

# IDAHO DEPARTMENT OF FISH & GAME

Jerry M. Conley, Director

FEDERAL AID TO FISH AND WILDLIFE RESTORATION

Job Performance Report

Project F-73-R-2

LIBRARY - COOPERATIVE  
WILDLIFE & FISHERY RESEARCH



SUBPROJECT IV: RIVER AND STREAM INVESTIGATIONS

Study VIII: South Fork Snake River Fisheries Investigations Job I: South Fork Snake River Creel Census

Job II: South Fork Snake River Tributary Inventory

by

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## JOB PERFORMANCE REPORT

STATE OF Idaho Name: RIVER AND STREAM INVESTIGATIONS  
PROJECT: F-73-R-2 Title: South Fork Snake River  
SUBPROJECT: IV Fisheries Investigations  
STUDY: VIII  
JOBS: I and II

Period Covered: 1 March 1979 - 29 February 1980

### ABSTRACT

Anglers on the South Fork Snake River fished 88,830 hours to catch 46,824 game fish (30,585 harvested) from 3 March 1979 to 29 February 1980. Catch rates for the entire river from Palisades Dam to the mouth of Henrys Fork, 110 km (63 mi), were .53 game fish/hr, .43 trout/hr, and .36 cutthroat/hr. Composition of fish in the angler's creels were 68% wild cutthroat, 4% hatchery cutthroat, 9% brown trout, 2% wild rainbow, 2% hatchery rainbow, 0.5% lake trout, and 14% whitefish. Mean total length for cutthroat was 309 mm (12.2 in), brown trout was 368 mm (14.5 in), rainbow was 292 mm (11.5 in), and whitefish was 312 mm (12.3 in).

Angler composition as amount of total effort was 53% bank anglers, 25% motorized boat anglers and 22% nonmotorized boat anglers. Bank anglers were predominately bait fishermen (69%) while boat anglers used mainly flies (59%). Nonmotorized boat anglers had the highest catch rate (.55 trout/hr) and the lowest harvest rate (.24 trout/hr).

The area from the Heise gauging station to the Heise Bridge (Section 5) sustained the most effort (17,128 hr) and the most intense effort (2,801 hr/km). The highest catch rate was in the roadless canyon area from Conant Valley to Black Canyon Creek, .74 fish/hr. Anglers using flies had the highest seasonal catch rate of .77 fish/hr.

Anglers were predominately local residents with over 80% from the adjacent counties. Only 8% of the anglers were nonresidents. Most fishermen interviewed would favor some form of restrictive regulation, if necessary, to protect the fishery from over-harvest.

The South Fork cutthroat trout fishery is thought to be stable and in good condition. Comparisons with past data and the South Fork in Wyoming show few changes or differences in catch rates and length frequencies.

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## RECOMMENDATIONS

1. Terminate the use of hatchery rainbow in the South Fork as this practice is not successful.
2. Take no action on the restriction of fishing from motorized boats until more data is available on the life history of South Fork fishes.

## OBJECTIVES

Obtain estimates of total angler use, catch, and harvest of game fish for the South Fork Snake River below Palisades Dam.

Determine the number of cutthroat from Palisades Reservoir taken in the river fishery.

Evaluation of tributaries of the South Fork Snake River.

Determine population and abundance of game fish in the South Fork Snake River.

Monitor angler opinions, preferences and attitudes on the South Fork Snake River.

Obtain biological data from game fish found in the angler's creels (length, weight, age, and growth).

## ACKNOWLEDGMENTS

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## INTRODUCTION

The South Fork Snake River is located in southeastern Idaho. It flows into Idaho from western Wyoming where it originates in Yellowstone and Grand Teton National Parks. The river flows in a northwesterly direction from the Idaho-Wyoming state line to its confluence with the Henrys Fork. Only 101 km (63 mi) of the river from Palisades Dam to the mouth of the Henrys Fork are free flowing (Fig. 1). The completion of Palisades Dam in 1956 inundated the remaining 32 km (20 mi) of the river up to the Idaho-Wyoming state line. Water flows in the South Fork below Palisades Dam are presently controlled for irrigation, flood control and power production. Prior to 1956 they were somewhat regulated by Jackson Dam, built in 1909.

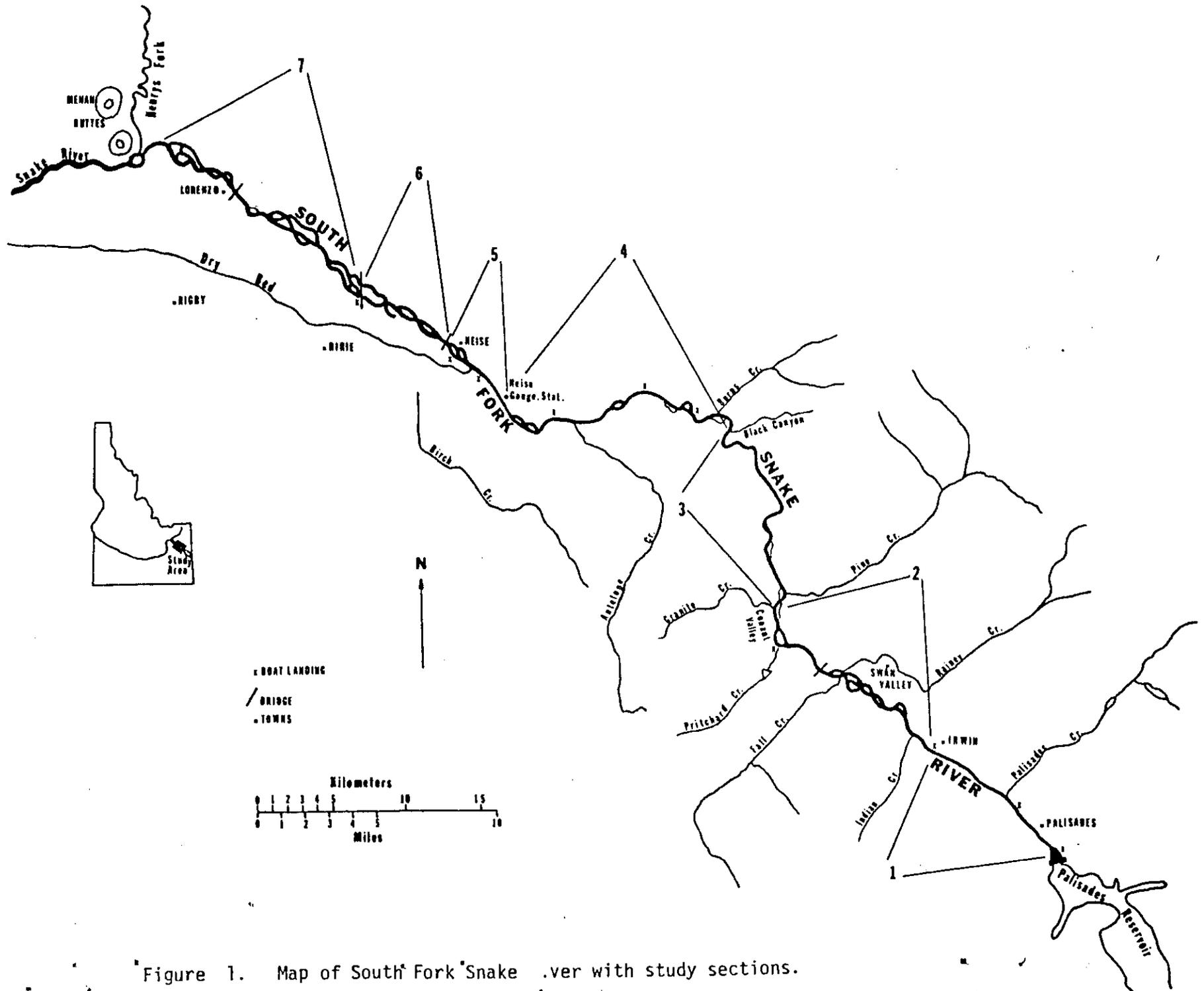


Figure 1. Map of South Fork Snake River with study sections.

Historically the South Fork Snake River was known for its large native cutthroat, up to 2.3 kg (5 lb). Local anglers state these large fish disappeared from the South Fork by the early 1960's, 3 to 5 years after completion of Palisades Dam. No extensive pre-impoundment studies were undertaken on the South Fork. Several studies have been done by the U.S. Fish and Wildlife Service (USFWS) since 1956--mostly angler use in the area proposed for the Lynn Crandall and Clark Ranch Dams. Their data shows the largest cutthroat collected was 53.3 cm (21 in) in 1957 (Miller and Roby 1957; USFWS 1958a, 1958b, 1960, 1970).

Prior to construction of Palisades Dam, the fishery of the South Fork was characterized as producing "some fine catches of cutthroat," but due to high spring flows and fluctuations from Jackson Lake "fishing in the river is of little consequence until the first part of September" (U. S. Forest Service 1947).

The completion of Palisades Dam ended any upstream movement of spawning cutthroat. Large numbers of trout were observed congregating in the afterbay of the dam in the spring of 1957. These fish were believed to be remnant runs from tributaries above the dam (Miller and Roby 1957).

Two forms of cutthroat are presently found in the South Fork below Palisades Reservoir; the large-spot Snake River cutthroat and "fine-spot" Snake River cutthroat (Fig. 2). The exact designation of the native cutthroat in the South Fork Snake River below Palisades Reservoir is unknown (Murphy 1974; Behnke 1971). The "fine-spot" Snake River cutthroat (an undescribed sub-species) is native in the South Fork above Palisades Reservoir up to Jackson Lake in Wyoming (Behnke 1971, Keifling 1978, Murphy 1974). It is thought the natural downstream limit of the "fine-spot" cutthroat in the South Fork (prior to Palisades Reservoir) was near the confluence of the Salt River (Behnke and Wallace, personal communication). "Fine-spot" cutthroat are presently stocked in Palisades Reservoir as catchables (300,000/year) by Jackson National Fish Hatchery (Idaho Department of Fish and Game 1979). Some of these fish pass through Palisades Dam and can be identified from wild cutthroat by their deformed pectoral and dorsal fin rays (Jeppson 1970).

