.S. Army Corps of Engineers 1972). Below the dam, Willow Creek supports a seasonal fishery, but total curtailment of water releases from the reservoir for flood control during periods of extreme cold results in the loss of a stable, year-round fishery (Jeppson 1979, Fisher 1979).

Game fish species found in Willow Creek and its tributaries include the native cutthroat trout (Salmo clarki), brown trout (S. trutta), rainbow trout (S. gairdneri), and brook trout (Salvenlinus fontinalis). Additionally, coho salmon (Oncorhynchus kisutch) and chinook salmon (0. tshawytscha) are stocked in Ririe Reservoir and contribute to the downstream fishery. Whitefish (Prosopium williamsoni) are found only below the dam.

Nongame species in the drainage include mottled and Piute sculpins (Cottus bairdi and C. beldingi), longnose and specked dace (Rhinichthys cataractae and R. osculus), redside shiner (Richardsonius balteatus), Utah, bluehead and mountain suckers (Catastomus ardens, C. discobolus and C. platyrhyncus), and Utah chubs (Gila atraria)

Nongame fish eradication programs have been conducted on various portions ow Willow Creek in 1960, 1965, 1966, 1967 and 1975 (Table 1). Following treatment, streams were restocked with one or more of the following species: cutthroat, brown, brook and rainbow trout. All species but rainbow appear to have established wild, naturally reproducing popluations.

Creel census and fish inventory work on Medicine Lodge and Birch Creek were undertakn to evaluate current management programs in regards to stocking of hatchery catchables and status of wild trout. Updating of angler use and harvest information was also needed.

Medicine Lodge Creek and Birch Creek are two of the complex of Idaho streams which terminate in sinks on the Snake River Lava Field

Table 1. Locations and lengths of stream treated in Willow Creek drainage for the purpose of rough-fish eradication since 1960.

1960

Stream	Km Treated
Willow Creek Drainage	222.4

1965

Stream	Km Treated
Willow Creek	40.0
Birch Creek	1.6
Squaw Creek	1.6
Canyon Creek	1.6
Twin Creek	4.8
Cellars Creek	11.2
Mud Creek	6.4
North Fork Cellars Creek	1.6
Long Valley Creek	4.8
Mill Creek	9.6
Buck Creek	3.2
Hancock Creek	4.8
Seventy Creek	6.4
Strawberry Creek	1.6
Steele Creek	3.2
Cranes Creek	24.0

1966

Stream	Km Treated
Grays Lake Outlet Drainage	30.0

1967

Stream	Km Treated
Willow Creek Drainage below Grays Lake Outlet	40.0

1975

Stream	Km Treated
Willow Creek	48.0
Grays Lake Outlet	32.0

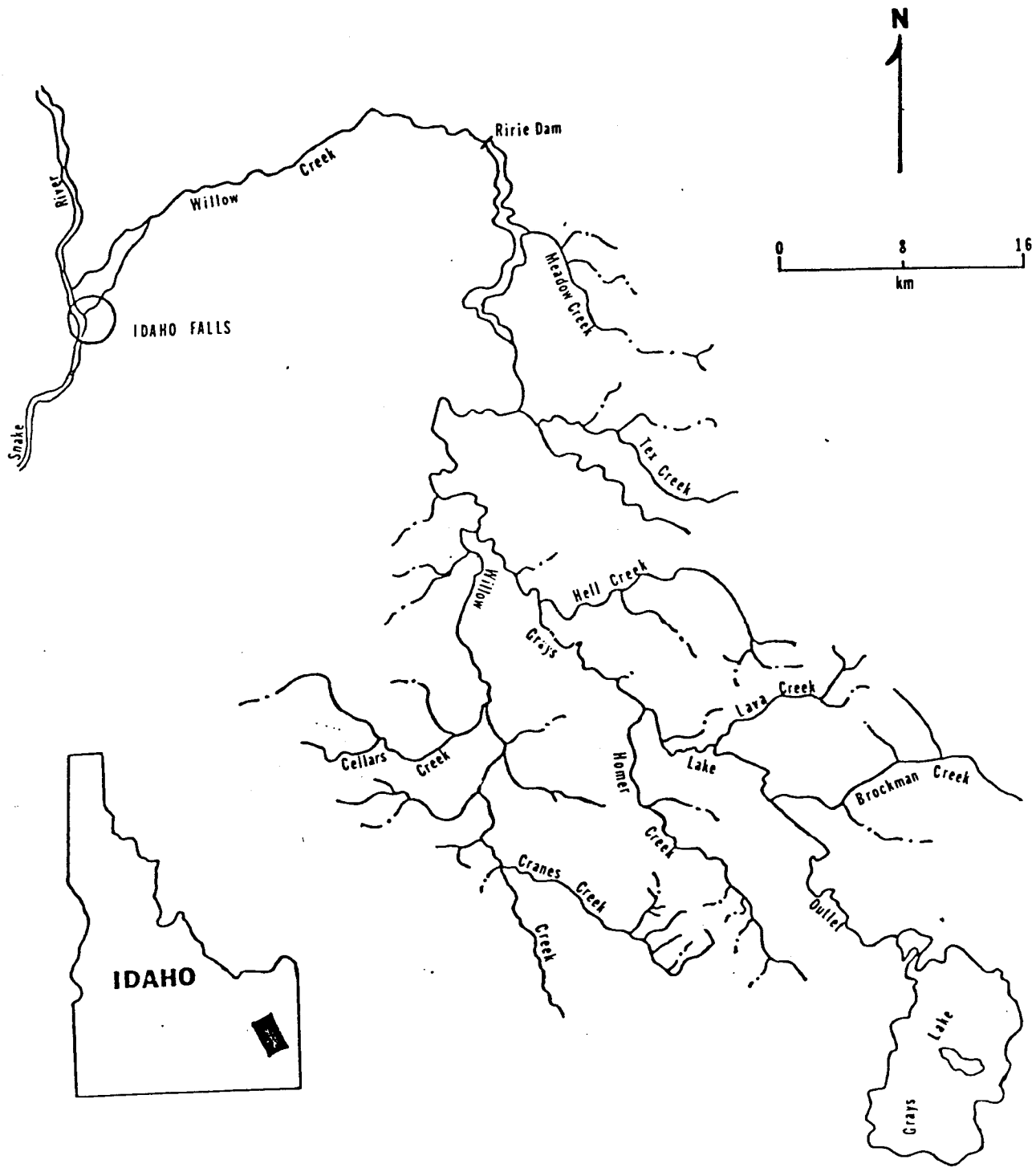

Figure 1. Map showing Willow Creek drainage and approximate location.

(Figures 2 & 3). These systems were isolated from all other drainages during the last several million years by continuous basalt lava flows which built up a pourous plateau several thousand feet thick in some areas (Andrews and Minshall 1979).

FINDINGS

Tex Creek Drainage

Tex Creek is a small, second order stream which, prior to its confluence with Willow Creek, flows through heavily grazed rangeland and then the Tex Creek Wildlife Management Area (WMA). Riparian vegetation above the WMA is sparse and banks are severely eroded in some sections due to cattle grazing. Grazing has been restricted since 1976 within the WMA boundaries, allowing recovery of the riparian zone. Vegetation is dense and has begun to curb the sloughing that resulted from previous cattle usage. Beavers utilize the dense vegetation for food and dam constructions, and in some cases are returning the water table and riparian zones to former levels with their dam building activity.

We electrofished Tex Creek at two transects on 28 July and one transect on 24 October.

The two transects sampled in July produced 14 wild cutthroat and one wild rainbow trout over a combined transect length of 340 m. Cutthroat trout ranged in length from 175 mm to 275 mm. The rainbow measured 180 mm. Thirty-five suckers ranging in length from 55 mm to 192 mm were also captured (Table 2).

In October, one transect 82 m long with a mean width of 3.8 m was electrofished. This transect was located at the confluence of a small tributary, Cove Creek, approximately one mile upstream from the previous transects. Young of the year (YOY) cutthroat observed out-numbered YOY brook trout observed *by 22* to 8. Age groups 1+ and older cutthroat were present **in** approximately equal numbers with similar age brook trout (12 to 11 respectively). Juvenile and adult brook trout ranged in length from 195 mm to 310 mm (Figure 4). Cutthroat trout juveniles and adults ranged from 115 mm to 230 mm in length (Figure 5). All brook trout larger than 195 mm were sexually mature. Brook trout spawning activity was observed; we counted four redds and six of the mature females captured were spent.

Bulls Fork, a small, heavily silted tributary to Tex Creek, was electrofished on 27 September. Transect location was approximately

Table 2. Electrofishing data for Willow Creek tributaries quantitatively sampled between November 1981 and January 1983.

Stream	Transect Length (m)	Date	Electrofishing Runs C_1	C_2	C_3	Population Estimate	Trout per 100 m	Comments
Tex Creek #1	147	07/28/82	7	1		8	5.4	100% WCT
Tex Creek #2	192	07/28/82	6	1		7	3.6	1 WRB shocked - others WCT
Tex Creek #3	82	10/24/82	22 (24)	1 (6)		23 (32)	28.0 (39.0)	1+ and older 48% BK, 52% CT YOY 27% BK, 73% CT
Cellars Creek #1	72	09/28/82	19	7		30	41.7	77% WCT, 23% Brn
Cellars Creek #2	85	09/28/82	35	10		49	57.7	Fry not estimated (5 Brn fry observed) 60% WCT, 40% Brn
Homer Creek #1	57	09/28/82	26	11		45	78.9	61% Brk, 32% Brn, 7% HRB No fry observed
Sawmill Creek #1	190	10/05/82	75 (17)	38 (12)		152	80.0	100% WCT - (# fry not estimated)
Corral Creek #1	126	10/05/82	28 (6)	5 (5)		34	26.9	100% WCT - (# fry not estimated)
Corral Creek #2	71	10/05/82	17 (4)	16 (3)	6 (1)	56	78.9	100% WCT - (# fry not estimated)
Hell Creek #1	**69**	07/16/82	**6**	2		9	13.0	100% WCT in this transect
Cranes Creel: #1	82	11/12/81	75	14		92	112.5	58% Brn, 41% Brk, 1% WCT
Cranes Creek #2	231	11/12/81	71	*		87	37.6	80% Brn, 20% Brk
Cranes Creek #3	85	01/26/83	11	2		13	15.3	54% Brk, 38% Brn, 8% WCT

