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FISHERY RESEARCH

IDAHO FISH & GAME

FEDERAL AID IN FISH RESTORATION

Job Performance Report, Project F-73-R-5
Subproject IV: River and Stream Investigations
Study XV: South Fork Boise River
Flow and Regulations Evaluations

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF FIGURES

State of Idaho Idaho __ NAME: RIVER AND STREAM INVESTIGATIONS

Project No: __ F-73-R-5 ___ TITLE: South Fork Boise River Flow and Regulations Evaluation _____

Subproject: _____ IV _____

Study No: _____ XV _____

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Period Covered: _ 1 March 1982 to 28 February 1983

ABSTRACT

Anglers fishing the South Fork Boise River in 1982 fished 13,568 hours to catch 20,758 fish. Rainbow trout caught and released made up 87% of the catch, with only 3% entering the creel. Whitefish, bull trout, and kokanee made up the remaining 10% of the catch. Catch rates during the study period ranged from a low of 0.5 fish per hour during the interval 29 May to 25 June, to a high of 3.7 fish per hour during the interval 18 September to 15 October.

Rainbow trout sampled from the South Fork of the Boise River ranged in age from 1+ to 5+ years. The mean size of rainbow trout measured was 281 mm total length.

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INTRODUCTION

In 1976, the Idaho Department of Fish and Game designated the South Fork of the Boise River, between Anderson Ranch Dam and Arrowrock Reservoir, as a special trout stream. The Fish and Game Commission imposed special regulations of a three fish bag limit, and 305 mm (12 inch) minimum length for trout to reduce mortality and to allow a greater number of fish to reach spawning size. Terminal gear was restricted to artifical flies and lures, with a single barbless hook, to reduce the mortality of released fish. Also, the Idaho Department of Fish and Game ceased the planting of hatchery rainbow trout to provide a totally wild trout fishery.

Early studies (Mate 1977, Mate and Cadwallader 1978, Moore et al. 1979) demonstrated the success of the special regulations. At that time, the fishery had shown an increase in catch rates and the mean total length of fish in the catch.

Following the termination of the last research project on the South Fork of the Boise River in 1973, spot creel checks displayed continuing improvement in the South Fork fishery. However, during the 1981 general trout season, anglers reported that they had caught fewer large fish and catch rates had declined. Although catch rates appeared high in 1981, 1.8 fish per hour, the average size declined to 213 mm total length. As a result of this limited data and the concern of sportsmen, the Fish and Game Commission changed the South Fork Boise regulations for the 1982 season to three fish under 12 inches (305 mm) and one over 20 inches (508 mm). This limit is intended to allow fishermen to harvest a portion of the small fish, keep one trophy trout, and still provide the needed protection for spawning-size fish.

We initiated this study to obtain baseline data to evaluate the new regulations and to compare existing conditions with those **in** 1976, 1977, and 1978.

OBJECTIVES

To obtain angler use and fish harvest estimates, obtain length frequencies, and age structure of game fish populations, and to document movement of rainbow trout.

TECHNIQUES USED

Creel Census

Using creel census procedures outlined by Reid (1973), we divided the census period, 29 May to 30 November, into seven four-week intervals. We randomly selected 50% of the weekend days and 20% of the weekdays in each interval for angler counts. All holidays were treated as weekend days. During each selected count day, we divided the day into four equal time periods and randomly selected the start time for the first count. To insure that the census clerk could obtain angler counts in less than one hour, we divided the study area into two sections: Anderson Ranch Dam to Indian Rock and Indian Rock to Danskin Bridge (Fig. 1). We did not attempt to count anglers using the river below Danskin Bridge due to the inaccessibility of the area.

To estimate angler hours of use for each census interval, we used the formula:

$$\frac{T}{N} A \times d \times d h = T U$$

where:

TU = total use
TA = total anglers counted
N = number of counts
D = days in interval
dh = daylight hours for the interval.

Weekday use and weekend use were calculated separately and then totalled.

To obtain an estimate of total harvest, we interviewed anglers on the river. Information collected provided us with data to calculate catch rates (fish per hour), species composition, and length frequency of fish caught.

To provide an estimate of total harvest, we used the formula:

$$Cr \times TU = TH$$

where:

Cr = catch rate in fish per hour
TU = total angler use
TH = total harvest.