Murphy (1974) states there are indications the cutthroat historically found in the South Fork was a large-spot Snake River cutthroat similar to the Yellowstone and Henrys Lake cutthroats. They were historically found in the Snake River below the Henrys Fork. These cutthroat have provisionally been named Salmo clarki bouvieri (Behnke 1973 & 1979, Varley 1979, Loudenslanger 1979). Stocking records show the "black spot" (Yellowstone), Henrys Lake and "fine-spot" cutthroat have all been introduced in the South Fork and tributaries since 1936 (Costley 1941; Idaho Department of Fish and Game 1958, 1968, 1979).

Cutthroat presently planted in the South Fork include both "fine-spot" (from Jackson National Hatchery brood stock) and Henrys Lake cutthroat. These fish are planted as fry and fingerlings and exhibit no fin deformity which would allow them to be separated from wild trout.

Other game fish commonly found in the South Fork are brown trout and whitefish. Lake trout and rainbow trout are taken infrequently. All of these species were present in the South Fork prior to construction of Palisades Dam.

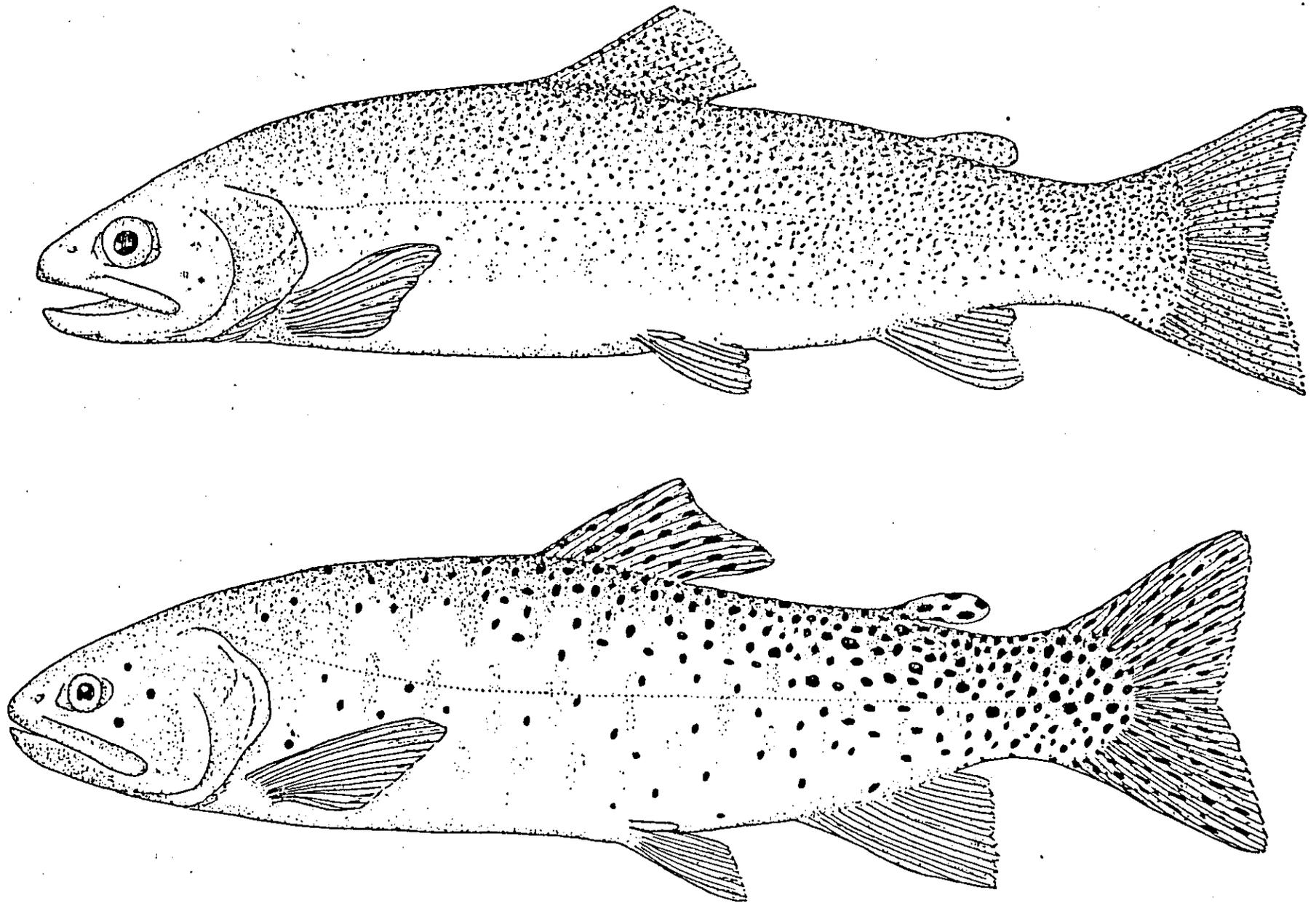


Figure 2, Fine-spotted cutthroat, *Salmo clarki* spp. and large-spot Snake River cutthroat, *S. c. bouvieri*. (Murphy 1972).

Brown trout were not introduced in the Idaho portion of the South Fork until 1968 (Appendix 1) but were present in good numbers (5% of all trout sampled) in 1955 (Miller and Roby 1957) and represented 9% of the angler catch in 1966 (USFWS, unpublished data). The presence of lake trout in the river has increased since completion of the Dam but their presence was noted as 1% of all trout sampled in 1955. These lake trout were most likely from Jackson Lake (Keifling 1978).

Rainbow trout (Salmo gairdneri) have been introduced into the South Fork and its tributaries in Idaho since 1940 but have occurred only infrequently in the catch. Brook trout were introduced into many of the South Fork tributaries in the 1940's and 1950's but did not establish self-sustaining populations. None have been found in recent years (Idaho Department of Fish and Game planting records, 1936-1979).

Whitefish, Prosopium williamsoni, are the most numerous game fish found. Jeppson (1970) states changes in the water temperature due to Palisades Reservoir have created an environment favorable to whitefish which compete with trout for food and space. Whitefish have never been utilized to any degree as a sport fish by South Fork anglers even with a winter whitefish season (U.S. Fish and Wildlife Service 1966, 1972; Jeppson 1970, 1973). Attempts were made in 1972 and 1973 to reduce whitefish populations in the South Fork with explosives. Some evidence was found that condition of whitefish was improved (Jeppson 1974, unpublished data).

Other fish present in the South Fork include Utah sucker (Catostomus ardens), bluehead sucker (C. discobolus), mountain sucker (C. platyrhynchus), mottled sculpin (Cottus bairdi), Piute sculpin (C. beldingi), longnose dace (Rhinichthys cataractae), speckled dace (R. osculus), reidside shiner (Richardsonius balteatus), and Utah chub (Gila atria). Suckers constitute the largest fish biomass in the river. Sculpins are important food items and are numerous. Dace are found in backwater areas with vegetation and the chubs are from Palisades Reservoir and are not thriving in the river.

The study area also includes all the tributaries of the South Fork. This area is presently being leased and explored for geothermal, oil, gas and phosphate resources. The potential for additional hydropower generation is again being investigated with the Lynn Crandall, Burns Creek, and Clark Ranch Dams most promising (U.S. Fish and Wildlife Service 1980). The above, coupled with the angling public's perception of a declining fishery in the South Fork, has promoted the initiation of this study to inventory the fisheries resources of the South Fork Snake River in Idaho.

#### DESCRIPTION OF STUDY AREA

The South Fork Snake River drains approximately 15,000 km<sup>2</sup> (5,810 mi<sup>2</sup>). Mean discharge for 68 years of record near Heise was 197 m<sup>3</sup>/S (6,930 ft<sup>3</sup>/S) or 6,198 hm<sup>3</sup>/year (5,027,000 acre-ft/yr). Maximum flows occurred in 1894 and 1927 floods with flows of 1,840 m<sup>3</sup>/S (64,000 ft<sup>3</sup>/S). Flows over 680 m<sup>3</sup>/S (24,000 ft<sup>3</sup>/S) are considered flood flows. Minimum flows of .54 m<sup>3</sup>/S (19 ft<sup>3</sup>/S) occurred in November 1956 and 1957 when testing of generators at Palisades Dam took place. Prior to construction of Palisades Dam, 34 m<sup>3</sup>/S (1,210 ft<sup>3</sup>/S) was the lowest naturally occurring flows recorded.