* Efficiency from previous transect used. (
) Number of fry

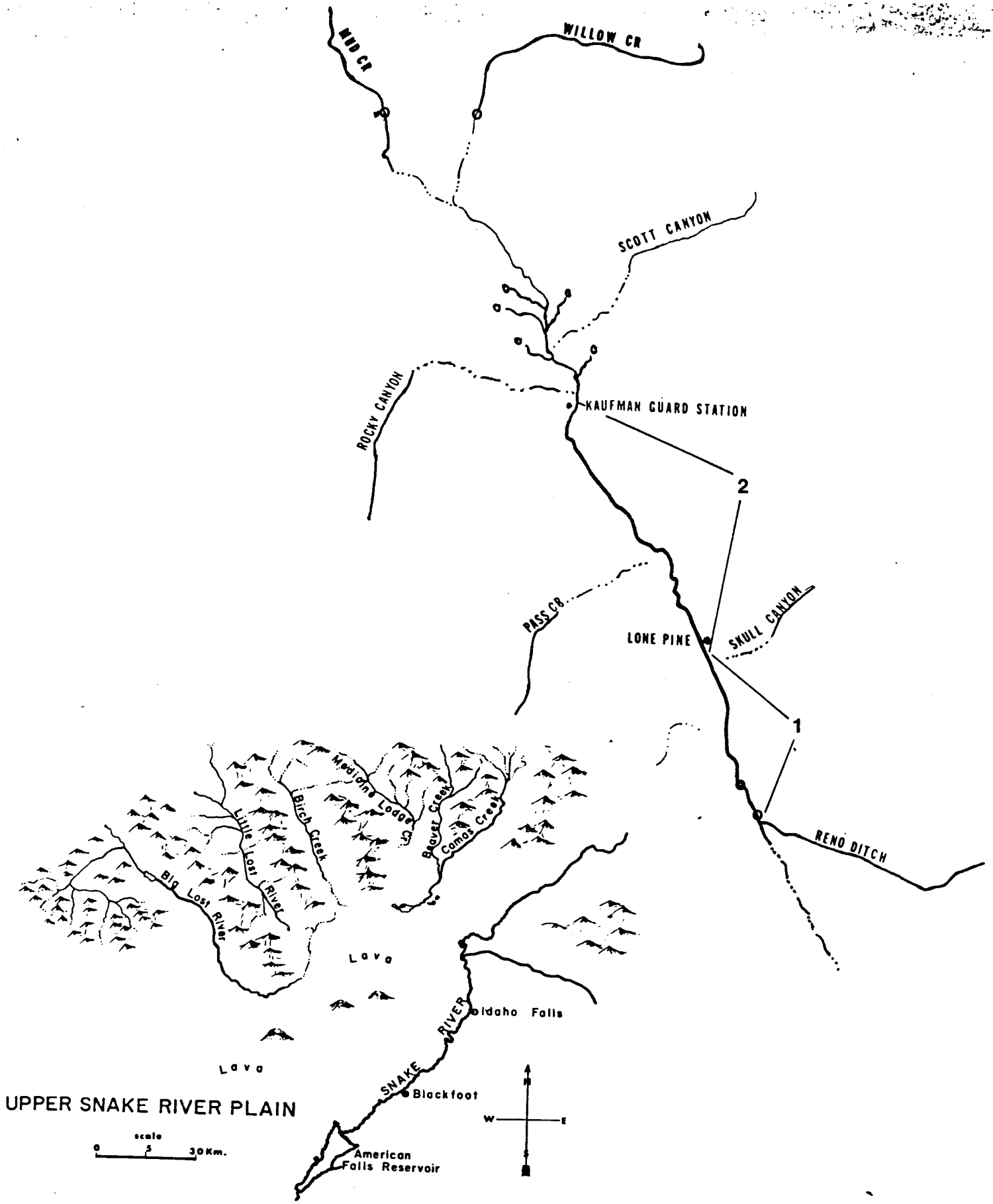

Figure 2. Map of Birch Creek showing study sections, electrofishing stations, and location to other streams.

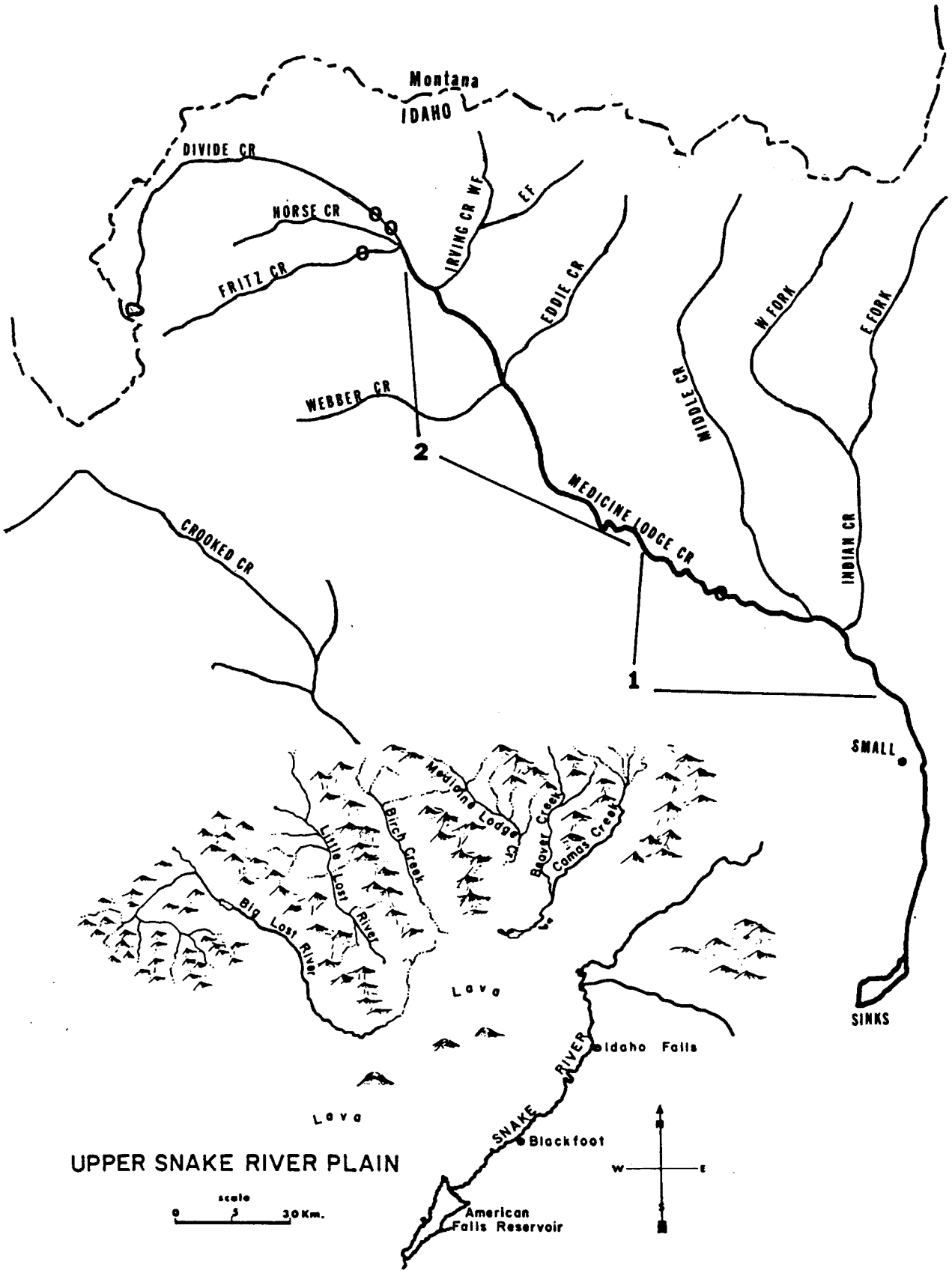

Figure 3. Map of Medicine Lodge Creek showing creel census sections, electrofishing stations, and location to other streams.

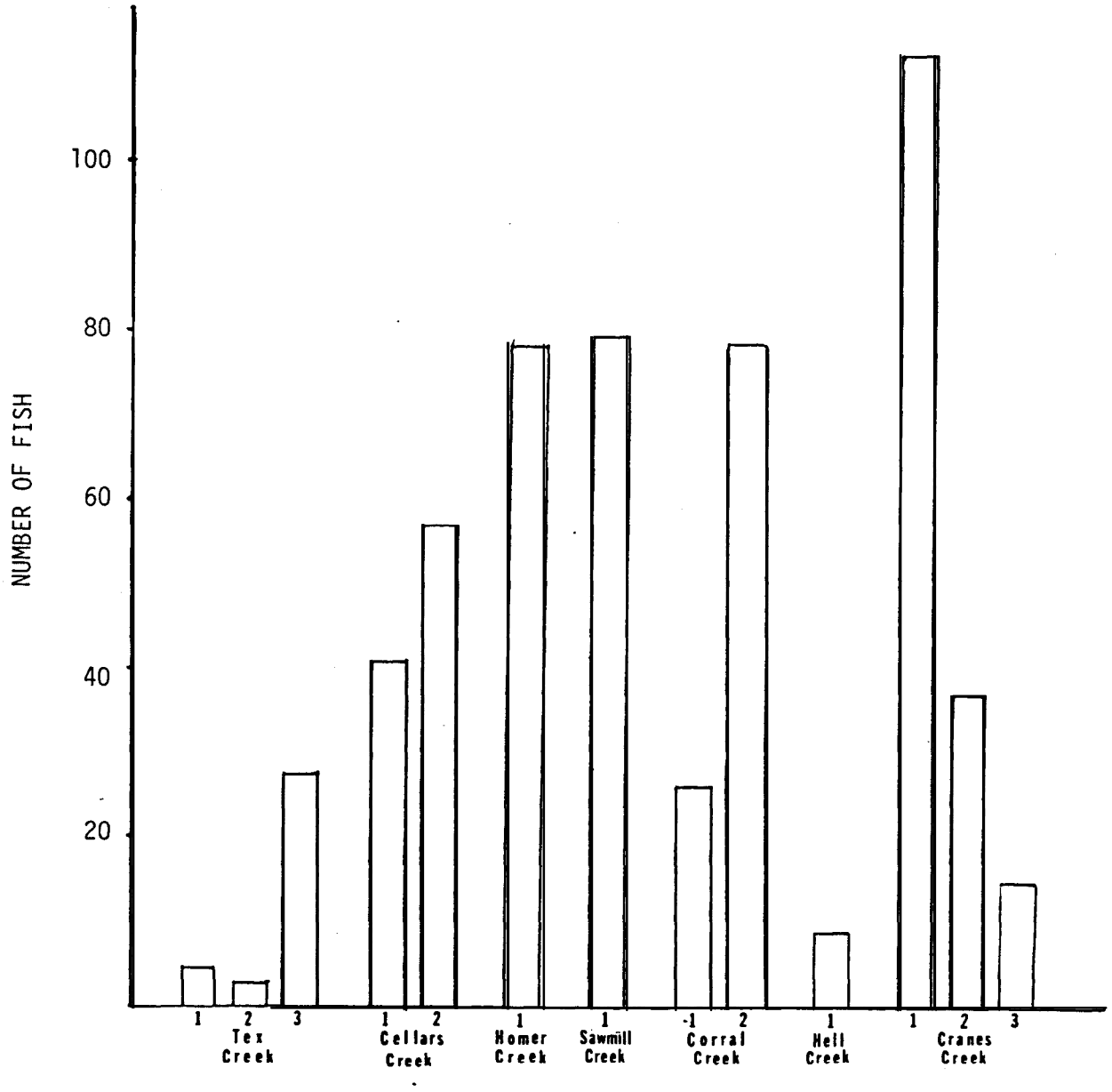

Figure 4. Estimated number of age 1+ and older trout for transects quantitatively sampled, Willow Creek Drainage. November 1981 to January 1983.