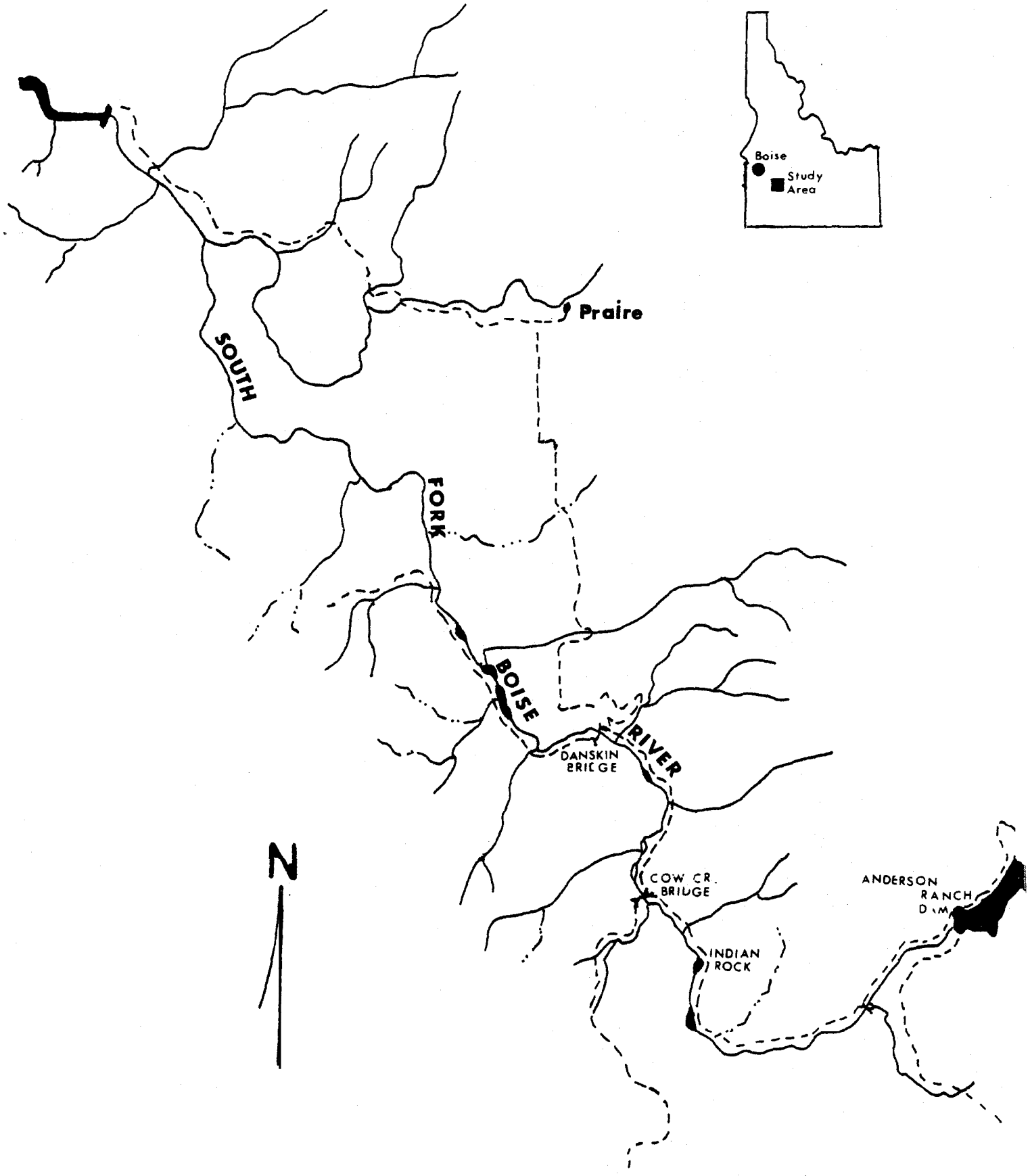

Figure 1. Study area map of the South Fork Boise River and tributaries.