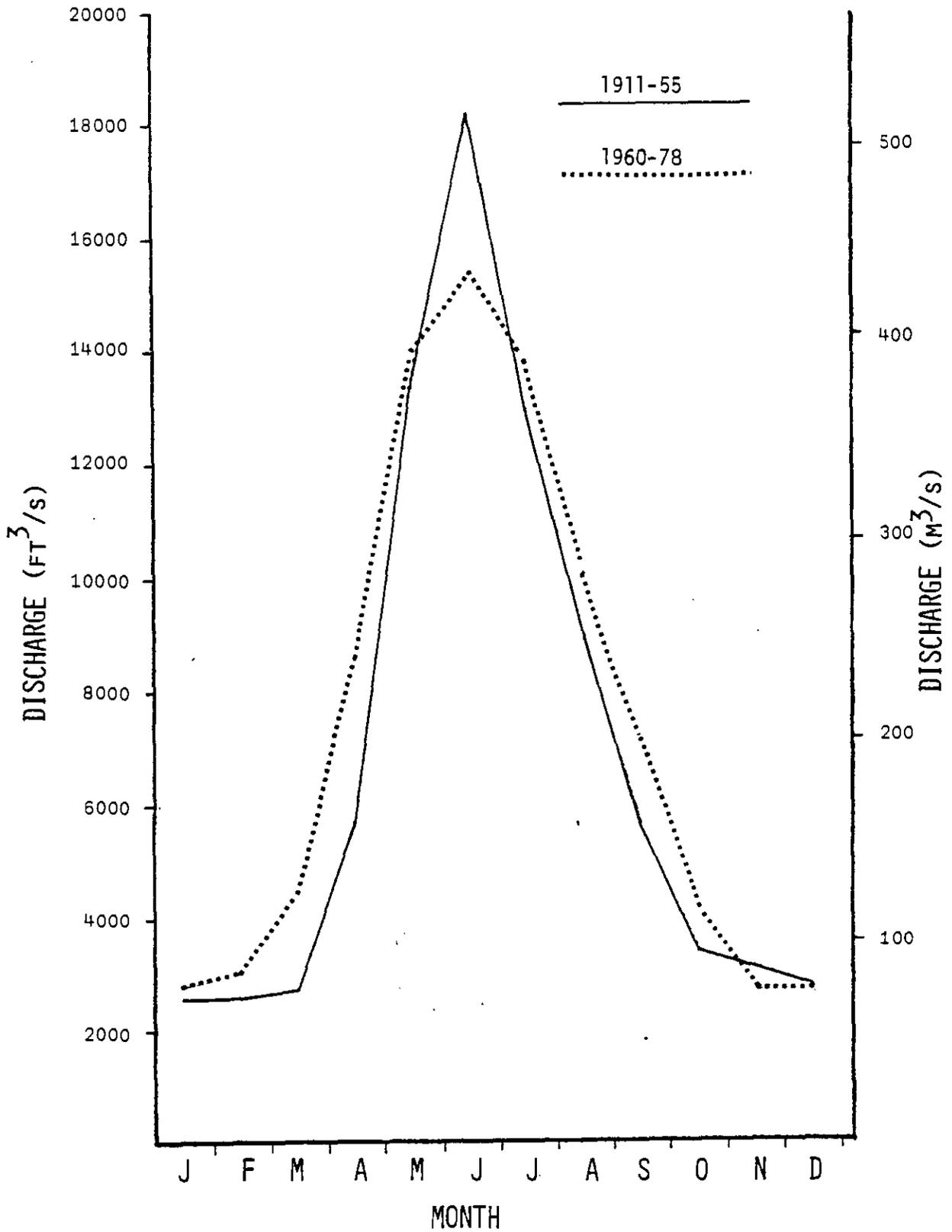


Figure 4. Mean monthly discharge before (1911-1955) and since completion (1960-1978) of Palisades Reservoir at the Heise gauging station, South Fork Snake River. (USGS data).

They were caused by ice jams in January 1935 and January 1955. The lowest flows recorded below Palisades Dam in normal operation were during the 1977 drought in March, with 15 m<sup>3</sup>/S (527 ft<sup>3</sup>/S) recorded several times, (U.S. Geological Service 1956, 1963, 1977, 1979).

The South Fork below Heise is subject to low flows from irrigation diversion (Fig. 3). Flows below 14 m<sup>3</sup>/S (500 ft<sup>3</sup>/S) were recorded in 1924 near Lorenzo indicating this is not a new problem (U.S. Geological Service 1956). Flows during the drought of 1977 were so low as to be unmeasurable and resulted in closing the river to fishing during the fall and winter of 1977 to protect the fishery (Jeppson, personal communication).

Annual discharge patterns for the South Fork have not changed much since construction of Palisades Dam (Fig. 4). Peak flows naturally occur during May, June, July and August, which is the primary irrigation season. Late spring runoff is a result of the 2,134 m (7,000 ft) average elevation in the South Fork Drainage (U.S. Geological Service 1978). Operations at Palisades Dam presently dampen the natural peak flows which normally occur in June and also lower flows during the winter.

Flows from Palisades to Heise are nearly the same with input from the tributaries in the area having minimal effects (Fig. 4). The river below the Heise area is not affected greatly by peak flows (spring runoff) due to irrigation removals at Heise. Although little data for the lower South Fork is available, mean flows by month for 1924 to 1927 indicate water removal above Lorenzo has increased over the last 50 years as compared to present flows (U.S. Geological Service 1956, 1979).

Continuous water temperature records for the South Fork at the Heise gauging station are available for water years 1957 (October, 1956) to the present from the USGS "Water Resources Data for Idaho" publications. No temperature data is available prior to the initiation of Palisades Dam construction. We used October 1956 to September 1957 data as baseline. Water temperatures in the South Fork are well within the range for salmonid production (Bardach, et. al. 1972). Mean monthly temperatures at the Heise gauging station range from 1.0 to 13.5 C (34 F - 56.3 F) with minimums and maximums of 0 C (32 F) and 18.5 C (65.3 F), respectively, since 1960 (Fig. 5). Since the filling of Palisades Reservoir the river at Heise warms sooner in the spring and cools slower in the fall. Extensive periods of 0 C (32 F) water temperatures no longer occur. The mean monthly temperature range has decreased by about 4 C (7.2 F) since completion of Palisades Reservoir (Fig. 5). The mean annual temperature has increased by .9 C (1.6 F) from 6.5 C (43.7 F) in 1957 to 7.4 C (45.3 F) since 1960, primarily as a result of increased winter water temperatures (USGS data).

The water quality of the South Fork appears adequate for cold water fisheries (USGS 1979). Chemical composition generally reflects the igneous and sedimentary land forms that predominate in the drainage (Whitehead 1978). The dissolved solids, hardness, and alkalinity indicate the South Fork below Palisades Reservoir should be a moderately productive system (Appendix 7). Based on conductivity values, the dissolved solids in the South Fork show no significant change since Palisades Dam was built.

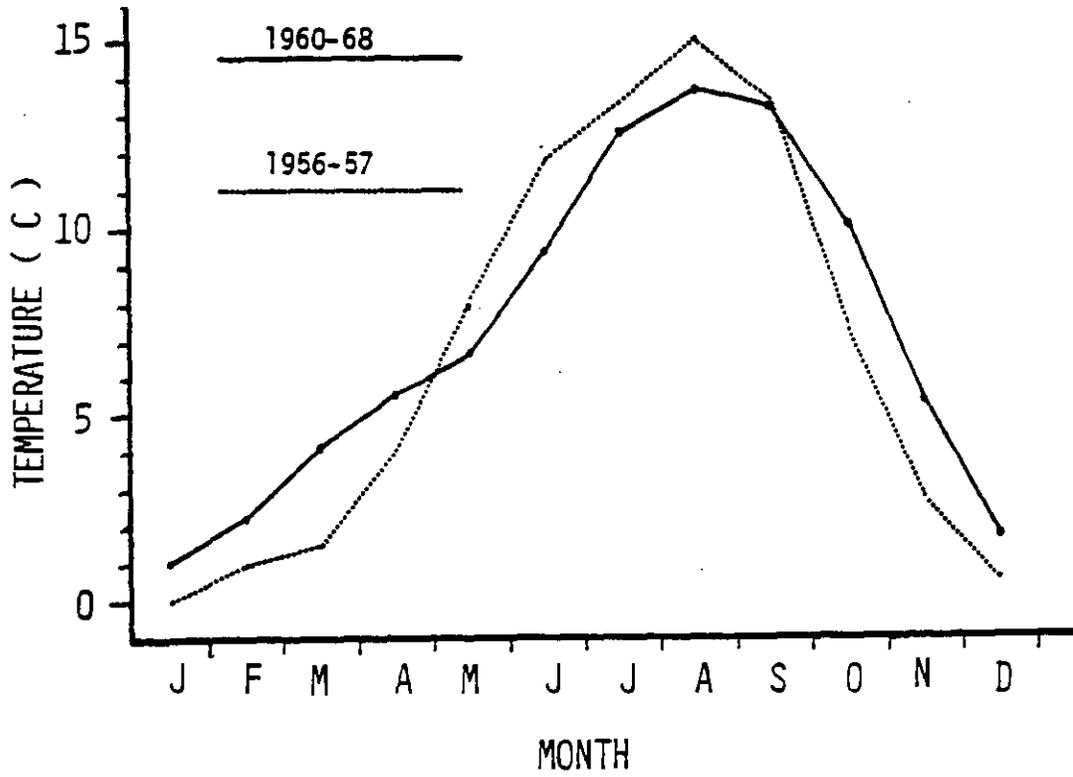


Figure 5. Mean monthly temperatures during (1956-1957) and after filling (1960-1968) of Palisades Reservoir, at the Heise gauging station, South Fork Snake River (USGS data).

Table 1. Study sections for South Fork Snake River.

Section	Section	km	mi
1	Palisades Dam to foot bridge abutments near Irwin	11.9	7.4
2	Irwin to Granite Creek	16.4	10.2
3	Granite Creek to Black Canyon	15.8	9.8
4	Black Canyon to Heise Gauging Station (near Anderson Canal)	20.3	12.6
5	Heise Gauging Station to Heise Bridge	6.1	3.8
6	Heise Bridge to Archer-Ririe Highway Bridge	6.6	4.1
7	Archer-Ririe Highway Bridge to present mouth of Henrys Fork	24.0	14.9
	Mouth of Henrys Fork to Palisades Dam	101.0	62.8

## Study Sections

For purposes of the creel census, the South Fork from Palisades Dam to the Henrys Fork was divided into seven sections (Fig. 1 and Table 1) because of differences in fisherman access or season.

Section 1 - (Palisades Dam to Irwin footbridge abutments [Fig. 1]). This area covers 11.9 km (7.4 mi) and is open to fishing for all species from 1 April to 30 September. This season was established in 1972 to protect the brown trout during spawning. The river in this area is confined to a single channel, flowing in long, shallow runs with poor riffle-pool structure. Palisades Creek is the only major tributary in this section. The river flows along the southwest edge of Swan Valley.

Section 2 - (Irwin footbridge abutments to Granite Creek, 16.4 km [10.2 mi]). This area is open during the general season (26 May to 30 November for 1979). The river in this area flows through the northern end of Swan Valley into Conant Valley. Conant Valley and Swan Valley are separated by a narrowing of the valley floor for about 2 km (1.2 mi). This section is characterized by much braiding and several extensive side channels. Good riparian vegetation and riffle-pool structure give this area good fisheries habitat during both high and low water flows. Several tributaries with fisheries enter in this section: Indian Creek, Fall Creek, Rainey Creek and Pritchard Creek. Fall Creek enters the river on the south side over a 10 m (33 ft) high waterfall, making it inaccessible to river fish. It provides an important wintering area for trout below the falls due to warmer water from Fall Creek (Jeppson 1970). This is a favored fishing hole for both bank and boat anglers. Access is fair for bank anglers via a county road on the south side of the river.