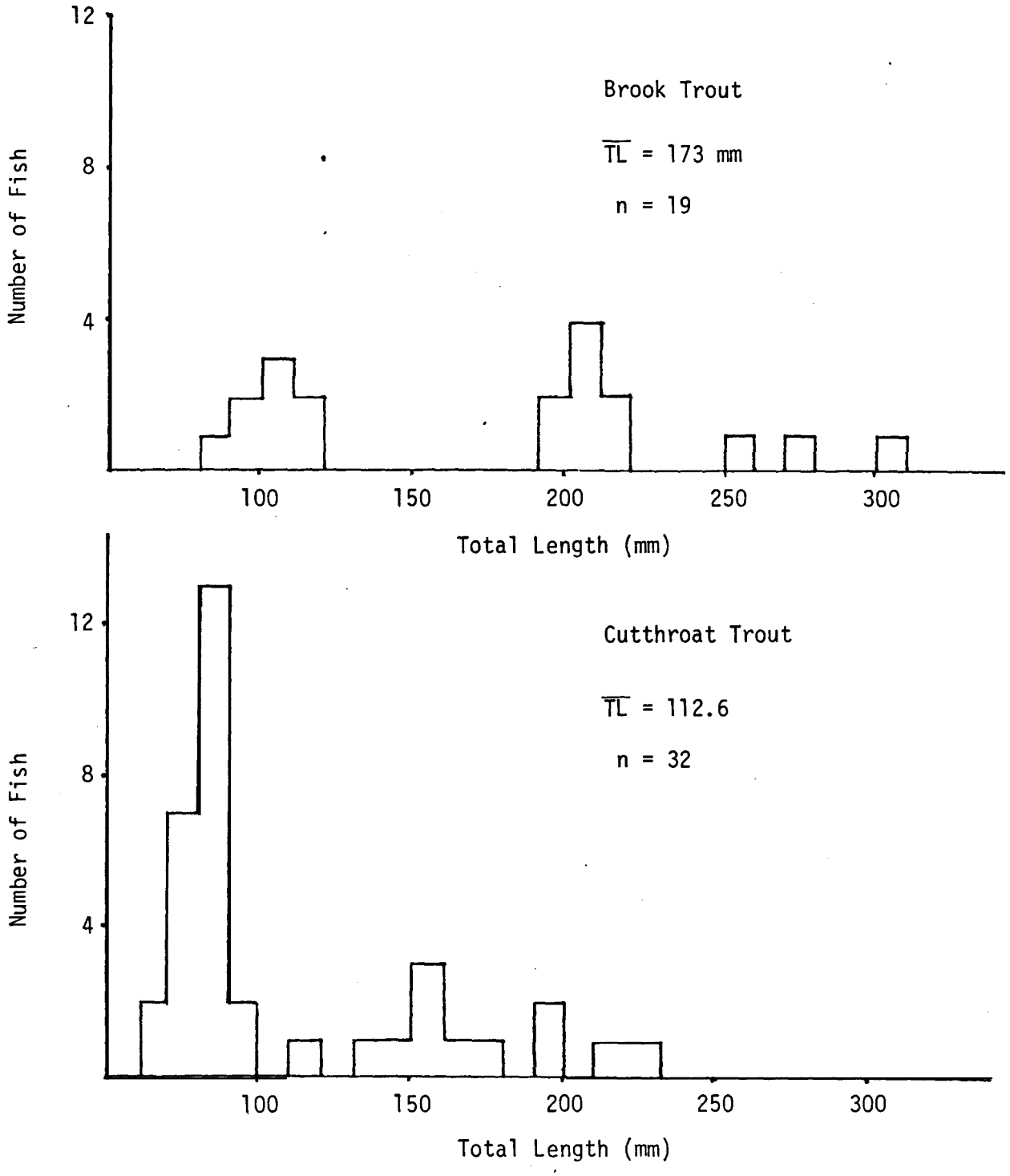

Figure 5. Length frequency distributions of brook trout and cutthroat trout taken from Tex Creek in October 1982.

one-half mile upstream from the confluence with Tex Creek. Habitat was primarily small beaver ponds. No fish were observed in the 320 m transect.

Homer Creek

Homer Creek originates in the Little Valley Hills, then flows through open sagebrush range before entering a small, steep-sided canyon that leads to its confluence with Grays Lake Outlet. Deep pools and beaver ponds are common throughout the 19 Km length of this third order stream.

On 28 September we electrofished one 57 m long transect near the Long Valley Road. An estimated 42 (±14; 95% CI) trout were present in this transect, of which 27 (61%) were brook trout, 14 (32%) were brown trout and three (7%) were hatchery rainbow trout. Brook trout were actively spawning; four ripe males, two ripe females, and one spent female were observed. Brook trout length ranged from 170 mm to 390 mm (Figure 6). Brown trout ranged in length from 185 mm to 270 mm (Figure 6); none of these appeared mature. No YOY brook trout or brown trout were observed. Utah suckers (46%), reside shiners (21%), speckled dace (28%), and longnose dace {5%) comprised the nongame species collected. Suckers ranged in total length from 75 mm to 250 mm, reside shiners from 30 mm to 105 mm, speckled dace from 30 mm to 120 mm and longnose dace from 75 mm to 100 mm.

Sawmill Creek - Corral Creek

Sawmill and Corral Creeks are small, first order tributaries to Brockman Creek. Except for the lower ends of the streams where grazing is evident, riparian zones appear to be in good condition. Both active and inactive beaver ponds are frequent.

One transect was shocked on Sawmill Creek on 5 October. Cutthroat were the only trout species present, but were quite numerous. The estimated number of age 1+ and older cutthroat (total length > 75 mm) for the 190 m transect was 152 (±43, 95% CI). Twenty-nine fry were also captured, indicating spawning is occurring. Total lengths of all cutthroat ranged from 35 mm to 220 mm (Figure 7). Sculpins were also numerous and ranged in length 30 mm to 85 mm.

We electrofished two transects on Corral Creek representing two habitat types. The first transect was run through a series of three beaver ponds and measured 83 m. Estimated number of age 1+ cutthroat (total length > 75 mm) was 56 (no CI). Eight fry were also observed. Two sculpins, two redside shiners, and one speckled dace were captured.

The second transect measured 126 m and consisted of pool and riffle habitat. Numbers of age 1+ cutthroat in this transect were estimated at 34 (±3; 95% CI), total number of fry observed was 12. Forty-nine sculpins and seven Utah suckers were also seen.

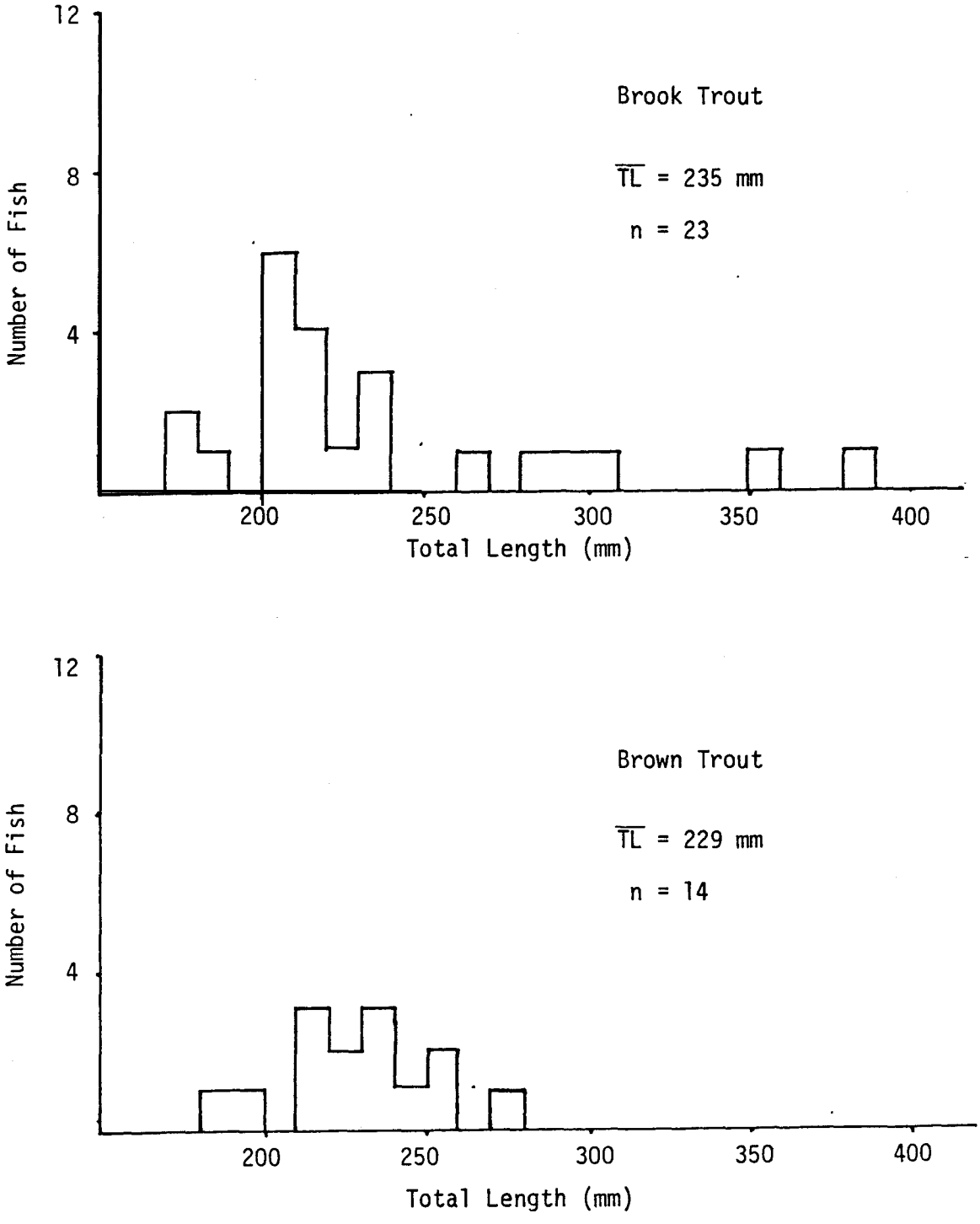

Figure 6. Length frequency distribution of brook trout and brown trout taken from Homer Creek, September 1982.

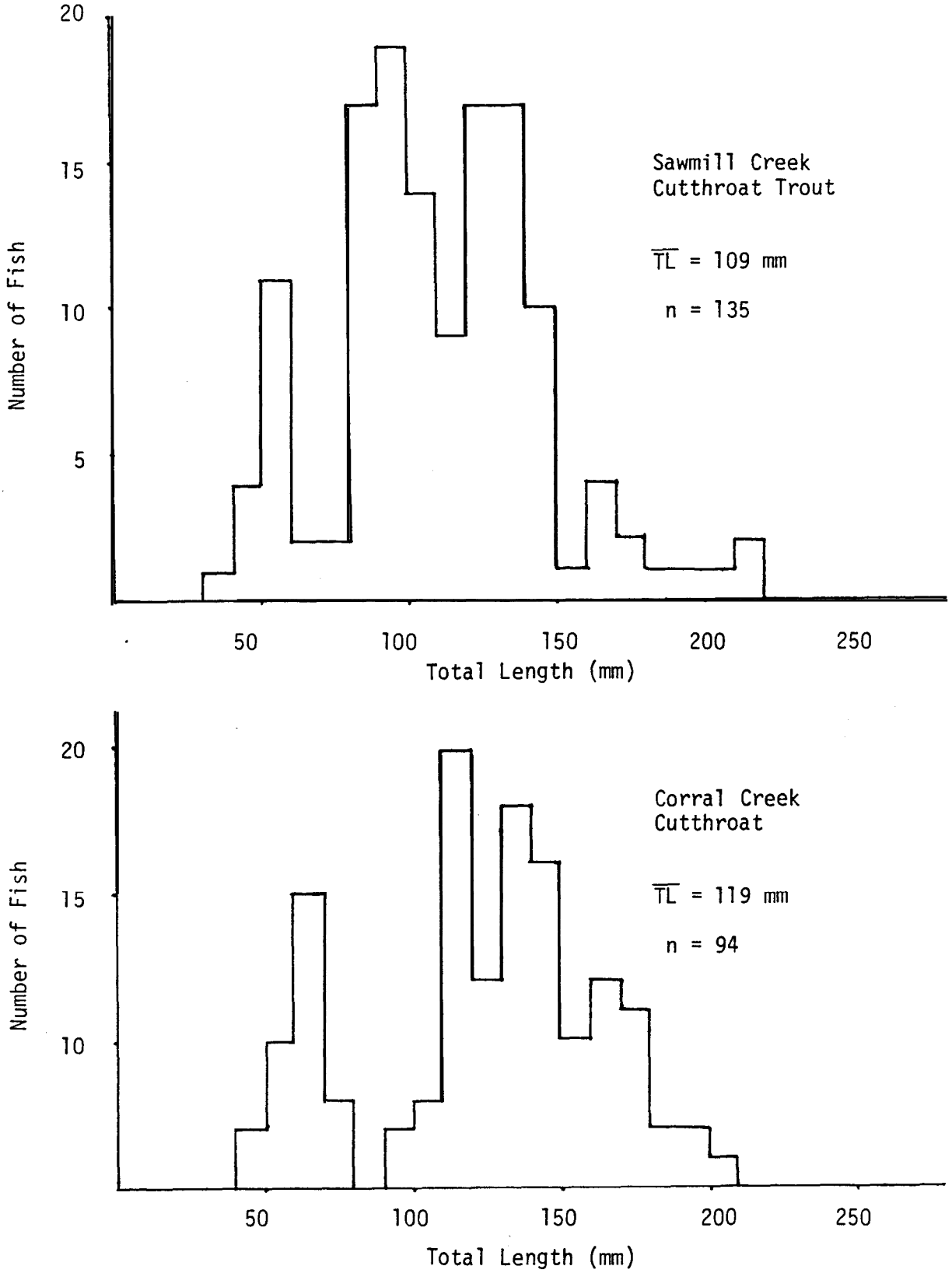

Figure 7. Length frequency distributions of cutthroat taken from Sawmill Creek and Corral Creek, October 1982.