Age and Growth

During angler interviews, we measured the total length of all rainbow trout observed and obtained scale samples. We dry-mounted the scales on clear slides and projected them at a power of 6.5 on a Kenevision scale projector. The scale length and the length of each annulus was measured. A linear regression was computed from the scale length to body length relationship. We then back-calculated the body length at each annulus by the formula:

$$L = a + cS$$

where:

L = body length

$$a = \frac{(\sum L)\ \ (\sum S^2) - (ES)\ (ELS)}{NES^2 - (\sum S)^2}$$

$$c = \frac{N \sum LS - (\sum L)\ (\sum S)}{N \sum S^2 - (\sum S)^2}$$

S = scale length

N = number of groups of scale lengths.

We obtained angler composition and method of fishing information from the angler interviews conducted on the river.

FINDINGS

Angler Use

For the period 29 May to 30 November 1982, anglers fished an estimated 13,568 hours (Table 1). Due to extremely high flows, anglers expended only 486 hours during the first four-week interval. Use increased to 1,507 hours during the second interval, and peaked at 3,750 hours during the fourth interval. Anglers expended only 186.1 hours fishing during the last 18 days of the general trout season, 13 November to 30 November.

Table 1. Estimated angling effort and catch on the South Fork Boise River from Anderson Ranch Dam to Danskin Bridge for seven creel census intervals, 29 May to 30 November 1982.

Census interval start date	Est. angling hours	Rainbow caught and released	Rainbow harvested	Whitefish caught	Bull trout caught	Kokanee caught	Total catch	Fish/hr
29 May	485.7	136	7	25		60	228	0.47
26 June	1506.6	1991	58	262		47	2358	1.57
24 July	3477.6	4486	225	321		51	5083	1.46
21 Aug	3750.0	5229	128	219	32	49	5657	1.51
18 Sept	1433.4	4543	186	514	14	42	5299	3.70
16 Oct	1304.1	1647	54	227	7	99	2034	1.56
13 Nov	186.1	260	10	22	1	6	299	1.61
Total	13568	18292	668	1590	54	354	20958	1,55
Fish/hr		1.35	.05	.12	2.01	.03	1.55	
% of total		87	3	8	41	2		

Angler use during the 1982 general trout season decreased from 1978 estimates of 18,647 hours and 1975 estimates of 14,958 hours, but was above the estimate of 12,117 hours for 1976 (Table 2).

Angler Catch and Catch Rates

Anglers fishing the South Fork of the Boise River during the 1982 general trout season caught a total of 20,958 fish, for an overall catch rate of 1.5 fish per hour (Table 1). The lowest total catch and lowest catch rates occurred during the first four-week interval, when anglers caught only 228 total fish at a rate of 0.5 fish per hour. During the three consecutive four-week intervals, 24 July to 15 October, fishermen caught over 5,000 fish per four-week period. The greatest overall catch rate, 3.7 fish per hour, occurred during the interval 18 September to 15 October.

Rainbow trout caught and released made up 87% of the total catch. We estimated that only 668 rainbow trout (3%) actually entered the creel during the 1982 general trout season. The number of trout entering the creel was the lowest recorded during a census year, while the number of rainbow caught and released was exceeded only during the 1978 general trout season. Whitefish in the catch made up only 8% of the total catch; bull trout, 0.3%, and kokanee, 1.7%. This is the first census year that any harvest of kokanee has been reported.

Age and Growth

From 109 scale samples obtained for rainbow trout, we determined that their age in the sample ranged from 1+ to 5+, with the majority of the sample 2+ to 3+ years (Table 3). We did not obtain any 0+, and only two 1+ fish, which reflects the selectivity of harvest. Calculated body length by scale length relationship displayed good linear regression, with an r value of 0.91 (Fig. 2). Mean calculated growth increments ranged from a high of 148.5 mm for age 0 to age 1, to a low of 37.1 mm between age 1 and age 2. Growth for all fish appeared slower than rainbow trout sampled in previous census years.

Length Frequency

Rainbow trout measured from the South Fork of the Boise River ranged from 100 mm to 585 mm total length (Fig. 3), with a mean of 281 mm. The mean total length of rainbow trout measured during the 1982 general trout season was the smallest recorded since inception of special regulations on the South Fork of the Boise River. Only during the 1974 season did the mean size not reach lengths greater than 281 mm.