Section 3 - (Granite Creek to Black Canyon, 15.8 km [9.8 mi]). Granite Creek enters the South Fork at the north end of Conant Valley. This is the beginning of the South Fork Canyon, which is bounded by the Big Hole Mountains on the north and Antelope Flat on the south. No public roads penetrate to the river in this area, with most access generally limited to boat traffic. The river bottom is generally confined by steep basalt walls which in many areas create deep runs and large deep pools. Short sections of braiding are common, creating many islands. Recreational floating for sightseeing and camping is a very popular activity. Fishing is open during the 6-month general season (26 May to 30 November for 1979). Pine Creek enters near the upper end of this section and provides the largest drainage available to the South Fork fishery.

A developed boat ramp at Conant Valley allows easy boating access, with several convenient takeout points downstream.

Section 4 - (Black Canyon to Heise gauging station, 20.2 km [12.6 mi]). The area is still confined by canyon walls, but has a wider valley bottom, resulting in shallower runs. A county road parallels the river on the north side up to Black Canyon, giving good access. Most boat activity from Section 3 continues through this area.

The effects of farming on Antelope Flats are evident by increased siltation from Antelope Creek into the South Fork during periods of heavy rain.

Burns Creek is the only tributary with known fishery values in this section and has long been recognized as a major cutthroat spawning area (Jeppson 1969).

Section 5 - (Heise gauging station to Heise Bridge, 6.1 km [3.8 mi]). The South Fork Snake River flows out of the canyon near the Heise gauging station onto a flood plain bounded on both sides by agricultural lands. The river in this area is diverted extensively for irrigation at nine locations, with 50 to 90% of the water being lost from the main river. These diversions also result in considerable loss of fish from the river, often creating good fisheries below the headgates. The river channel has been confined from braiding in most of this section to allow maximum water to the diversion headgates. Only during flows of 8,000 cfs or greater does water reach the side channels.

Fishing below the Heise gauging station is open year-round and Section 5 is a favorite area for winter anglers because of easy access and fish congregating near the headgates.

Section 6 - (Heise Bridge to Archer-Ririe Highway Bridge, 6.6 km [4.1 mi]). The area from Heise Bridge to Archer Bridge is very similar to the area downstream to the mouth of the Henrys Fork (Sec. 7). Section 6 was separated because a county road parallels it, allowing good access, whereas no roads parallel Section 7, limiting access.

Section 7 - (Archer Bridge to mouth of Henrys Fork, 27.6 km [14.9 mi]). The river is bounded by levees on both sides for flood control, which are about 1 km (0.6 mi) apart. This allows much braiding and meandering with natural channel cutting by the river within the levees. Good fishery habitat is available around snags when flows are adequate. The area below the Archer Bridge was practically dry during the drought of 1977. The majority of the river in Sections 6 and 7 is surrounded by private agricultural lands.

#### TECHNIQUES USED

##### Creel Census: (South Fork Snake River below Palisades Reservoir)

Creel census interviews and angler counts were conducted during the 12-month period from 3 March 1979 to 29 February 1980. The schedule was stratified by river section, angler type, interval of season, day of the week and time of day. The creel census procedures consisted of angler counts conducted on 50% of the weekend days and 20% of the week days of each week in a 14-day census interval. Specific count days were selected at random. The opening day and all holidays were always included as census days (Pettit and Lindland 1979).

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 two or three equal time periods. The earliest count time was selected at random within the first count period with counts in subsequent periods spaced evenly apart.

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.

Anglers were interviewed as often as possible on both count and non-count days. Mean catch rate was determined for each species and multiplied by estimated effort for each interval to give estimated harvest and catch by species for each interval.

Separate counts were made of anglers fishing from the bank, using motorized boats and non-motorized boats to give accurate estimates of total use for each angler type. Motorized and non-motorized boat anglers were those people using a boat whether they were fishing from the boat or the bank. Motorized (power) boaters were anglers using a boat with any type of motor attached regardless of how it was being used (i.e. actually fishing with the motor on, as transportation to a bank fishing location or transportation upstream so they could float the river to their start point while fishing).

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. When conditions permitted we also recorded angler opinions to the following questions on the South Fork fishery that were considered to be of major public concern:

1. If fishing from boats is shown to be a major cause of a decline in the South Fork fishery, would you favor or oppose a restriction on fishing from boats?
2. If fishing from motorized boats is shown to be a major cause of a decline in the South Fork fishery, would you favor or oppose a restriction on fishing from boats with a motor attached?
3. Would you be in favor of or opposed to some form of restrictive regulation (i.e. size, creel or season) if overharvest is found to be a major cause of a decline in the South Fork fishery?

We counted anglers on the South Fork by the use of cars, jet boats, and airplanes depending on availability of equipment, access and water flows. Car counts were used on Section 1 from 1 April to 26 June and then we switched to counts from boats until the close of the season. Sections 2, 3 and 4 were censused with boats from 26 May to 2 November when low flows (< 1,000 cfs) made jet boating hazardous. Counts were continued by airplane until 30 November. Sections 5 and 6 were censused by car from 3 March to 18 June and 8 December to 29 February. Boats were used from 19 June to 2 November and air counts from 11 November to 5 December. Boat counts were used in Section 7 (below Archer-Ririe Highway Bridge) 31 March to 17 October when flows dropped below 800 cfs. Air counts were conducted from 11 November to 5 December after which counts were terminated for Section 7. We hope to get data in Section 7 for the period 6 December to 28 February in 1980-81 if water flows are normal.

#### Length and Weight

Total length of harvested fish was measured to the nearest 5 mm (.25 in) and recorded on angler interview forms by species.

Weights were taken to the nearest 25 g (1 oz) using hand held spring scales.

Length-weight relationships were determined using pair data of length and weight in a Hewlett Packard 1200-E calculator and plotter. The calculator computes the best fit curve for the points plotted and graphs this curve. Calculated lengths or weights can then be determined from the derived formula for the curve which is generally a log function.

### Condition Factors

Condition factors (K) were calculated using:

$$K = W/L^3 \times 10^5$$

where W = weight in grams and L = total length in mm. K is a relative indicator of body plumpness as compared to length (Lagler 1956) and can be used to elucidate changes in body form within a population.

Mean K was determined using the mean total length to calculated weight, from the length-weight relationship for each species.

### Tributary Stream Survey

Tributaries of the South Fork were walked out as far as possible with notes taken on fish presence and fisheries habitat. Evaluations of fish habitat were as described by Duff and Cooper (1976).

Electro-shocker transects 100-m long were established (when time allowed) and fish population estimates were made using the DeLury successive removal technique (Braaten 1969). Two or three passes were generally made.

Quantitative measurements of stream habitat were done in conjunction with Targhee National Forest personnel using General Aquatic Wildlife System (GAWS) methods (U.S. Forest Service 1976). Multiple stations with several transects in each station were established on most tributaries. Determinations of flow, channel width, stream bank stability, substrate size, pool ratio and riparian vegetation were made.

### Redd Counts

Brown trout redd counts were made from the air using a Cessna 182, flying at 91-15 m (300-500 ft) above the stream. We counted all redds seen from Palisades Dam to the mouth of the Henrys Fork during five flights in November, December and February.

## FINDINGS

### Creeel Census - Angler Use

South Fork Snake River anglers fished an estimated 88,830 hours (22,200 angler days) during the period 3 March 1979 to 29 February 1980 (Table 2). Because of the three different seasons available on the South Fork and differences in length of study sections, comparison of effort as total hours did not reveal intensity of use and must be looked at as angler effort per unit area. Effort peaked during Interval 10 (7 to 20 July), which corresponds to the peak of the stonefly hatch (Pteronarcys), holding high through the remainder of the summer until 31 August when it began to decline. Effort during the winter is greatest in March and April when days become longer and warmer. Conversely, effort was lowest during December and early January (Fig. 6). Angler effort was greatest in Sections 1 and 5 (Table 2 and Fig. 7).

Table 2. Estimated angler effort (hrs) by census section and interval, South Fork Snake River, 1979-80.

Interval beginning	Census Section							Totals
	1	2	3	4	5	6	7	
1. 3 March	Season closed	season closed	season closed	season closed	2,165	456	1,206	3,827
2. 17 March	"	"	"	"	1,256	353	741	2,350
3. 31 March	1,615	"	"	"	1,263	312	963	4,153
4. 14 April	1,008	"	"	"	921	160	246	2,335
5. 28 April	1,035	"	"	"	831	349	358	2,573
6. 12 May	1,575	"	"	"	1,077	118	138	2,908
7. 26 May	1,233	1,088	460	1,636	502	58	61	5,038
8. 9 June	623	609	200	1,450	709	313	292	4,196
9. 23 June	1,200	1,061	857	2,049	1,234	389	1,038	7,828
10. 7 July	500	1,348	2,371	2,652	1,273	212	985	9,341
11. 21 July	1,224	1,962	1,696	1,595	664	221	236	7,598
12. 4 Aug	2,439	1,716	1,881	1,115	435	303	477	8,366
13. 18 Aug	1,689	1,838	1,978	1,134	727	790	501	8,657
14. 1 Sept	669	690	1,150	1,230	516	310	682	5,247
15. 16 Sept	638	432	908	626	445	0	334	3,383
16. 29 Sept	180	488	588	619	500	492	646	3,513
17. 13 Oct	Season closed	185	504	485	467	231	513	2,385
18. 27 Oct	"	126	116	184	459	75	401	1,361
19. 12 Nov	"	378	0	181	301	220	290	1,370
20. 24 Nov	"	72	5	0	135	179	36	427
21. 8 Dec	"	"	"	"	126	0	59	185
22. 22 Dec	"	season closed	season closed	season closed	117	0	55	172
23. 5 Jan	"	"	"	"	172	19	89	280
24. 19 Jan	"	"	"	"	98	0	46	144
25. 2 Feb	"	"	"	"	218	55	126	399
26. 16 Feb	"	"	"	"	517	27	250	794
3/3/79 - 2/28/80	15,628	11,993	12,714	14,956	17,128	5,642	10,769	88,830