Total length of cutthroat ranged from 45 mm to 200 mm for both transects (Figure 7). Total lengths of sculpins ranged from 25 mm to 100 mm, suckers ranged from 115 mm to 140 mm, the redside shiners measured 95 mm and 100 mm and the speckled dace measured 65 mm. Cutthroat trout in both Corral and Sawmill Creeks exhibited a faint red slash along the lower mandible (lip). Twenty-five specimens were sacrificed from Corral Creek for genetic analysis at the Idaho State University electrophoresis lab. Electrophoresis will be completed in spring 1983.

Cellars Creek

Cellars Creek is a small, third order stream with some evidence of grazing damage in its upper reaches. We electrofished two transects below the Bone Road on 28 September. Habitat was generally good through this stretch, although beavers have utilized much of the riparian vegetation for food and building materials.

The first transect shocked measured 85 m and consisted of pool and riffle habitat. Estimated number of trout was 49 (±28; 95% CI) for age 1+ and older fish. Composition was 60% cutthroat and 40% brown trout. Five brown trout fry were captured in this transect. Nongame species found included: sculpins, Utah suckers, longnose dace, and redside shiners.

We shocked a second transect through a series of beaver ponds downstream from the initial transect. Transect length was 72 m. Estimated number of age 1+ and older trout was 30 (±9, 95% CI) of which 77% were cutthroat and 23% were brown trout. We also captured sculpins, Utah suckers and redside shiners.

Total length of cutthroat for both sections ranged from 120 mm to 315 mm (Figure 8). Total lengths of brown trout ranged from 85 mm to 235 mm for both sections, indicating that Cellars Creek may be used as a spawning and rearing tributary for brown trout. Longnose dace ranged in length from 80 mm to 150 mm and made up 35% of the nongame species examined. Sculpins (34%) ranged in length from 40 mm to 100 mm, and Utah suckers (14%) ranged in length from 100 mm to 380 mm. Twenty-five cutthroat were sacrificed for electrophoresis work.

Cranes Creek

Cranes Creek is largely a spring fed, third order stream with numerous beaver ponds. Spring seep ponds are present along the stream and in some cases, are accessible to fish from the main channel year-round. Habitat along Cranes Creek shows localized areas of grazing impacts resulting in siltation of the stream channel.

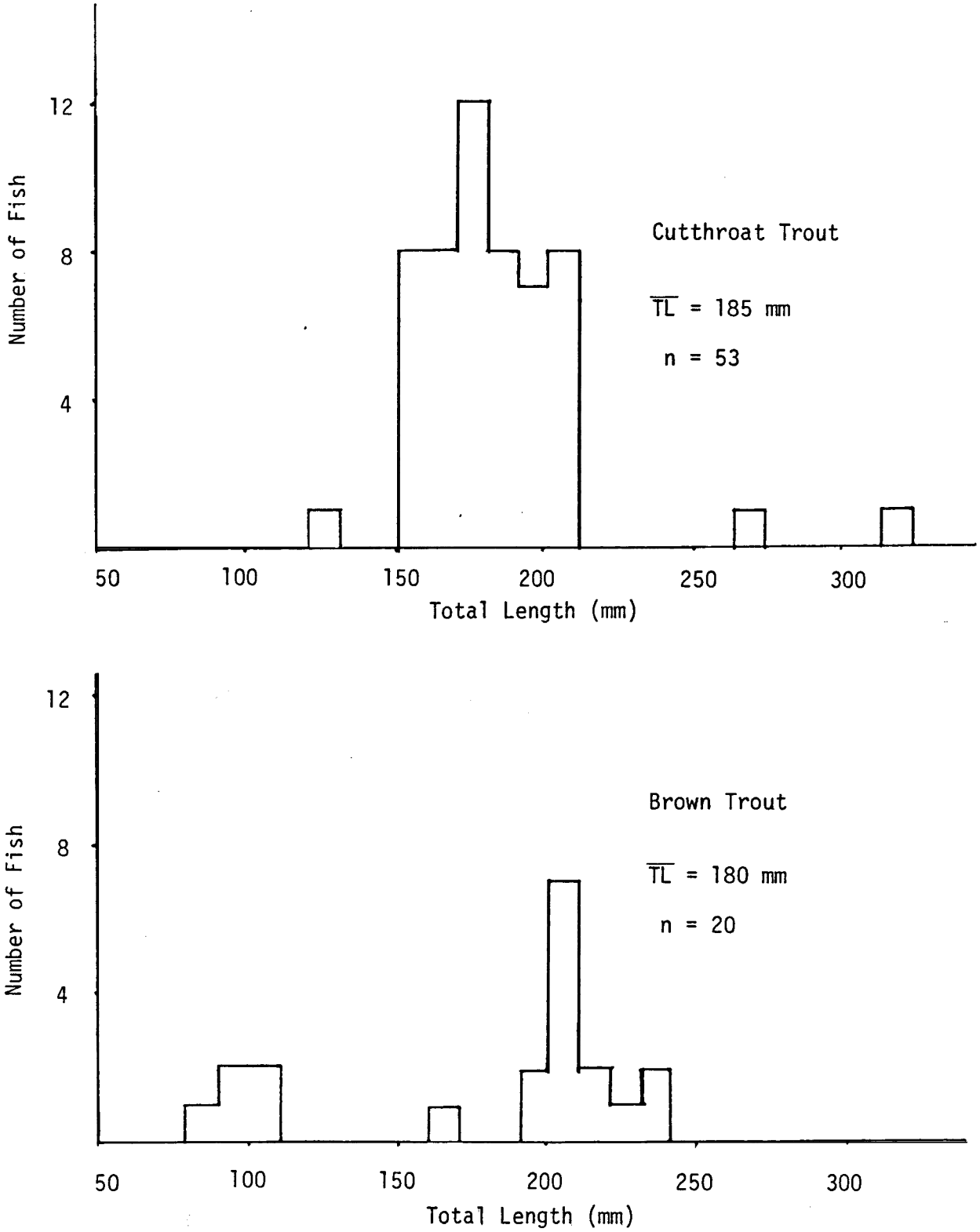

Figure 8. Length frequency distribution of cutthroat trout and brown trout taken from Cellars Creek, September 1982.

Cranes Creek was electrofished on two occasions, 12 November 1981 and 26 January 1983. A total of three transects were sampled. Brown trout (54%) and brook trout (44%) were the dominant game fish species found in all transects. Only two cutthroat (<2%) were captured during electrofishing.

We shocked two transects in November 1981. The first transect consisted of two large beaver ponds and measured 92 m. Fifty-three brown trout (+4, 95% CI), 38 brook trout (±5, 95% CI), and one cutthroat (no CI) were estimated to be present. A second transect through 231 m of slow water revealed an estimated 71 brown trout ($6^{\pm}$, 95% CI) and 18 brook trout (±2, 95% CI) (Table 1). Estimated number of trout per 100 m for the transects are compared in Figure 2. Brown trout and brook trout were actively spawning at this time. Brook trout ranged in length from 95 mm to 370 mm and brown trout from 100 mm to 430 mm (Figure 9). The cutthroat measured 320 mm, two others caught on rod and reel the same day measured 330 mm each. Longnose dace, speckled dace, redside shiners, and sculpins were abundant. A few Utah and bluehead suckers were also observed. No counts or measurements were made on nongame species.

We electrofished one transect **in** January 1983, located approximately 1 Km upstream from the previous transects. Habitat was primarily pool-riffle. Estimated number of trout for the 85 m transect was 13 (±2, 19%). Composition was 54% brook trout, 38% brown trout, and 8% cutthroat. Brook trout ranged in length from 125 mm to 295 mm and brown trout from 165 mm to 465 mm. One cutthroat was measured at 320 mm. Distribution of nongame species in this transect was similar to the downstream transects. Two small seep ponds away from the stream were shocked revealing 15 brook trout in one and two in another. No measurements were taken on these fish but they appeared to represent all age groups.

Hell Creek

Hell Creek has been severely impacted by grazing and one stretch of riparian vegetation (primarily willows) had been sprayed to provide access to the creek by cattle. Some beaver activity occurs in the drainage.

On 16 July we electrofished 69 m of Hell Creek adjacent to the sprayed riparian zone. An estimated nine cutthroat ranging from 180 mm to 225 mm were present. One run through a separate transect resulted in the capture of two brown trout measuring 180 mm and 185 mm.

Nongame species were abundant with redside shiners, sculpins, longnose dace, speckled dace, and Utah suckers comprising 77%, 12%, 4%, 4% and 3%, respectively, of the nongame fish captured.

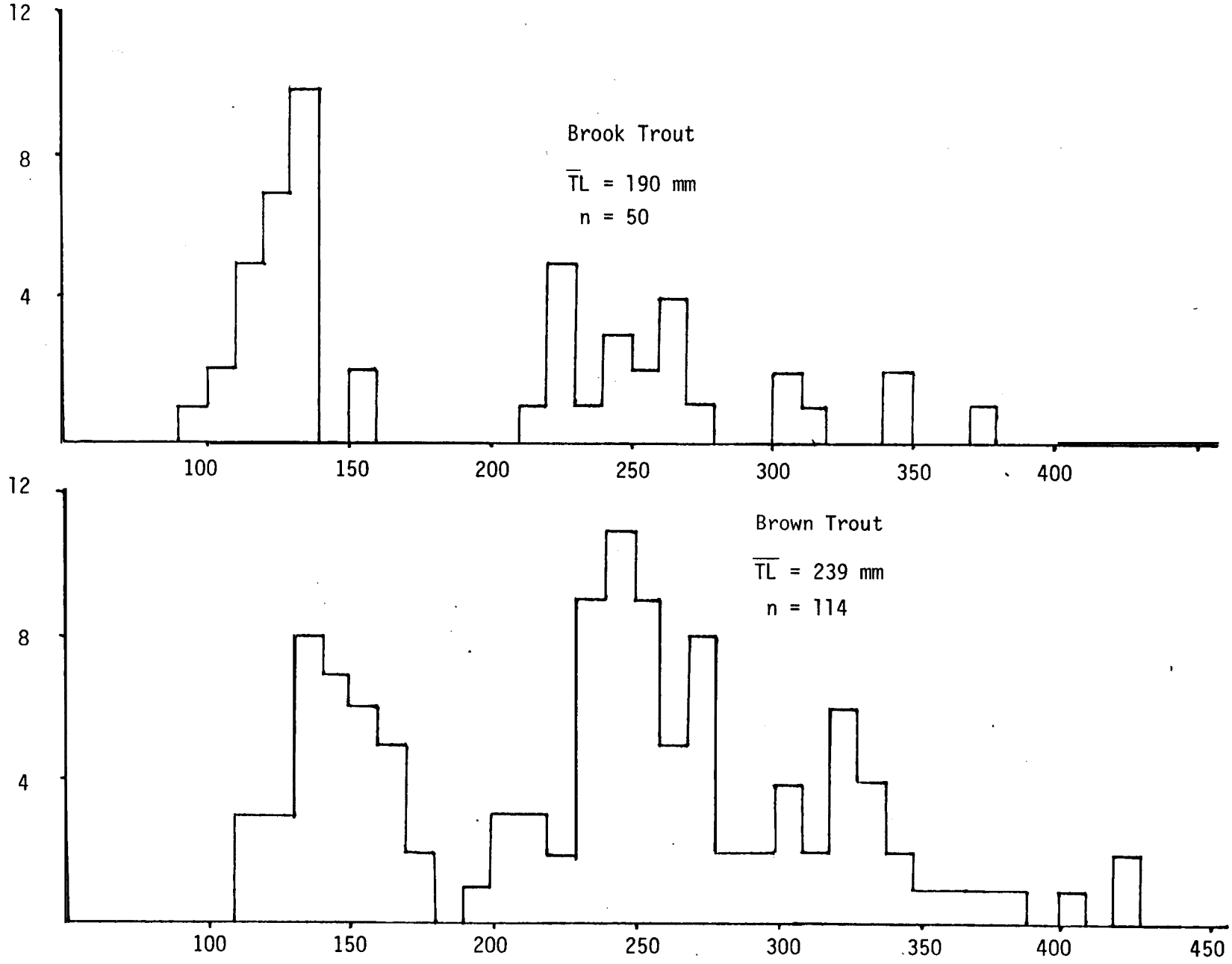

Figure 9. Length frequency distribution of brook trout and brown trout from Crane Creek, November 1981 to January 1983.