Table 2. Estimated angler hours of use during the general trout season for the five years of census 1974, 1976, 1977, 1978, 1982 on the South Fork of the Boise River, Anderson Ranch Dam to Danskin Bridge.

Period covered	Angler hours	Wild rainbow harvested	Hatchery rainbow harvested	Rainbow caught and released	Whitefish caught	Bull trout caught	Kokanee caught	Total	Fish/hr
25 May-30 Nov 1974	26,443	5,710	11,832	1,730	1,727	51		21,050	0.80
29 May-30 Nov 1976	14,958	1,325	226	9,525	6,214	58		17,348	1.16
28 May-30 Nov 1977	12,117	1,103		10,715	2,022	8		13,848	1.14
27 May-30 Nov 1978	18,647	1,677		28,902	7,276	22		37,877	2.03
29 May-30 Nov 1982	13,568	668		18,292	1,590	54	354	20,958	1.52

Table 3. Mean calculated total length and growth increments for wild rainbow trout sampled from the South Fork of the Boise River, Anderson Ranch Dam to Danskin Bridge, 1982. Calculations made using total length (mm) = 11.42 + 0.27S. Scales read at 10X.

Age class	Sample size	Calculated mean total length (mm) each annulus 1	2	3	4	5
1	2	151				
2	38	151	199.5			
3	50	146.9	186.6	237.6		
4	16	149.9	182.5	231.9	271.9	
5	3	143.9	173.6	212.2	278.9	337.5
Grand mean		148.5	185.6	227.2	275.4	337.5
Mean growth		37.1	41.6	48.2	62.1	