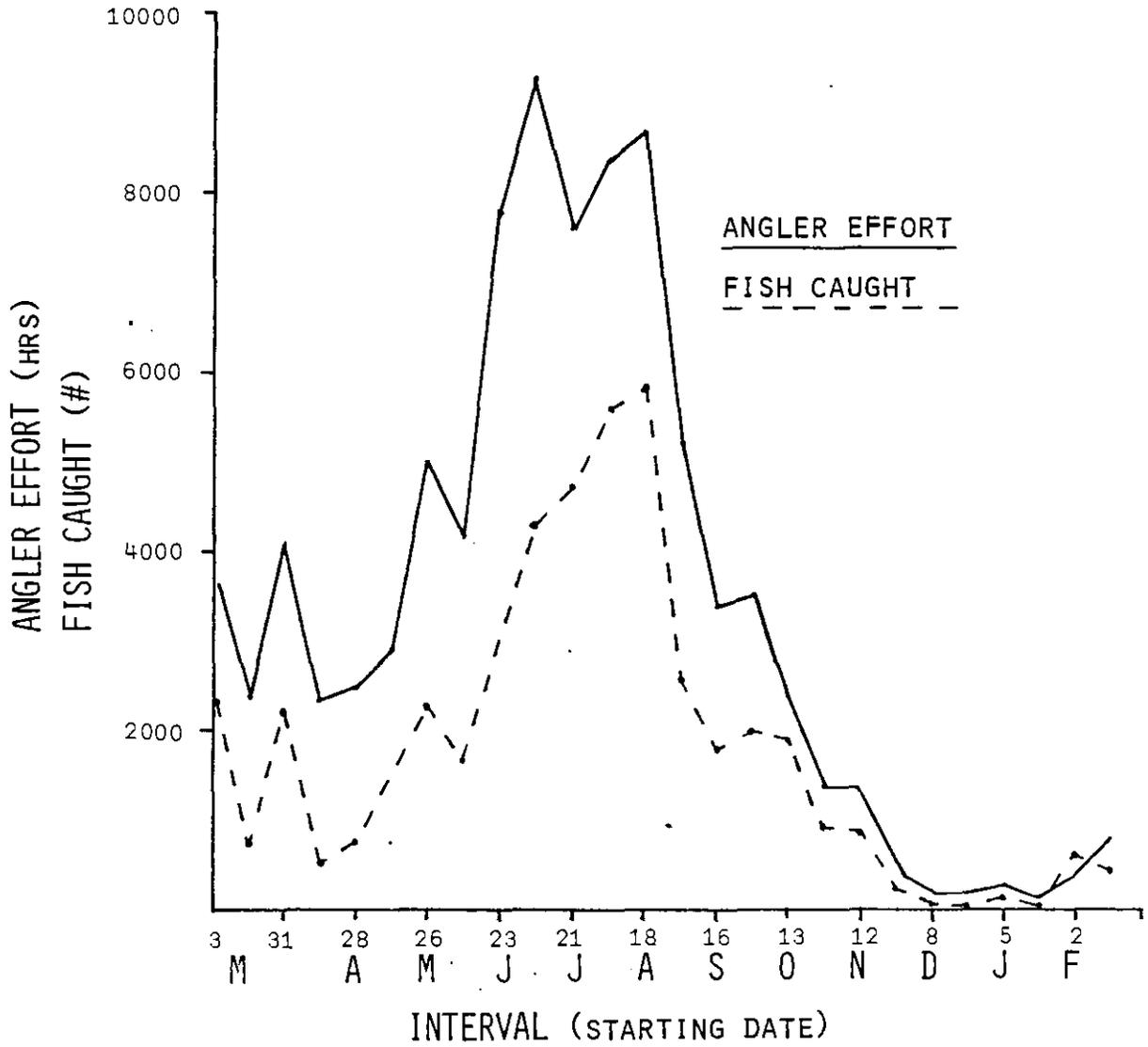


Figure 6. Angler effort and catch by 14-day census interval for all study sections, South Fork Snake River, 1979-80.

Table 3. Estimated angler effort (hrs) for each angler type by census section, South Fork Snake River, 3 March 1979 to 29 February 1980.

Section	Angler Type			Total
	Bank	Power Boat	Drift Boat	
1	11,285(72%)	1,595(10%)	2,748(18%)	15,628
2	3,258(27%)	3,956(33%)	4,779(40%)	11,993
3	1,250(10%)	6,103(48%)	5,361(42%)	12,714
4	5,353(36%)	6,097(41%)	3,506(23%)	14,956
5	15,930(93%)	508(3%)	690(4%)	17,128
6	4,275(76%)	665(12%)	702(12%)	5,642
7	<u>5,883(55%)</u>	<u>2,928(27%)</u>	<u>1,958(18%)</u>	<u>10,769</u>
Total	47,234(53%)	21,852(25%)	19,744(22%)	88,830

Table 4. Terminal tackle used (% anglers interviewed) by each angler type by section, South Fork Snake River, 3 March 1979 to 29 February 1980.

Section beginning at	Bank			Motorized boats			Non-motorized boats		
	Bait	Lure	Fly	Bait	Lure	Fly	Bait	Lure	Fly
1. Palisades Dam (n)	88	10 (474)	2	34	36 (49)	30	11	34 (71)	50
2. Irwin (n)	63	15 (110)	22	16	18 (116)	66	36	31 (164)	33
3. Granite Creek (n)	53	24 (17)	24	16	18 (213)	66	4	26 (161)	70
4. Black Canyon (n)	58	20 (144)	22	14	16 (185)	70	15	27 (123)	58
5. Heise Gauging Station (n)	65	12 (590)	23	0	0 (6)	100	37	13 (16)	50
6. Heise Bridge (n)	54	22 (169)	24	25	17 (24)	58	0	19 (21)	81
7. Archer-Ririe Highway Bridge (n)	53	23 (137)	24	36	30 (72)	33	9	39 (78)	52
Palisades Dam to Highway Bridge (n)	69	15 (1651)	17	23	24 (550)	53	11	24 (553)	64
Catch rate (fish/hr)	.33	.34	.95	.36	.21	.61	.33	.54	.77
% fish released	6	15	37	7	36	38	14	48	62

All angler types

	<u>Bait</u>	<u>Lure</u>	<u>Fly</u>
% anglers (n)	48 (1316)	19 (516)	33 (922)
Catch rate (fish/hr)	.34	.35	.73
% fish released	7	37	46

Table 5. Comparative creel census statistics, South Fork Snake River, 1966-1979.

Year	Catch rate (trout/hour)	Angler Effort (hours)	Percent composition of the catch					Area	Reference
			Ct	Wf	Brn	Rb	Mak		
1966	.50 (.42)	77,000 (54,827) <sup>1</sup>	97	3	.8		.1	Palisades Dam to Heise 1 June - 31 October	U.S. Fish & Wildlife Service (unpublished data)
1969	.42 (.43)	16,809 (14,956)	75	24	1			Black Canyon to Heise Gauging Station 30 May - 30 November	Jeppson (1970)
1970	.56 (.45)	17,377 <sup>2</sup> (40,335)	85	8	6	1	.3	Palisades Dam to Black Canyon 1 May - 30 November	Jeppson (unpub. data)
1972	.51 (.43)	33,390 (39,000)	75	20	2	3	.3	Palisades Dam to Heise 1 July - 30 September	U.S. Fish & Wildlife Service (unpublished data)
1973	.32 (.43)	no est.	56	37	6		.3	Palisades Dam to Henry's Fork All seasons covered 1 January - 31 December	Jeppson (1973) (sporadic creel checks)
1979	.43	88,830	72	15	9	4	.5	Palisades Dam to Henry's Fork 3 March 1979 -29 February 1980	Present study

<sup>1</sup> Numbers in ( ) are for the corresponding periods and sections from 1979 data.

<sup>2</sup> Under-estimated due to techniques used.

Bank anglers expended the majority of the effort, 53%, as compared to 25% by anglers using motorized boats and 22% by those using non-motorized craft (Table 3). Bank anglers were predominately bait fishermen (69% of those interviewed) while the majority of anglers using boats preferred artificial flies as terminal tackle. Lures were not a favored tackle for South Fork anglers (Table 4).

Angler effort for 1979-80 has declined slightly from previous studies (Table 5) but because of different census methods this may not indicate a trend. Some pressure from the South Fork may have been transferred to Ririe Reservoir since that fishery developed in 1976 (Jeppson, personal communication).

### Section 1

The area from Palisades Dam to Irwin (Sec. 1) encompasses 11.9 km (7.4 mi) with a 6-month season from 1 April to 30 September. Anglers expended 18% of the effort (15,628 hrs) in the 12% of the river encompassed by Section 1. Effort was greatest from 4 August to 17 August (2,439 hrs) (Table 2). High angler use also occurred in April and May prior to the general season opener, indicating the eagerness of anglers to get out in the spring. Section 1 exhibited the second most intensive fishery of 1,313 hr/km (2,112 hr/mi), on the river, mainly due to ease of access for bank anglers (Table 6). Bank anglers represented 72% of the effort while 10% used motorized boats and 18% used non-motorized craft. The majority of the bank angler effort was in the after-bay of Palisades Dam (Table 4).

### Section 2

Anglers fished 11,993 hours in Section 2, Irwin to Granite Creek, an area covering 16.4 km (10.2 mi). This area was open during the 6-month general season, 26 May to 30 November, and the effort represents 14% of the river total in 15% of the river area. Boat anglers expended 73% of the effort, 33% from motorized boats and 40% from non-motorized craft (Table 3). Although this area has roads along the river, good access is limited to a few locations at boat ramps and bridges. Effort in Section 2 peaked with the interval (13) ending 13 August, declining substantially until the end of the season (Table 2).

### Section 3

Section 3, Granite Creek to Black Canyon (15.8 km/9.8 mi), sustained 12,714 hours of angler effort. This represents 14% of total effort within 16% of the river study area. Section 3 is open for the general trout season only. Boat anglers represented 90% of the effort, 48% using motorized boats and 42% using non-motorized craft (Table 3). The low bank angler effort (10%) was expected as there is no road access in this portion of the South Fork Canyon. Effort per unit area was 806 hr/km (1,297 hr/mi) (Table 6), the third highest for the river. Effort was greatest from 7 July to 20 July, the period of peak stonefly hatch, holding steady until the end of September, when it declined to 0 by 12 November, 3 weeks before the end of the season. This was due primarily to the shorter daylight hours, making float trips difficult to complete in 1 day (Table 2).

Table 6. Catch, harvest and effort (hr) per river kilometer by census section, South Fork Snake River, 3 March 1979 to 29 February 1980.