Remainder of Willow Creek Drainage

Brockman Creek was qualitatively sampled by shocking during November. Ice cover prevented extensive sampling. Two young of the year cutthroat were observed. Test angling on Willow Creek near the mouth of Cellars Creek was conducted in October and revealed brown trout, cutthroat trout, and one holdover hatchery rainbow trout. Mature brown trout were in spawning condition. Test angling on Lava Creek in September and Grays Lake Outlet in July revealed adult and juvenile cutthroat trout. Ririe Dam stilling basin was salvaged in late October; cutthroat trout, brown trout, rainbow trout and whitefish were captured and placed in a deep pool immediately downstream. Additional survey work will be performed on other Willow Creek drainage streams in 1983.

Birch Creek

Birch Creek anglers fished an estimated 25,444 hours from 28 May to 31 September 1982 (Table 3). The most effort occurred in the creek below Skull Canyon (Blue Dome) 13,866 hours as compared to 11,578 for the creek above Skull Canyon. Most of Birch Creek above Skull Canyon is on private property which limits access. Peak effort was in July and August, dropping dramatically after the Labor Day holiday. Effort during June was less than expected due to cold wet weather.

Creel census conducted in 1971 and 1954 show that effort was about twice as great as found in 1982 (Table 3). The reasons for this appear to be the different methods used for calculating angler effort and does not, we feel, reflect a real decline in angler use. Car counts were used to estimate angler presence and used for both the previous studies. We conducted a car count and angler count on opening weekend in 1982 to compare effort estimates by both methods and found a difference of 2.6 times in effort estimates with car counts based high (Table 4). Effort estimates were calculated for car counts as explained by Andriano (1955).

Comparisons of opening weekend effort using the car count method data shows that effort has changed little since 1971 (Table 4). We believe that the previous studies using assumptions that any parked cars indicated angler use and that there is a 2 fold turnover in cars per day resulting in over estimates of effort and harvest. We believe this indicates that little change in effort has occurred on Birch Creek over the last 28 years if past estimates are adjusted down by 161% as shown on Table 4.

Anglers harvested an estimated 21,851 trout at .93 fish/hour. The majority of fish caught were released (59%) giving a total catch rate of 2.30 fish/hour on Birch Creek. Most fish were released mainly due to their small size (under 150 mm).

Return to the creel for the 20,085 catchable rainbow planted in Birch Creek during 1982 (IFG 1982) was very high at 57%. These fish had a mean size of 251 mm ranging from 150 mm to 320 mm (Figure 10). Return to the creel was 40% in 1971 (Jeppson 1971) and 52% in 1978 (Jeppson and Ball 1979) during the June through August time period.

Table 3. Estimated angler effort and catch for Birch Creek from May 20 to September 30, 1982 and data from 1954 and 1971 creel census.

INTERVAL	EFFORT(hrs)			HARVEST					RELEASED	TOTAL CATCH RATE
	Sec.1	Sec.2	Total	WRB	HRB	BRK	Total	Catch Rate		(fish/hour)
May 29-31	1474	686	2160	1584	134	0	1718	.80	0	.80
June	3056	2328	5384	2157	1816	0	3973	.74	7752	2.18
July	5431	3187	8618	5077	4263	0	9340	1.09	7071	1.91
August	3005	4277	7282	1327	5262	231	6820	.94	17279	3.31
Sub Total	12966	10473	23444	10145	11475	231	21851	.93	32102	2.30
September	1100	900	2000	1)						
Season Total	14006	11378	25444							
1954 Data[2)]			44252		71315	5121	76436	1.77		
1971 Data[2)]		-	41734	27334	18715	313	46362	1.11		

1) Insufficient data for calculation of harvest.

2) Used car counts for estimates of effort which is biased high - see text.

Table 4 . Comparison of effort estimates using car counts and angler counts on opening weekend 1971 and 1982 at Birch Creek, Clark County.

Year	Mean Car Counts	Estimated effort(hr) using car counts	Estimated effort(hr) using Angler counts
1982	102	5,630	2,160 (161% difference)
1971	131	6,058	2,321[2]

1) as described by Andriano 1954
2) car count effort adjusted by 161%

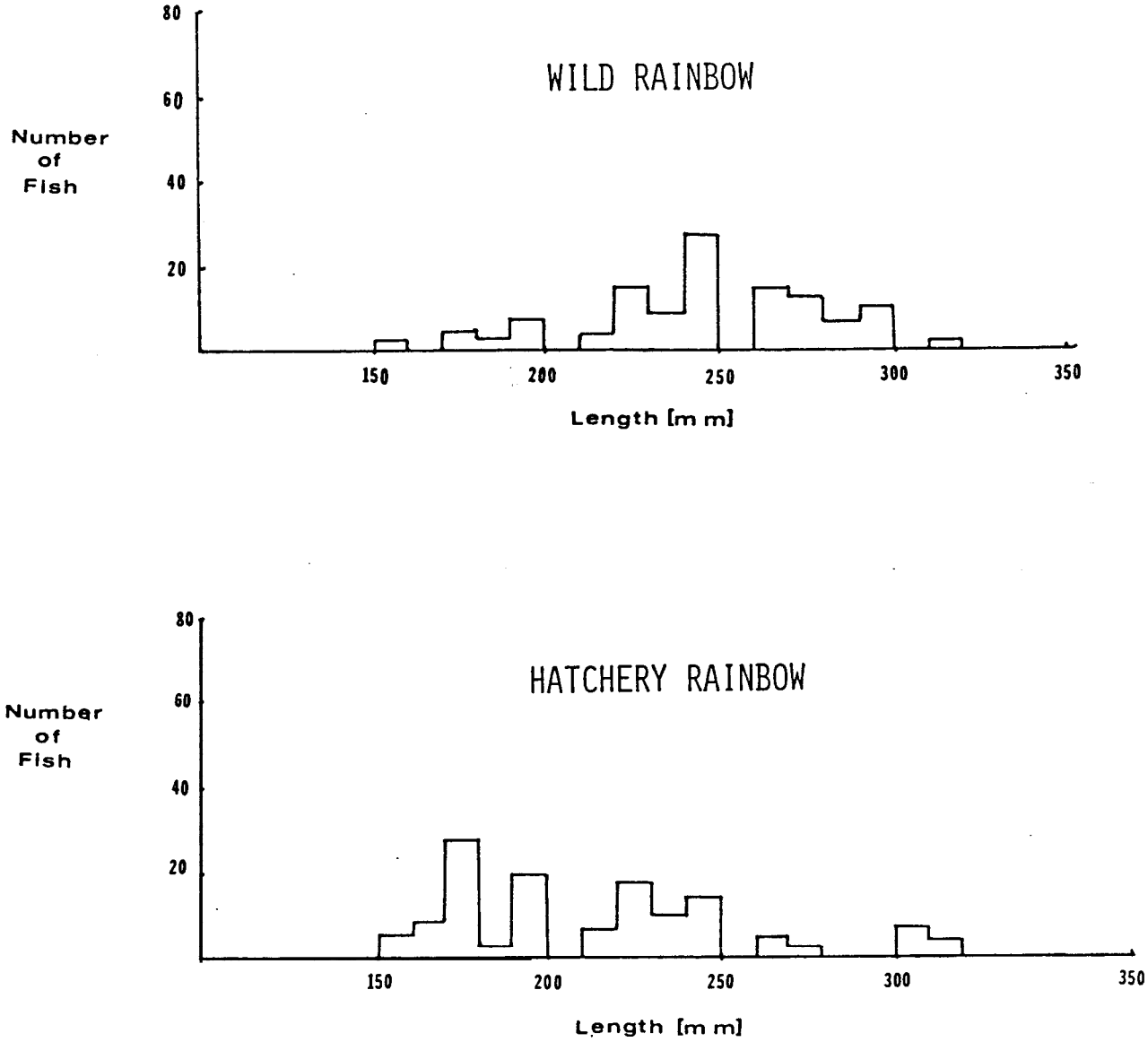

Figure 10. Length frequency of rainbow trout measured from anglers creels, Birch Creek, 1982.

Wild rainbow had a mean length of 217 mm and ranged from 150 mm to 320 mm. No lengths were recorded for brook trout.

Medicine Lodge Creek

Medicine Lodge Creek anglers fished an estimated 5,323 hours (2,801 man days) from 28 May to 31 September 1982 (Table 5) with most, 4,003 hours, in the upper creek (Section 2) and 1,320 hours in the lower creek in the canyon area. Peak effort occurred in July dropping precipitously in August and September. Recreation use for June and July was much below the normal generally observed due to the late snow melt and cold weather patterns. The normal heavy use period of the lower creek was not apparent and is thought related to high flows in June and July.

Angler effort for 1982 was substantially lower than the 10,823 hours fished during the same time period in 1963. Fisherman utilization was found to be "much higher" in the easily accessible water of the canyon (lower creek) during 1963 (Jeppson 1963).

Anglers harvested 5,742 trout at 1.08 fish/hour. Only .6 of the fish caught were released giving a total catch rate of 1.14 fish/hour. Catch rates improved throughout the season peaking during September at 1.67 fish/hour (Table 5). Catch rates were 1.36 fish/hour in 1963 (Jeppson 1963).

Wild rainbow trout comprised 73% of the catch followed by hatchery rainbow, 21% and brook trout, 6%. No cutthroat trout were caught, although they are found throughout the Medicine Lodge Creek drainage and were reported in the catch during 1963 (Jeppson 1963). Most wild rainbow showed some hybridization with cutthroat trout.

Return to the creel of the 3,750 catchable rainbow planted in 1982 (IFG, 1982) was 32%. These fish had a mean size of 247 mm ranging from 200 mm to 280 mm (Figure 11). Jeppson (1963) found that catchables comprised 28% of the catch and had a mean size of 244 mm ranging from 160 mm to 315 mm, very similar to the 1982 data.

Wild rainbow trout had a mean size of 233 mm ranging from 160 mm to 330 mm (Figure 11), compared to 216 mm mean and range of 115 mm to 470 mm found during 1963 (Jeppson 1963). Brook trout had a mean length of 196 mm ranging from 152 mm to 330 mm which is nearly the same as found during 1963.

Catch rates and species composition have changed little from Medicine Lodge Creek since 1963 (Appendix 1), with a 20 year mean of 1.34 fish/hour. The catch rate for 1982 of 1.14 was not signify-cantly different (p=.95) than the twenty year mean.

Table 5. Estimated angler effort,harvest and catch for Medicine Lodge Creek from May 29 to September 30, 1982. and comparison to the 1963 data.