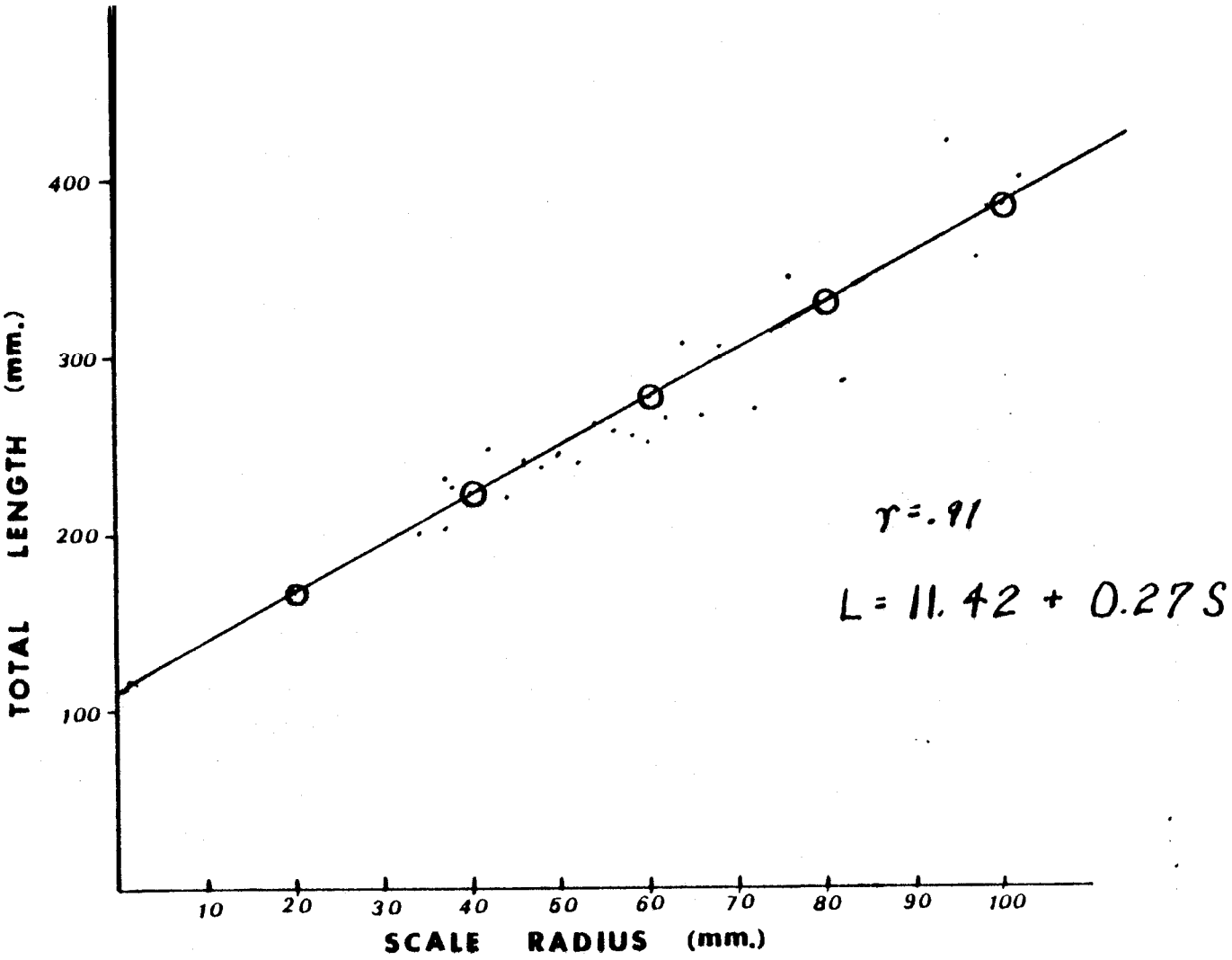

Figure 2. Relationship of total length to maximum anterior scale radius for wild rainbow trout, South Fork of the Boise River, 1932.