Section (beginning at)	km (mi)	Effort/ km (mi)	No. of trout/km (mi)	
			Catch	Harvest
1. Palisades Dam	11.97 (7.4)	1,313 (2,112)	285 (453)	213 (343)
2. Irwin footbridge abutments	16.4 (10.2)	731 (1,176)	405 (651)	219 (353)
3. Granite Creek	15.8 (9.8)	806 (1,297)	511 (822)	225 (362)
4. Black Canyon	20.3 (12.6)	738 (1,187)	314 (505)	227 (365)
5. Heise Gauging Station	6.1 (3.8)	2,801 (4,507)	1,136 (1,828)	1,021 (1,643)
6. Heise Bridge	6.6 (4.1)	855 (1,376)	364 (586)	314 (506)
7. Archer-Ririe Highway Bridge	24.0 (14.9)	452 (728)	183 (295)	151 (243)
Entire river	101.0 (62.8)	879 (1,415)	378 (608)	260 (418)

Note - Sections 5, 6, and 7 are open to year-round fishing while Sections 1, 2, 3, and 4 are open for 6-month seasons.

#### Section 4

Section 4, Black Canyon to the Heise gauging station (20.3 km/12.6 mi) is the roaded portion of the South Fork Canyon. Anglers fished 12,714 hours in Section 4 which represented 14% of the effort sustained in 20% of the river. Boaters expended 64% of the effort, 41% in motorized boats and 23% in non-motorized craft. Much of the non-motorized boat use consisted of continuing trips which originated in Section 3. Although bank anglers are limited to the north side of the river they still contributed 36% of the effort. Effort per km was 738 hrs (1,187 hr/mi) nearly identical to Sections 2 and 3 (Table 6). As in Section 3, effort peaked during the 7 July to 20 July interval, the period of peak stonefly emergence, declining gradually to zero 1 week prior to the close of the general season (Table 2).

#### Section 5

Section 5, from the Heise gauging station to the Heise Bridge, 6.1 km (3.8 mi), produced 17,128 hours of estimated angler effort during the census period 3 March 1979 to 29 February 1980. The river below the Heise gauging station is open to fishing year-round. This was the most intensive fishery on the river, with 2,801 hr/km (4,507 hr/mi) (Table 6) or 6% of the river area sustaining 20% of the effort. Even when the 12-month season is factored into this figure, this shortest census section still remains the most heavily fished area of the South Fork. This was primarily the result of excellent road access to the river from irrigation head-gate roads and Section 5's location near Heise, a favorite recreation area for local residents. Bank anglers expended most of the effort (93%), while fishermen using motorized and non-motorized boats expended 3 and 4% of the effort, respectively (Table 3). Effort was highest during the spring and declined with the opening of the general season, indicating anglers had moved to other waters. Other than a peak in effort from 23 June to 20 July (Independence Day holidays) the summer fishery remained fairly constant. The least amount of effort seen was during early January, when the weather was the coldest. Even though effort declined with the onset of the general season, half (48%) of the effort in Section 5 was observed during that 6-month period (Table 2).

#### Section 6

Anglers fished an estimated 5,642 hours (Table 2) in the area from the Heise Bridge to the Archer-Ririe Highway Bridge (Sec. 6) during the 12-month period from 3 March 1979 to 29 February 1980. This 6.6 km (4.1 mi) section which contains 7% of the total river area sustained 6% of the total effort. The unit area effort of 855 hr/km (1,376 hr/mi) was only 31% of that in Section 5 (Table 5). This illustrates the effect of access, as both sections are similar, except that Section 6 road access is less available to bank anglers. Bank, motorized boat and non-motorized boat anglers expended 76%, 12% and 12% of the effort, respectively (Table 3). Peak angling pressure occurred from 18 August to 31 August, being practically nonexistent during the winter months (Table 2).

#### Section 7

Anglers fished an estimated 10,769 hours in the 24 km (14.9 mi) lower portion of the South Fork from the Archer-Ririe Highway Bridge to the mouth of the Henrys Fork, Section 7 (Table 2).

Table 7. Estimated angler catch (C) and harvest (H) by section for species and angler type, South Fork Snake River, 3 March 1979 to 29 February 1980.

Species		Census section							Total
		1	2	3	4	5	6	7	
WCT	H	1052	3152	3179	3746	5364	1500	2981	20,974
	C	1853	5973	7485	5329	6034	1799	3697	32,170
HCT	H	725	67	71	332	53	0	8	1,256
	C	725	67	71	332	53	0	8	1,256
WF	H	351	395	199	542	1889	747	230	4,353
	C	489	1027	1414	1099	2364	1892	346	8,631
Brn	H	536	331	198	450	658	334	254	2,761
	C	573	422	367	583	691	363	316	3,315
Wrb	H	0	46	95	73	126	84	100	524
	C	0	77	117	117	126	84	100	621
Hrb	H	102	0	0	0	43	155	275	575
	C	102	0	0	0	43	155	275	575
Lake	H	125	9	8	0	0	0	0	142
	C	135	99	15	7	0	0	0	256
All trout	H	2540	3605	3551	4601	6244	2073	3618	26,232
	C	3388	6638	8055	6368	6947	2401	4396	38,193
Game fish	H	2891	4000	3750	5143	8133	2820	3848	30,585
	C	3877	7665	9469	7467	9311	4293	4742	46,824
<u>Angler type</u>									
Bank 1/	H	2059	1211	319	1369	5778	1498	1789	14,023
	C	2177	1433	756	1890	6346	1597	2317	16,516
Motorized boat 1/	H	163	1602	1854	2263	382	365	849	7,478
	C	163	2934	2976	3063	382	401	984	10,903
Non-motorized boat 1/	H	318	792	1378	969	84	210	980	4,731
	C	1048	2271	4323	1415	219	403	1095	10,774

1/ Trout only

H = fish harvested, those fish kept by the angler  
 C = all fish caught, includes fish harvested and fish released

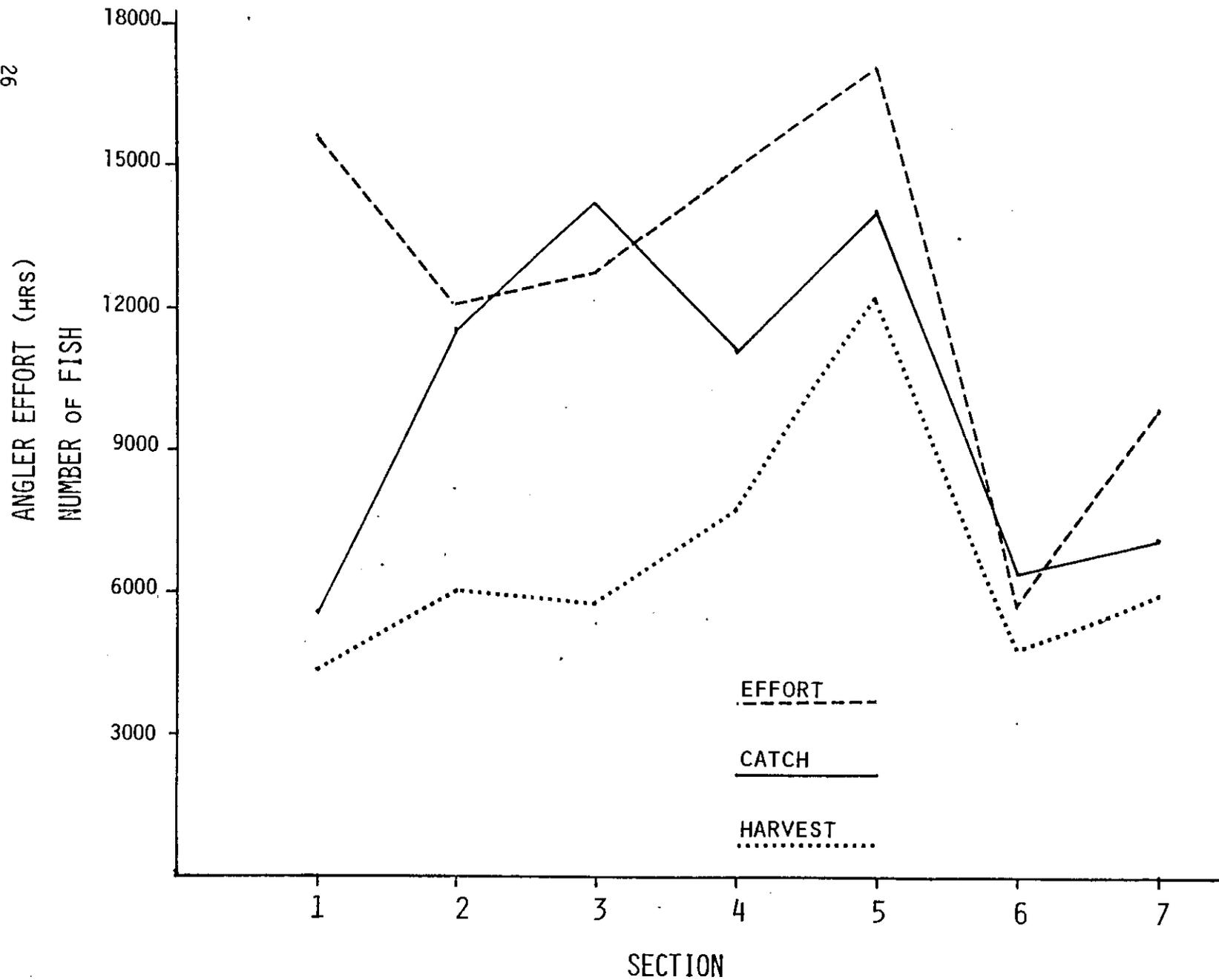


Figure 7. Effort, catch, and harvest by census section for all game fish, South Fork Snake River, 3 March 1979 to 29 February 1980.

Table 8. Catch rates by section for species and angler type for harvest (H) and total catch (C), South Fork Snake River, 3 March 1979 to 29 February 1980.