INTERVAL	EFFORT (hrs)			HARVEST				RELEASED	CATCH RATE
	Sec.	Sec. 2	Total	WRB	HRB	BRK	Total		(fish/hour)
Play 29-31	525	427	952	390'	111'	87	588	0	.62
June	292	755	1047	638	160	53	851	30	.85
July	286	1789	2075	1785	537	116	2438	281	1.32
August	217	532	749	630	344	57	1031	29	1.42
September	0	500	500	750	42	42	834	0	1.67
TOTALS	1320	4003	5323	4193	1194	355	5742	340	1.14
1963[2]	-	-	11156	10246	4229	384	15186	0	1.40

1) Based on WRB-HRB ratio from June to September.

2) Jeppson, 1964.

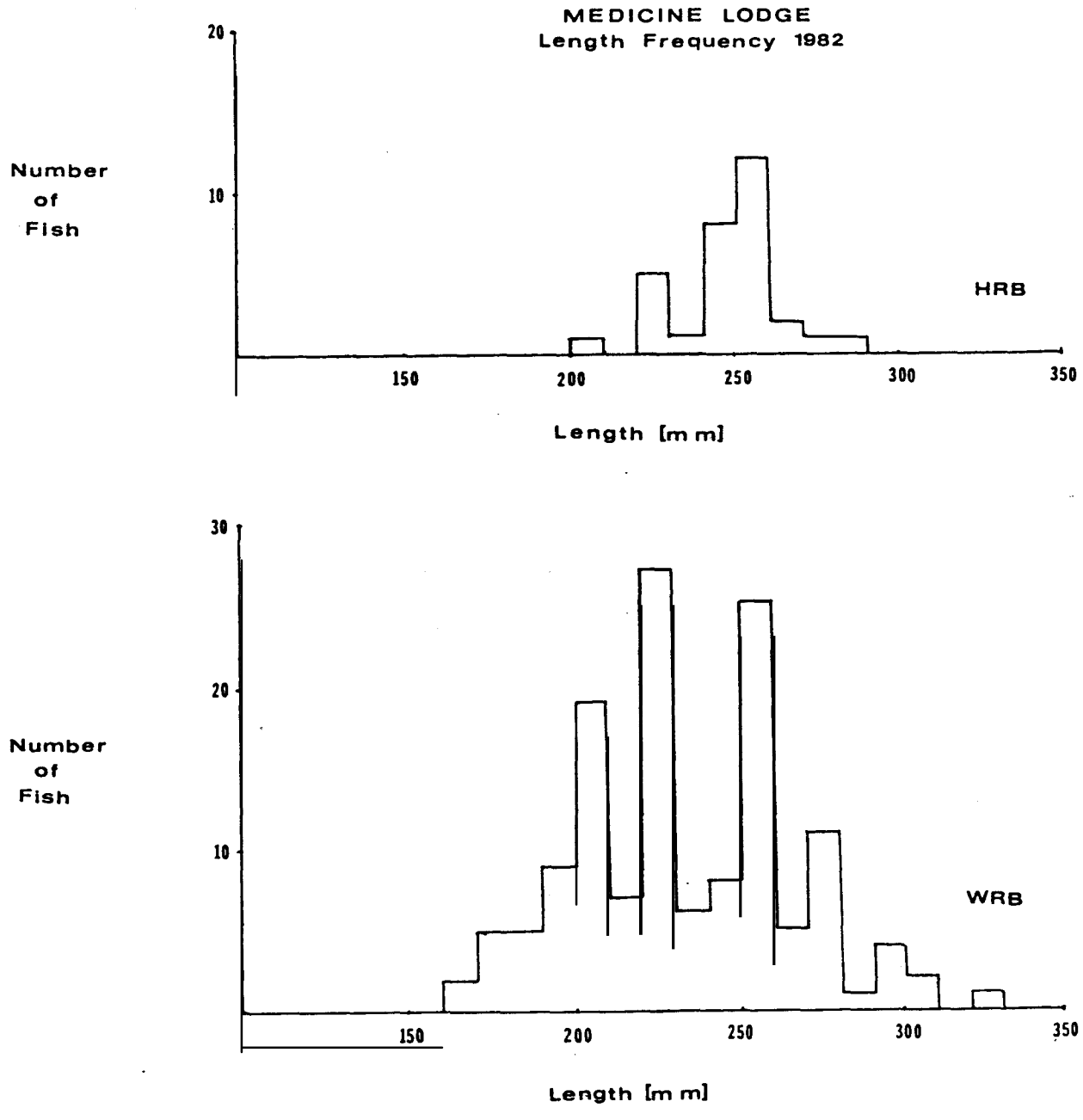

Figure 11. Length frequency of rainbow trout checked in anglers creels from Medicine Lodge Creek, 1982.

Fisheries Inventory

Medicine Lodge Drainage

Electrofishing showed the highest densities of trout found in Warm and Divide Creeks (Figure 12) (Table 6). High conductivities limited the effectiveness of the shocker on Medicine Lodge and Warm Creeks. Estimates either were not made or should be considered as minimums only as many fish escaped capture and left the transect resulting in some under estimations.

Irving creek was the only tributary sampled with just cutthroat trout present. Cutthroat and brook trout were found in East Fork Irving and Edie Creek. Warm Creek and its tributary Divide Creek contained only rainbow trout. Fritz Creek contained both rainbow and brook trout. Medicine Lodge Creek had rainbow, brook and cutthroat trout present. Sculpins were present in all tributaries, but not all stations. No other species of fish were observed.

Birch Creek

Population estimates were made for Birch Creek near the Reno Ditch for evaluation of a small hydro-power project's impacts on October 1, 1982. We found relatively good densities of wild rainbow trout at two sites on lower Birch Creek. We estimated 27 trout/100 m at the Reno Diversion and 18 trout/100 m at the proposed power plant diversion 3,000 ft upstream. No hatchery rainbow were sampled in this area; sculpins were present though. Mean length for the wild rainbow was 216 mm ranging from 150 mm to 330 mm, nearly identical to the size of wild rainbow sampled **in** the creel. Rainbow population upstream in areas where stream improvement structures have been installed ranged from 33 trout/100 m to 28 trout/100 m **in** 1977, an increase of 330% to 240% from pre-stream improvement levels (Ball and Jeppson 1978).

Mud Creek

Mud Creek is a small spring feed headwater tributary to Birch Creek near Gillmore Summit. Flow is interment at the lower end but is perennial on the upper portion. We electrofished Mud Creek at the bridge road crossing on June 26, 1982. We sampled five wild rainbow ranging in size from 315 mm to 120 mm. The population estimate was 7 fish/100 m of stream. Higher density of rainbow are reported further upstream but have not been confirmed.

Crooked Creek

Crooked Creek is a small sinks tributary draining the Black mountain area near Barney Hot Spring (Sec. 14, T13N, R28E). We electrofished 300 m of Crooked Creek on July 19, 1982 at Sec. 3, T10N, R32E. No fish were observed or captured. Crooked Creek has been stocked in the past with grayling.

Table 6. Population estimates for the Medicine Lodge Drainage. Creek

STREAM	TRANSECT LENGTH	DATE	ELECTROFISHING RUNS			POPULATION ESTIMATE	TROUT/100m	COMMENTS	LOCATION		
			C1	C2	C3				S	T	R
Medicine Lodge Cr.#1	121 m	7-6-81	10	1		11[1]	8.3	9% cutthroat, 91%WRB poor estimate shocker not working well too high conductivity 17.5C	17	11N	34E
Medicine Lodge Cr. #2	245 m	7-6-81	10			11	4.5	30% HRB 70% WRB, 17.5C	2&3	11N	33E
Warm Cr #1	89 m	7-6-81	32			43	48.0	100% WRB, conductivity too high for effective shocking, 20C	22	13N	32E
Divide Cr.	100 m	7-6-81	38			42	42.0	95% WRB 5% HRB, 11C High densities of sculpins confluenc	16 Above of Warm Cr.	13N	32E
Irving Cr. #1 lower end of BLM property	91	7-7-81	7	1		8	9.0	100% WCT 8C few sculptns seen	16	13N	32E
Irving Cr.#2 below BLM-FS boundary fence	51	7-7-81	5	0		5	9.8	100% WCT shocking incomp- lete due to thick vegetation no sculpins	16	13N	33E
E.F. Irving Cr. #1	193 m	7-7-81	25	3		27	14.0	18% WCT 82% brook, no sculpins observed, 9C	21	13N	33E
E.F. Irving Cr. #2	182 m	7-7-81	22(4)	15(2)		28(8)	15.4	7% WCT, 88% brook	16	13N	33E
Edie Cr.	113 m	7-7-81	14(3)			20	17.5	12% WCT, 88% brook sculpins present, 12C	4	12N	33E
Fritz Cr.	54 m	6-19-82	10(1)	3		14(1)	26.5	86% WRB 14% brook, sculpin numerous	27	13N	32E

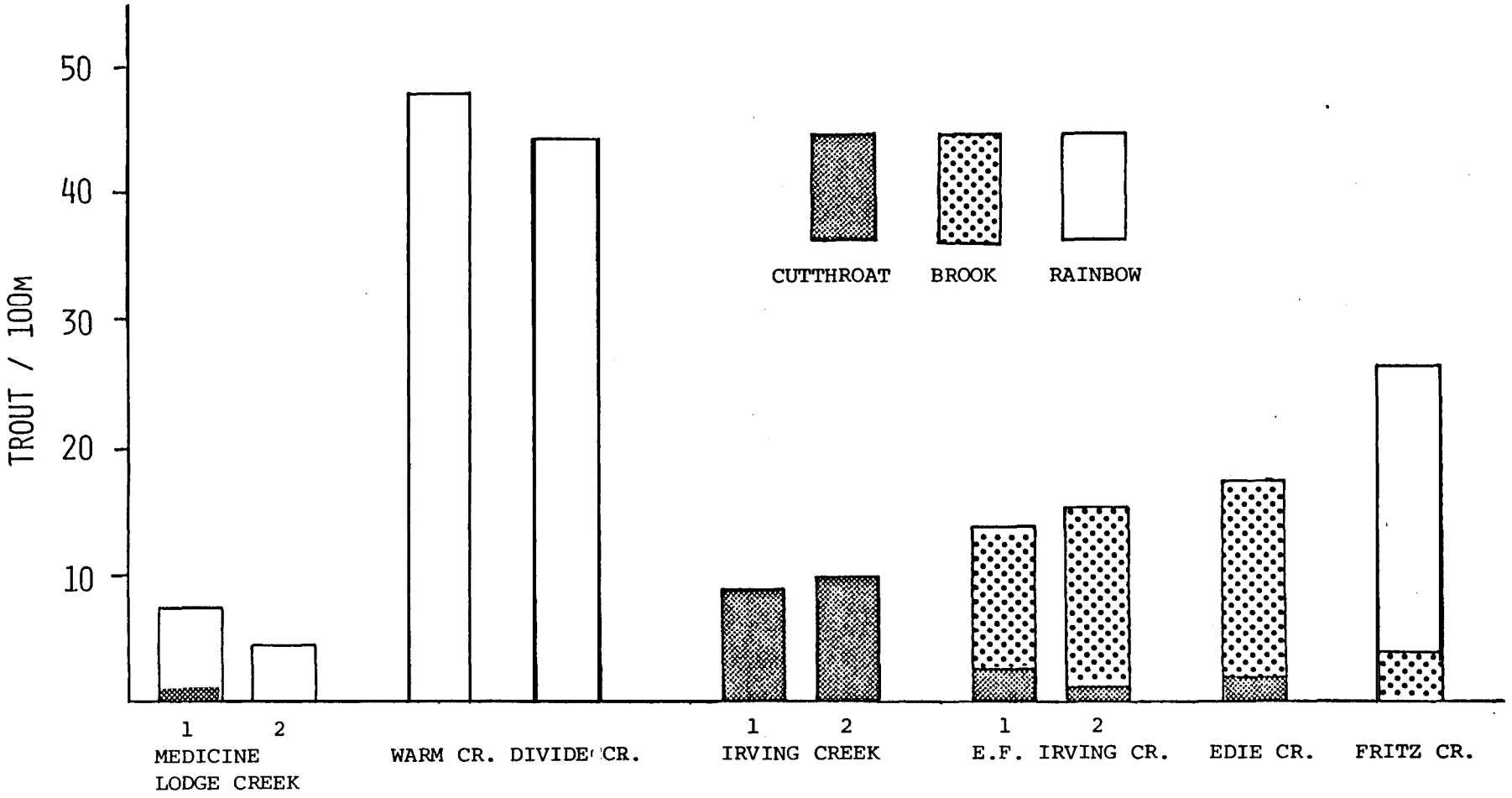

Figure 12. Estimated numbers and species composition of trout at selected location on streams in the Medicine Lodge drainage in July.