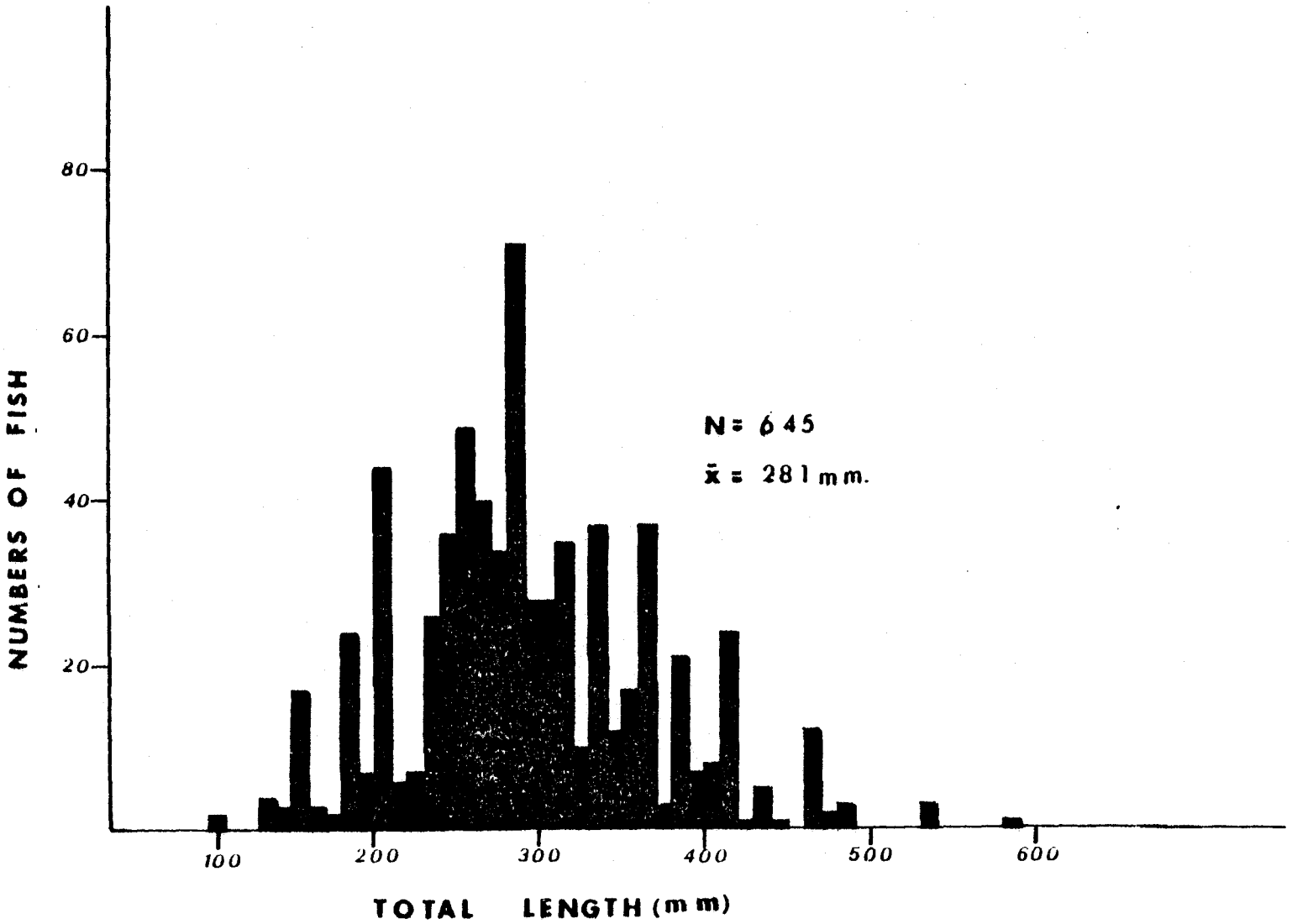

Figure 3. Length frequencies of wild rainbow trout sampled from the anglers' creels and by test fishing, South Fork Boise River from Anderson Ranch Dam to Danskin Bridge, 1982.

Angler Composition

We interviewed a total of 1,157 fishermen. Of that total, 90% (1,002) were residents of Idaho (Table 4). Residents of Boise made up 55% of the anglers, Mountain Home 17%, and other Idaho residents 18% (Table 5).

Fishermen using a fly rod made up 75% of the total anglers interviewed, and 80% of the fishermen used an artificial fly for terminal gear. We estimated that 4% of all anglers on the South Fork of the Boise River illegally fished with bait (Table 6). Fishermen wading the river made up 57% of all anglers interviewed, bank fishermen 33%, and boat fishermen 10%.

ACKNOWLEDGEMENTS

Sally Gregory and Julia Mulholland conducted the field investigations for this project. Members of the Boise Valley Fly Fishermen and Fly Fishermen of Idaho provided test angling assistance. Conservation officers Don Beach and Michael Elms provided invaluable help.

Table 4. License class recorded during creel census intervals on the South Fork of the Boise River, 29 May - 30 November 1982.

Code	Title	Number	Percent
01	Resident combination	524	47
03	Resident fish	410	36
04, 92	Senior	30	3
07	Junior resident combination	18	2
09	Junior resident fish	8	1
22	Nonresident season fish	24	2
23	Nonresident 7-day	48	4
24	Nonresident 1-day	58	5
95	Blind	---	--

Table 5 . Residence of anglers interviewed on the South Fork of the Boise River, 29 May - 30 November 1982.

Place of residence	Number	Percent
Boise	612	55
Mountain Home	191	17
Idaho	199	18
Out-of-state	118	10

Table 6. Angling methods and gear types used by anglers interviewed on the South Fork of the Boise River, 1982.

Fishing method	
Bank	33%
Wade	57%
Boat	10%
N = 1157	
Rod type	
Fly rod	75%
Spinning rod	25%
Other	
N = 1157	
Lure type	
Artificial fly	80%
Artificial lure	16%
Bait	4%
N = 1157	

LITERATURE CITED

Beach, Donald R. 1975. Survey of fish harvest in the South Fork of the Boise River from Anderson Ranch Dam to Arrowrock Reservoir. Job III-e. Idaho Fish and Game Department.

Mate, S. M. 1977. South Fork Boise River Fisheries Investigations. Project No. F-M-R-2. Idaho Department of Fish and Game.

Mate, S. M. and D. R. Cadwallader. 1978. South Fork of the Boise River Creel Census and Fish Population Study. Quarterly Report to the Bureau of Reclamation. 08-07-10-S-0062. Idaho Department of Fish and Game.

Moore, Virgil K., D. R. Cadwallader and S. M. Mate. 1979. South Fork of the Boise River Creel Census and Fish Population Studies. Annual Report to the Bureau of Reclamation. 08-07-10-0062. Idaho Department of Fish and Game.

Reid, Will W. 1973. Snake River Fisheries Investigations, Bernards Ferry to Cobb Rapids. Idaho Department of Fish and Game.

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