Species		Census section							Total
		1	2	3	4	5	6	7	
Wct	H	.07	.26	.25	.25	.31	.27	.28	.24
	C	.20	.50	.59	.36	.35	.31	.34	.36
Hct	H	.05	.006	.006	.02	.003		.001	.01
	C	.06	.006	.006	.02	.003		.001	.01
Wf	H	.02	.03	.02	.04	.11	.13	.02	.05
	C	.03	.09	.11	.07	.14	.34	.03	.10
Brn	H	.03	.03	.02	.03	.04	.06	.02	.03
	C	.04	.04	.03	.04	.04	.06	.03	.04
Wrb	H		.004	.007	.005	.007	.01	.009	.006
	C		.006	.01	.008	.007	.01	.009	.007
Hrb	H	.007				.003	.03	.03	.006
	C	.007				.003	.03	.03	.006
Lake	H	.008	.0008	.0006					.002
	C	.009	.08	.001	.0005				.003
Trout	H	.16	.30	.28	.31	.36	.37	.34	.30
	C	.22	.55	.63	.43	.41	.43	.41	.43
Game fish	H	.19	.33	.29	.34	.47	.50	.36	.34
	C	.25	.64	.74	.50	.54	.76	.44	.53
<u>Angler type 1/</u>									
Bank	H	.18	.37	.26	.26	.36	.35	.30	.30
	C	.19	.44	.60	.35	.40	.37	.39	.35
Motorized boat	H	.08	.40	.30	.37	.75	.55	.29	.34
	C	.10	.74	.49	.30	.75	.60	.34	.50
Non-motorized boat	H	.12	.17	.26	.28	.12	.30	.50	.24
	C	.38	.48	.81	.40	.32	.57	.56	.55

1/ Trout only

H = fish harvested, those fish kept by the angler  
 C = all fish caught, includes fish harvested and fish released

This is the least intensive fishery on the river, with 24% of study area sustaining 12% of the effort, or 452 hr/km (728 hr/mi), from 3 March 1979 to 29 February 1980 (Table 4). Bank, motorized boat and non-motorized boat anglers expended 55%, 27% and 18% of the effort, respectively (Table 3). Effort was greatest during March and April, dropping with the opening of the general season. There was a summer peak in use associated with the Independence Day holidays (28 June to 6 July) and the stonefly hatch (Table 2).

We also noted some anglers fishing through the ice in backwater areas during January and February but their catch is unknown due to lack of interviews.

Angler counts were not made in Section 7 from 3 March to 30 March (Intervals 1 and 2) and from 8 December to 29 February (Intervals 21-26). Effort for those intervals not counted was estimated as that percent of the total that occurred during the same census interval in Sections 5 and 6.

### Catch and Harvest

Anglers on the South Fork caught an estimated 46,824 game fish, harvesting 30,585 fish from 3 March 1979 to 29 February 1980 (Table 7). Overall catch rates were .53 fish/hr for all game fish and .43 fish/hr for trout only (Table 8). Anglers released 31% of their trout, but a great variation in release rate between angler types was evident, with bank anglers releasing 15% of their catch, motorized boat anglers 31% and non-motorized boat anglers 66% (Table 7).

Release rates also varied with species and river section, but appears related to the predominant angler type which was fishing a given area (Table 7 and Fig. 7).

Non-motorized boat anglers had the highest total success rate, with .55 trout/hr, catching 28% (10,774) of the trout with 22% of the effort. This was followed closely by motorized boat anglers with .50 trout/hr, catching 29% of the trout with 25% of the effort. Bank anglers had a lower success rate (.35 trout/hr), but because they expended more effort (53%) they caught the most fish, 16,516 or 43% of the total (Table 8).

Anglers fishing Section 3, Granite Creek to Black Canyon, caught the most trout, 9,469 (20%), and had the best success rate, .63% trout/hr. Non-motorized boat anglers from Section 3 experienced the highest seasonal catch rate, .81 trout/hr, for any angler type in any section. Anglers in Section 6, Heise Bridge to Archer Bridge, had the highest total catch rate of .76 fish/hr. Mainly a result of the large number of whitefish caught in this stretch; 44% of the game fish caught in Section 6 (Tables 7 and 8).

Anglers harvested 1,021 trout/km (1,643 trout/mi) in Section 5. This was over three times higher than the next highest section. The harvest rate for the river above the Heise gauging station was nearly the same for all sections, at about 218 trout/km (350 trout/mi), even though the total catch per unit varied greatly (Table 6).

Peak numbers of game fish caught occurred from 18 August to 31 August (Interval 13) with 5,867 fish (Fig. 6). Peak number of fish harvested occurred from 7 July to 20 July (Interval 10) (Appendix 8) which corresponds to the stonefly hatch.

### Cutthroat

Cutthroat were the most commonly caught fish on the South Fork with 33,426 caught and 22,230 harvested. This represented 73% of the fish caught and 72% of those creel. Hatchery cutthroat from Palisades Reservoir comprised 6% of the cutthroat harvested (Table 7). The catch rate for cutthroat was .35 fish/hr ranging from a high of .60 fish/hr in Section 3 to a low of .26 fish/hr in Section 1 (Table 8). Section 3 also had the largest number of cutthroat caught but Section 5 had the most harvested, which would not be expected considering its short length (Table 7). Peaks in catch occurred in June and July during the stonefly hatch. This was due to increased vulnerability of cutthroat and increases in fishing pressure.

### Whitefish

Whitefish represented 18% of the catch (4,353 fish) and 14% of the harvest (8,631 fish). Whitefish had the highest catch and release rate of 50% (Table 7), indicating whitefish are not a preferred fish by South Fork anglers. Catch rates for whitefish were .10 fish/hr, with a high in Section 6 of .34 fish/hr and a low in both Sections 1 and 7 of .03 fish/hr (Table 8). Whitefish can be readily taken by anglers seeking them, but most are taken incidentally by anglers seeking trout.

### Brown trout

Brown trout represented 7% of the estimated catch (3,315 fish) and 9% of the estimated harvest (2,761 fish) (Table 7). Only 17% of the brown trout caught were released, possibly because of their larger size. Catch rates for brown trout from the South Fork were very low, .04 fish/hr (25 hr/fish). Section 6 had the highest catch rate .06 fish/hr, with Section 5 having the greatest catch (Table 8). Although catch of brown trout was low they can be taken with fair consistency by anglers using lures in the proper habitat. Even though Section 1 is managed for brown trout by opening and closing the season early (1 April to 30 September) they are not caught with any greater consistency there than in other sections of the South Fork (Tables 7 and 8).

### Rainbow trout

Rainbow were found to represent 2% of the catch (1,196 fish) and 4% of the harvest (1,099 fish) (Table 7). This number also includes those fish identified as rainbow-cutthroat hybrids. Catch rates were low, -.03 fish/hr, indicating their low densities (Table 8). We estimated a harvest of 473 hatchery rainbow from the South Fork below the Heise gauging station (Table 7). During 1979, 4,200 catchable rainbow were stocked below the Heise Bridge (Idaho Department of Fish and Game 1979). Therefore, only 11% of the rainbow planted were estimated to have returned to the anglers creel. The only other area where hatchery rainbow were found was in Section 1. These fish most likely came from Yeaman Creek, where a pond is planted annually with about 1,000 catchable rainbow for a Boy Scout Camp (Appendix 1).

Wild rainbow trout (and rainbow-cutthroat hybrids) were caught in all areas of the river except Section 1 (Table 7). Many of these are believed to have come from tributaries which have been stocked with rainbow for many years (Appendix 1).

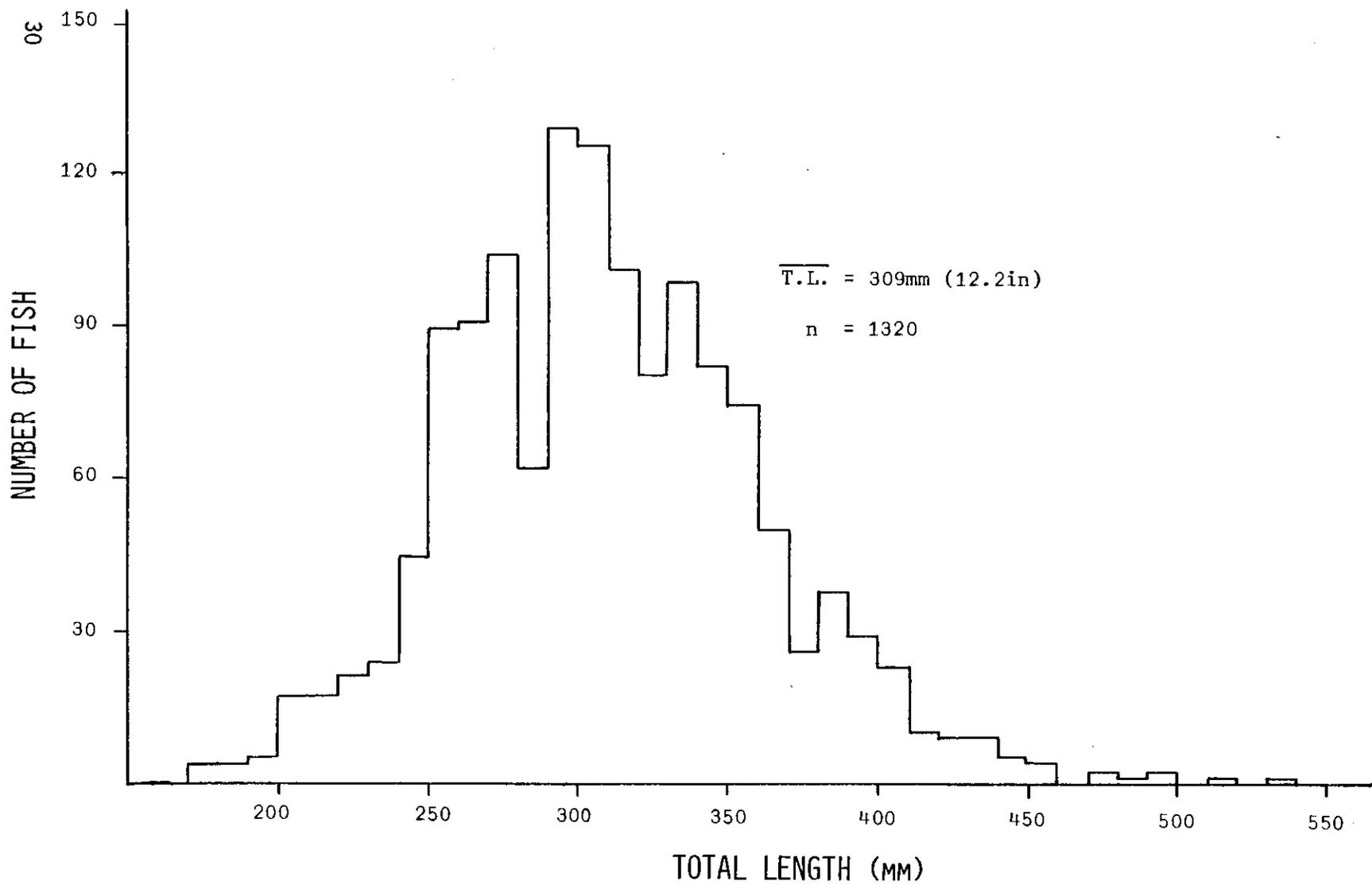


Figure 8. Length frequency of wild cutthroat trout from angler creels South Fork Snake River below Palisades Dam, 3 March 1979 to 29 February 1980.