Middle Fork Salmon River

Since initiation of catch-and-release regulations for cutthroat trout on the Middle Fork in 1972, the percent of increase of fish over 305 mm (12 in.) has continued to increase. The limited data collected on the six transects in 1982 indicates this trend is continuing. Nearly 48% of the cutthroat counted by snorkel in 1982 were greater than 305 mm compared to 28% in 1978 and approximately 16% in 1971 (Table 7). Numbers counted were similar in the six transects between 1978 and 1982, but the structure of the population observed indicated a shift toward older age (larger) individuals. In the 11-year period since the no-kill regulations were initiated, it appears the population structure has continued to change, although total numbers may be stabilizing.

Average length of the cutthroat captured by angling was 295 mm (11.6 in.) in 1982, compared to 286 (11.2 in.) in 1978 and 252 mm (9.9 in.) in 1969 (Tables 8 & 9). Angling gear tends to be selective for larger sized individuals and does not reflect the shift toward larger fish as clearly as snorkel observations, although it can be seen. The percent of the individuals greater than 300 mm (11.8 in.) collected by angling demonstrates the presence of older age fish more clearly; 49.4% in 1982 compared to 44.3% in 1978, and 19% in 1969 (Table 9).

Prior to 1980, anglers were allowed to keep 2 bull trout (Dolly Varden) per day on the Middle Fork. Beginning in 1980, this species was also included in the no-kill catch-and-release program. The number of bull trout counted in the six comparative snorkel transects in 1971, 1978 and 1982 are too few to draw any significant conclusions (Table 7).

The dramatically diminished numbers of chinook salmon juveniles observed between the three sampling years is a reflection of the extremely depressed runs into the state as a result of the effects of Snake and Columbia River Dams (Table 7).

Rainbow observed consisted primarily of juvenile steelhead trout. Wild steelhead runs are increasing slowly, due primarily to improved transportation and other smolt and adult passage regimes at downstream dams, and reduced harvest by protective regulations in the Salmon River system (Thurow, 1983). The increased numbers of juvenile steelhead counted in the six transects reflects these programs (Table 7).

Table 7 . Numbers of fish counted in comparative trend areas of the Middle Fork Salmon River in 1971, 1978 and 1982.

Transect name	Date	4152	152-305	305>	Rb	Wf	S	DV	Su	Ck
			1971		Size Ct (mm)					
Pungo	8/22		4			29	5	1		400
Marble	8/22		3		2	37	2	3		
Cougar	8/23		13	4		20	9			
Tappan	8/24		7	4		20	20		22	
Rattlesnake	8/25		2			14	3			
Otter	8/26		14			25	18		15	
Subtotal:			43	8						
Total:			51	15.6%	2		57	4	37	400
			1978							
Pungo	8/21	3	10	17	1	24		1		
Marble	8/21		51	10	7	58			1	12
Cougar	8/22		31	7	5	15				
Tappan	8/23		19	5		31			7	50
Rattlesnake	8/24		19	6	3	19			18	
Otter	8/25		18	14	13	28	12		3	20
Subtotal:		3	148	59						
Total:			210	28.1%	29	175	12	1	29	82
			1982							
Pungo	8/25	3	7	5	8	9	3			
Marble	8/26	14	20	25	3	57				
Cougar	8/27	2	12	6	6	21		2		2
Tappan	8/27		9	13	8	9	5			5
Rattlesnake	8/28		9	16	5	23			6	6
Otter	8/29	9	19	30	5	15		50+	50+	
Subtotal:		28	76	95						
Total:			199	47.7%	35	134	8	50+	50+	13

Table 8. Length frequency of cutthroat trout from the Middle Fork Salmon River, August, 1982.

Length (m)	Frequency
150-159	2
160-169	2
170-179	0
180-189	2
190-199	6
200-209	13
210-219	16
220-229	19
230-239	21
240-249	24
250-259	17
260-269	10
270-279	11
280-289	39
290-299	31
300-309	24
310-319	27
320-329	28
330-339	34
340-349	23
350-359	29
360-369	18
370-379	11
380-389	9
390-399	5
$\bar{X}$ = 295mm	N = 421

Table 9. Comparison of cutthroat total lengths between years of sampling on the Middle Fork Salmon River, 1959-1982.

Month & year	Average total length (mm)	N	Percent less than 200 mm	Percent greater than 300 mm
8-1959	262	217	23.5	19.4
8-1960	259	322	11.5	18.3
8-1969	252	142	7.7	19.0
8-1975	286	101	5.0	41.6
8-1976	273	70	5.7	34.2
8-1978	286	158	3.8	44.3
8-1982	295	421	2.6	49.4

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APPENDIX

Appendix 1. Catch and catch rates from spot creel checks and creel census on Medicine Lodge Creek 1942 to 1982.

YEAR	HRS FISHED	PERCENT COMPOSITION			TOTAL	CATCH RATE	
		RB	BRK	CT	Numbers	(fish/hour)	
1982	5323	94	6	-	6082	1.14	
1981	46	92	7	1	98	2.13	Reg.6 files
1980	71	84	16		139	1.96	"
1979(none)							
1978	55	75	24	1	90	1.64(opener)	"
1977(none)							
1976(none)							
1975	156	95	5	-	208	1.33	"
1974	180	99		1	75	.42	"
1973(none)							
1972	266	88	12	-	351	1.32	"
1971	287	94	6		321	1.12	"
1970	231	97	3	-	295	1.28	"
1969	519	80	20		554	1.07	"
1968	554	95	5		708	1.28	"
1967	215	80	20		225	1.05	"
1966	363	96	4	-	606	1.70	Jeppson 1967
1965	525	93	6	1	670	1.28	"
1964	-	98	0	2	44	-	"
1963	1534	97	3	1	2023	1.32	
1942	109	95	3	2	337	3.09	Jeppson 1963

1(Based on 3.9 hours/angler day.

JOB PERFORMANCE REPORT

State of: Idaho Name: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No.: F-71-R-6 & 7 Title: Region 6 Technical Guidance Job No.: VI-d

Period Covered: 1 January 1982 to 31 December 1982

ABSTRACT

Technical assistance was provided to all state and federal agencies upon request. We responded to requests for assistance and also provided advice for farm pond owners.

OBJECTIVES

To assist the Department of Water Resources and Corps of Engineers in evaluating the effects of habitat alterations on fish and fish habitat.

To recommend procedures that minimize adverse effects of stream and lake alterations.

To provide information on fisheries and aquatic habitat.

TECHNIQUES USED

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

FINDINGS

During 1982 we responded to requests for technical assistance and talks to the public on various water–related and fishery matters, as listed below:

Agency	Number of Requests	
	Salmon	Idaho
U.S. Forest Service	17	6
Idaho Department of Water Resources	22	25
U.S. Fish and Wildlife Service	8	8
Idaho Department of Lands	0	2
Federal Energy Regulatory Commission	1	22
Bureau of Land Management	2	7
Corps of Engineers	5	2
Bureau of Reclamation	1	5
Environmental Protection Agency	1	2
Miscellaneous	6	0
Sportmans Groups and Schools-presentations	0	19
Soil Conservation Service		4
Health and Welfare		2
Department of Highways		3
Bonneville County		3
Northwest Power		2
State Parks		1

We advised two individuals on their fish ponds.

There were no fish kills that were attributable to pollution or pesticides.

JOB PERFORMANCE REPORT

State of: Idaho Name: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No.: F-71-R-7

Title: Region 6 Salmon and Steelhead Investigations

Job No.: VI-e

Period Covered: 1 January 1982 to 31 December 1982

ABSTRACT

Chinook salmon spawning ground redd counts in the upper Salmon River drainage contined on a downward trend. Returning adult progeny from the large escapement of 1978 failed to materialize on the spawning grounds.

Fishing effort for steelhead trout in the Salmon River below North Fork set new records for participation and harvest during the fall 1982-spring 1983 season. Anglers harvested an estimated 75-77% of the steelhead run returning to the Pahsimeroi station.

Mandatory regulations requiring the release of steelhead with dorsal fins exceeding 57 mm (2 1/4 in.) caught in the main Salmon River below the Middle Fork went into effect in the fall of 1982. It is estimated this reduced the harvest of wild steelhead destined for the Middle Fork spawning grounds by 500 to 600 fish.

Author:

Mel Reingold
Regional Fishery Manager

RECOMMENDATIONS

Continue chinook salmon, sockeye salmon and steelhead trout spawning ground surveys. Monitor the general trend of both hatchery and wild steelhead sport fisheries and their impacts on these upper Salmon River runs.

Monitor and document the effect of special regulations on the harvest and escapement of wild steelhead into the Middle Fork.

Monitor the acceptance and compliance and workability of special regulations imposed upon the angling public to preserve wild steelhead stocks.

OBJECTIVES

To assess the escapement and spawning success of chinook salmon in the upper Salmon River by counting redds in selected areas.

To assess the contribution of both hatchery reared and wild steelhead in the upper Salmon River sport fishery.

To monitor fish runs and make recommendations for anadromous fishery management. To inform the public on the status of the fish runs and problem solutions.

TECHNIQUES USED

We conducted spawning ground surveys on chinook salmon in the established trend areas. On walking surveys, we counted redds, measured and sexed kelts and inspected fish for marks and prespawning mortality. On aerial surveys, we counted redds only.

Results of check station data and creel census information collected on the upper Salmon River steelhead fishery on IPC-26 project #03-88-940 are reported here.

FINDINGS

Spawning Ground Surveys

Chinook salmon redd counts were compiled with data from other regions in Idaho Department of Fish and Game Job Performance Report, Project F-73-R-5. Sockeye salmon redd trend counts were continued in 1982 in Redfish Lake and Fishhook Creek.

In 1981, the maximum number of sockeye salmon counted in Redfish Lake was 26 fish on 6 October. In 1982, maximum numbers **in** the same observation area was 22 fish on 13 October. As in 1981, no sockeye salmon or redds were found in Fishhook Creek, the main tributary to Redfish Lake, on 1982 surveys.

The numbers of chinook salmon redds counted continued on a declining trend **in** 1982 **in** the upper Salmon River drainage. For spring chinook, only the 1980 counts out of the last 6 years (1977-1982) were lower. Most disturbing is the lack of returning two-ocean adults from the high spawner escapement of 1978. The returning progeny expected from the 1978 egg deposition failed to materialize on the spawning grounds (Table 1). Losses of smolts at Snake and Columbia River dams has been identified as the primary cause of the declining runs of chinook salmon in Idaho.

Steelhead Check Station Summaries

Since the late 1960's, a steelhead angler check station has been operated near North Fork, Idaho to monitor the steelhead fishery below that point (Reingold 1982). The success of the Idaho Power Company financed Pahsimeroi River steelhead relocation program has returned substantial steelhead runs to the Salmon River. Subsequently, angler participation has increased markedly. Numbers: of hours spent fishing increased 237 percent through the North Fork check station from 1979-80 to 1982-83 (Table 2). New records were set **in** the fall 1982-spring 1983 steelhead fishery in numbers of steelhead caught and angler participation (Tables 3, 4, 5). The rate of harvest on the 1982-83 Pahsimeroi Hatchery steelhead run was estimated at 75-77 percent (K. Ball, personal communication).

While hatchery supported runs can often be harvested at rates of 80% or greater, wild stocks supported by natural spawning and rearing cannot. Studies on the Middle Fork Salmon River indicated declining wild runs and the need to afford special protection to reduce an exploitation rate estimated between 40-50 percent (Thurow, 1982) (Figure 1). This harvest occurred in the main stem Salmon River below the Middle Fork. The Middle Fork itself has been closed to steelhead fishing since 1975.

Beginning with the fall 1982 steelhead season, anglers fishing the main Salmon River below the Middle Fork were required to release all steelhead with dorsal fins greater than 57 mm (2 1/4 in.) total height. Studies at the Pahsimeroi showed 96% of all hatchery steelhead returning to that station had dorsal fins measuring less than 57 mm in height (Reingold, 1982). Check station and creel on the Salmon River disclosed 96% of all wild steelhead measured had dorsal fins exceeding 57 mm. Anglers were issued 57 mm wild plastic cards describing the technique for recognizing and measuring steelhead fins (Figure 2).

Thurow (personal communicatian) estimates that this special technique and regulation resulted in preventing 500-600 wild steelhead from being harvested in the main Salmon below the Middle Fork during the 1982-83 season and allowed their escapement to the spawning grounds.

During the spring of 1983, Senior Fishery Research Biologist, Kent Ball, conducted a randomized sample creel census of the effort and harvest of the steel head fishery between North Fork and the Pahsimeroi River on the main Salmon. He estimated that between 19 February and 3 April anglers expended 55,925 hours to catch 1,492 steelhead. The majority of these fish were destined for the Pahsimeroi station (K. Ball, unpublished data).

Table 1 . Upper Salmon River drainage chinook salmon redd counts, 1977-1982.

Streams	1977	1978	1979	1980	1981	1982
Spring chinook						
Alturas Lake Creek	85	303	29	7	7	9
Upper Salmon River	698	1,707	205	47	363	42*
Upper Valley Creek	18	141	25	6	2	1
Upper Yankee Fork	6	33	18	0	16	0
Upper East Fork	168	841	57	6	76	28
Herd Creek	6	26	2	0	9	1
Marsh Creek drainage	98	270	47	9	63	40
Lemhi River	474	796	154	47	126	163
Subtotal	1553	4117	537	122	659	284
Summer chinook						
Lower Salmon River	94	349	nc	11	75	39
Lower Valley Creek	63	219	15	4	17	8
Lower East Fork	136	nc	33	0	43	19
Loon Creek	62	29	nc	9	30	23
Subtotal	355	597	48	24	165	89
Unclassified						
Camas Creek	84	148	15	17	65	33
Lower Yankee Fork	12	27	nc	0	4	1
West Fork Yankee Fork	37	98	13	2	19	0
Subtotal	133	273	28	19	88	34
Total	2041	4987	613	165	912	407

*Reduced by fish trapping at Sawtooth Hatchery site.

Table 2 . Comparative numbers of anglers, effort and percent increase at the North Fork check station, 1979-80 to 1982-83

STEELHEAD ANGLER EFFORT
NORTH FORK CHECK STATION
1979 - 1983

YEAR	ANGLERS	HOURS	% INCREASE		
79-80	2,148	15,791			
80-81	3,964	26,821	70		
81-82	3,985	28,973	8	83	
82-83	6,436	53,160	83		237

Table 3 . Summary of data collected from fall steelhead seasons, 1971-1982, at the North Fork checkstation.

Year	No. Anglers	No. Hours	No. Steelhead Kept	Released	Total	Hrs/fish	% Hatchery
1971	930	6,206	657	n.r.	657	9	61
1972	898	7,154	254	n.r.	254	29	34
1973	650	5,828	247	n.r.	247	24	37
1974	360	3,354	53	n.r.	53	63	36
1975				---		--	--
1976	1,264	9,015	190	66	256	35	47
1977	1,849	13,031	580	118	698	19	66
1978				---		--	--
1979	946	6,338	171	50	221	29	75
1980	2,301	14,465	738	278	1,016	14	78
1981	3,090	21,278	822	154	976	22	76
1982	3,945	31,766	1,404	415	1,819	18	97*

n.r. = not recorded
*Special regulations reduced wild harvest.

Table 4 . Summary of data collected from spring steelhead seasons, 1971-1983, at the North Fork check station.

Year	No. Anglers	No. Hours	No. Steelhead Kept	Released	Total	Hrs/fish	% Hatchery
1971	1,416	10,370	366	n.r.	366	28	17
1972	12	543	23	n.r.	23	24	58
1973	1,318	10,164	257	n.r.	257	40	60
1974	780	3,083	97	n.r.	97	32	54
1975	---	---	---	---	---	---	---
1976	---	---	---	---	---	---	---
1977	735	3,885	107	18	125	31	58
1978	583	3,414	151	9	160	21	81
1979	372	1,966	52		52	84	75
1980	1,202	9,453	257	50	307	31	72
1981	1,663	12,656	335	85	430	29	65
1982	895	7,695	205	119	324	24	58
1983	2,491	21,394	464	278	742	29	93*

n.r. = not recorded
*Special regulations reduced wild harvest.

Table 5 . Summary of data collected at the North Fork check station by combining fall and spring steelhead seasons, 1971-72 through 1982-83.

Year	No. Anglers	No. Hours	No. Steelhead Kept	Released	Total	Hrs/fish	% Hatchery
1971-72	942	6,749	680	n.r.	680	10	61
1972-73	2216	17,318	475	n.r.	511	34	48
1973-74	1317	10,376	304	n.r.	344	26	41
1974-75	---	---	---	---	---	---	---
1975-76	---	---	---	---	---	---	---
1976-77	1999	12,900	297	84	381	34	51
1977-78	2432	16,445	731	1.27	858	19	68
1978-79	---	---	---	---	---	---	---
1979-80	2148	15,791	428	100	528	30	73
1980-81	3964	27,121	1069	377	1446	19	74
1981-82	3985	28,973	1027	273	1300	22	72
1982-83	6436	53,160	1868	693	2561	21	96*

n.r. = not recorded

*Special regulations reduced wild harvest.

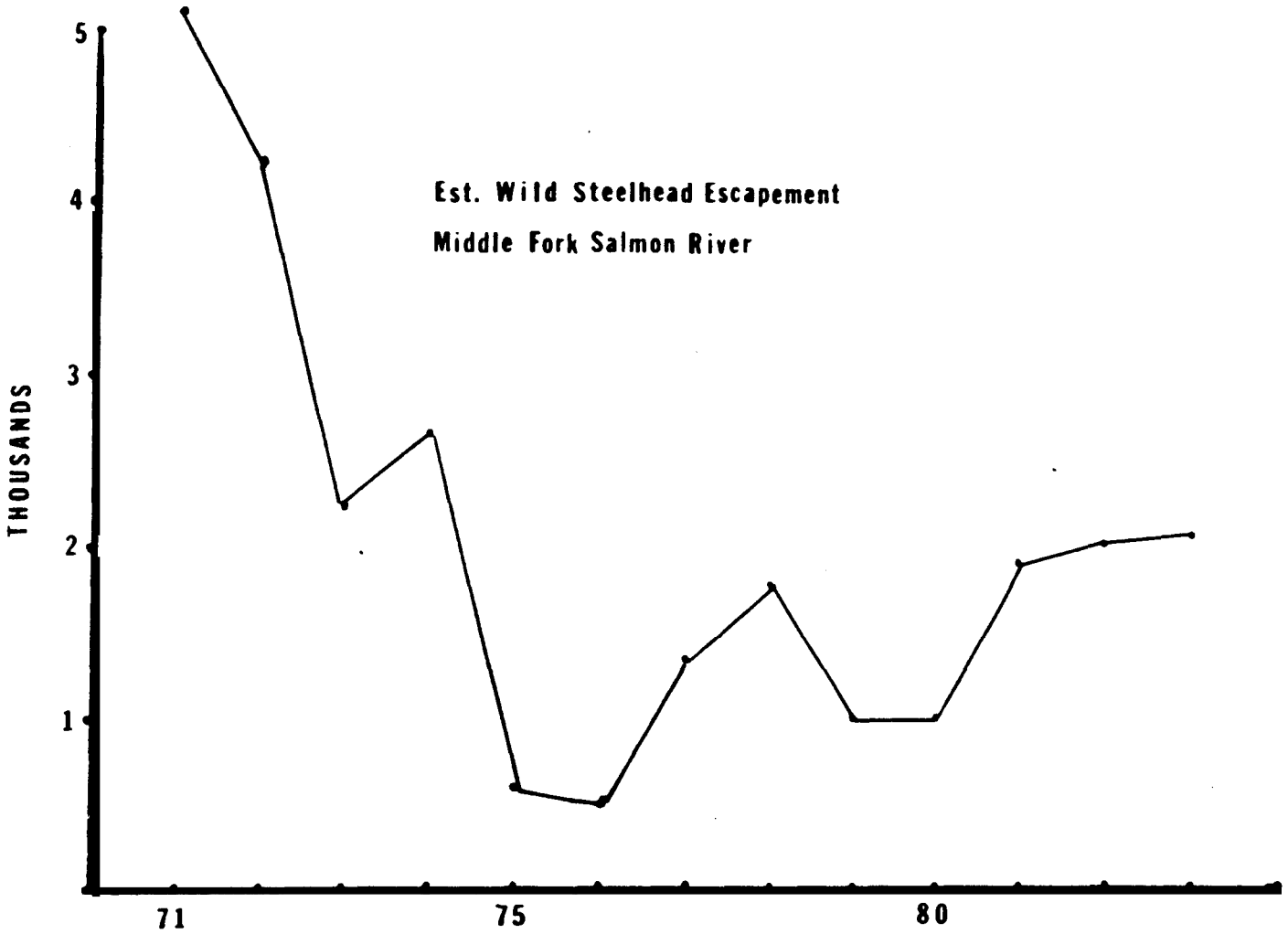
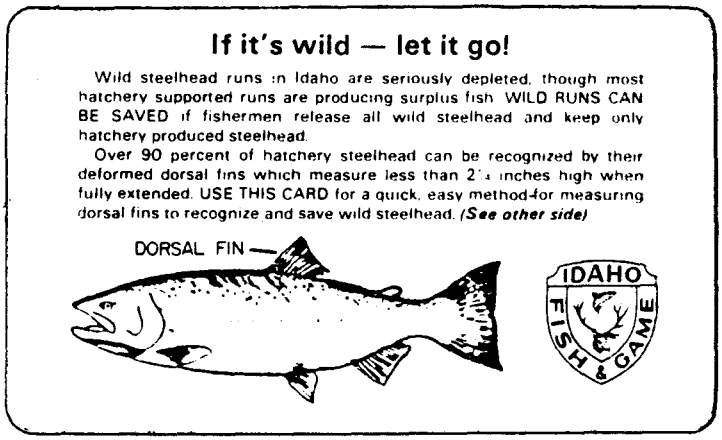


Figure 1. Estimated numbers of wild steelhead trout into the Middle Fork Salmon River, 1971-1983



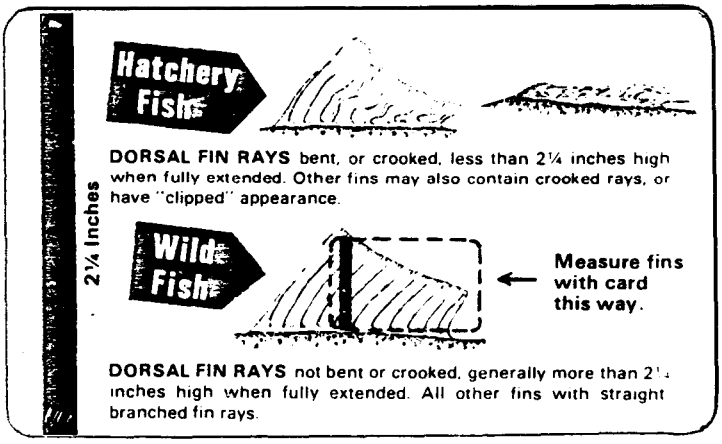


Figure 2. Plastic cards distributed to steelhead anglers describing technique for recognizing and measuring steelhead fins.

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