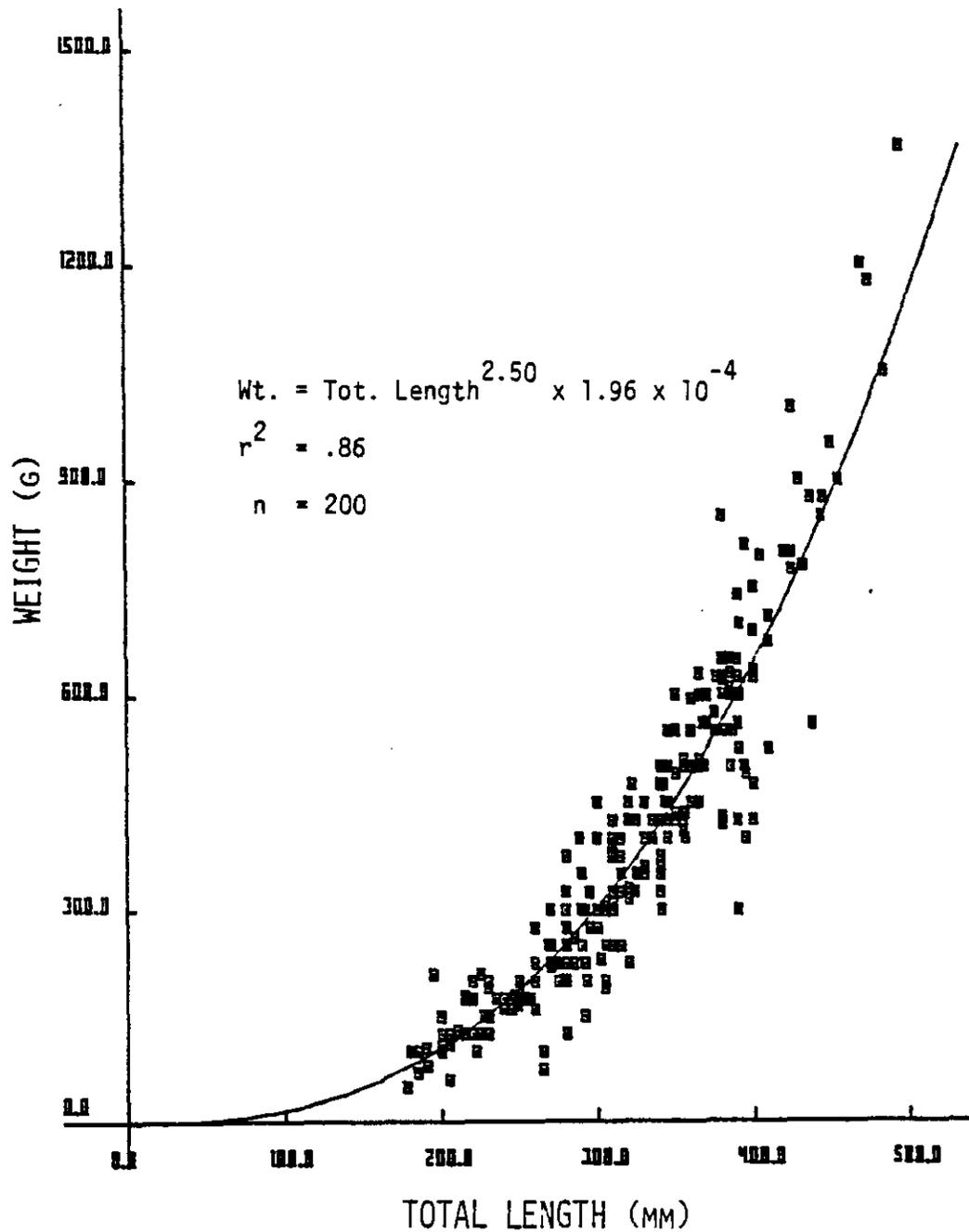


Figure 9. Length-weight relationship for wild cutthroat trout from the anglers creel South Fork Snake River below Palisades Dam, 3 March 1979 to 29 February 1980.

Table 9. Mean total length in mm (in) of fish measured from angler creels by section and species, South Fork Snake River, 3 March 1979 to 29 February 1980.

Species	Census section							All
	1	2	3	4	5	6	7	
Wild cutthroat	311(12.3) n = 78	337(13.3) 189	301(11.8) 277	321(12.7) 284	277(10.9) 254	310(12.2) 75	319(12.5) 163	309(12.2) 1320
Hatchery cutthroat	309(12.2) n = 41	328(12.9) 21	295(11.7) 4	258(10.1) 1	-	-	-	313(12.3) 67
Whitefish	315(12.3) n = 15	329(13) 13	348(13.7) 8	323(12.7) 14	300(11.8) 42	305(12) 2	292(11.5) 11	312(12.3) 105
Brown	393(15.5) n = 64	395(15.5) 20	375(14.8) 22	392(15.4) 31	344(13.5) 48	311(12.2) 19	343(13.5) 26	368(14.5) 230
Wild rainbow	239(12.4) n = 3	292(11.5) 1	309(12.2) 14	269(10.6) 3	350(13.8) 7	268(10.5) 3	272(10.7) 10	295(11.6) 41
Hatchery rainbow	246(9.7) n = 7	-	332(13.1) 1	-	322(12.7)	322(12.7)	286(11.2)	287(11.3) 5
Mackinaw (Laket.)	368(14.5) n = 3	-	257(10.1) 1	-	-	-	-	323(12.7) 5
Rainbow-cutthroat hybrid	342(13.5) n = 5	372(14.6) 5	279(11.0) 13	289(11.4) 3	321(12.6) 2	508(20.0) 1	227(8.9) 2	312(12.3) 31

## Lake Trout (Mackinaw)

Lake trout from Palisades Reservoir were caught infrequently, representing .5% of the catch and harvest, 256 and 142 fish, respectively. They are most commonly taken below Palisades Dam, with numbers caught decreasing with distance downstream, disappearing from the catch below Heise (Table 7). They do not appear to thrive in the river environment as most lake trout caught were in extremely poor condition.

### Length and Weight

#### Cutthroat trout

Cutthroat trout measured from angler's creels on the South Fork had a mean total length of 309 mm (12.2 in) (Fig. 8) and a calculated weight of 329 g (.72 lb) (Fig. 9). No significant difference in mean length was noted between wild and hatchery cutthroat. Section 2 cutthroat were the largest with a mean length of 336 mm (13.2 in) while those caught in Section 5 had the smallest mean total length of 227 mm (10.9 in) (Table 9). The largest cutthroat measured was 530 mm (20.9 in) and weighed 1.3 kg (3 lbs), caught in Section 5. Although 52% of the wild cutthroat measured were over 305 mm (12 in) total length only 4% were over 405 mm (16 in). Very few (.2%) cutthroat were measured larger than 510 mm (20 in) (Table 10). Comparison of lengths for cutthroat trout from the creel with past data for the South Fork indicates little change in mean total length. Jeppson (1970 and unpublished data) found the mean length of 888 cutthroat measured during 1969-70 in the angler's creel was 301 mm (11.8 in) with the largest being 560 mm (22 in). Their length frequency distribution was slightly different showing 41% over 305 mm (12 in) 6% over 405 mm (16 in), and 0.2% over 510 mm (20 in) for 1969 and 1970 seasons (Table 10). Length of the cutthroat trout in the Snake River, Wyoming, above Palisades Reservoir to Jackson Lake show little difference in mean length as compared to cutthroat taken below Palisades Dam. Cutthroat harvested above Palisades Reservoir from 1967 to 1975 displayed a mean length of 287 mm (11.3 in) with the largest fish generally being 550-585 mm (22-23 in) (Keifling 1972, Wiley 1969). Cutthroat larger than 380 mm (15 in) represented 9.5% of the harvest from the South Fork above Palisades Reservoir for 1967 to 1975 (Keifling 1978) while we found 10.2% for 1979 below Palisades Reservoir.

#### Whitefish

Whitefish measured from the angler's creels were 312 mm (12.3 in) mean total length (Fig. 10) and had a calculated weight of 256 g (.56 lb) (Fig. 11). Section 3 had the largest fish with a mean length of 348 mm (13.7 in) while Section 5 had the smallest fish, 300 mm (11.8 in) (Table 9). Whitefish sampled in 1969 exhibited a mean total length of 295 mm (11.6 in) (Jeppson 1970). Whitefish sampled with explosives in 1970 showed a mean length of 306 mm (12.1 in) (Jeppson, unpublished data) indicating length of whitefish taken by anglers is similar to that found in the population.

#### Brown trout

Brown trout from the angler's creel were found to have a mean total length of 368 mm (14.5 in) (Fig. 12) and a calculated weight of 546 g (1.2 lb) (Fig. 13) for the South Fork.

Table 10. Percent composition of wild cutthroat trout harvested by size groups and section, South Fork Snake River, 3 March 1979 to 29 February 1980.

Section beginning at	Larger than 305 mm (12 in)	Larger than 405 mm (16 in)	Larger than 510 mm (20 in)	Mean total length (mm)
1 Palisades Dam	53	0	0	311 n=78
2 Irwin	75	8	0.5	337 n=189
3 Granite Creek	44	2	0	301 n=277
4 Black Canyon	67	5	0	321 n=284
5 Heise Gauging Station 22		8	0.4	277 n=254
6 Heise Bridge	59	3	0	310 n=75
7 Archer Bridge	55	6	0	319 n=163
Palisades Dam to Henrys Fork	52	4	0.2	309 n=1320

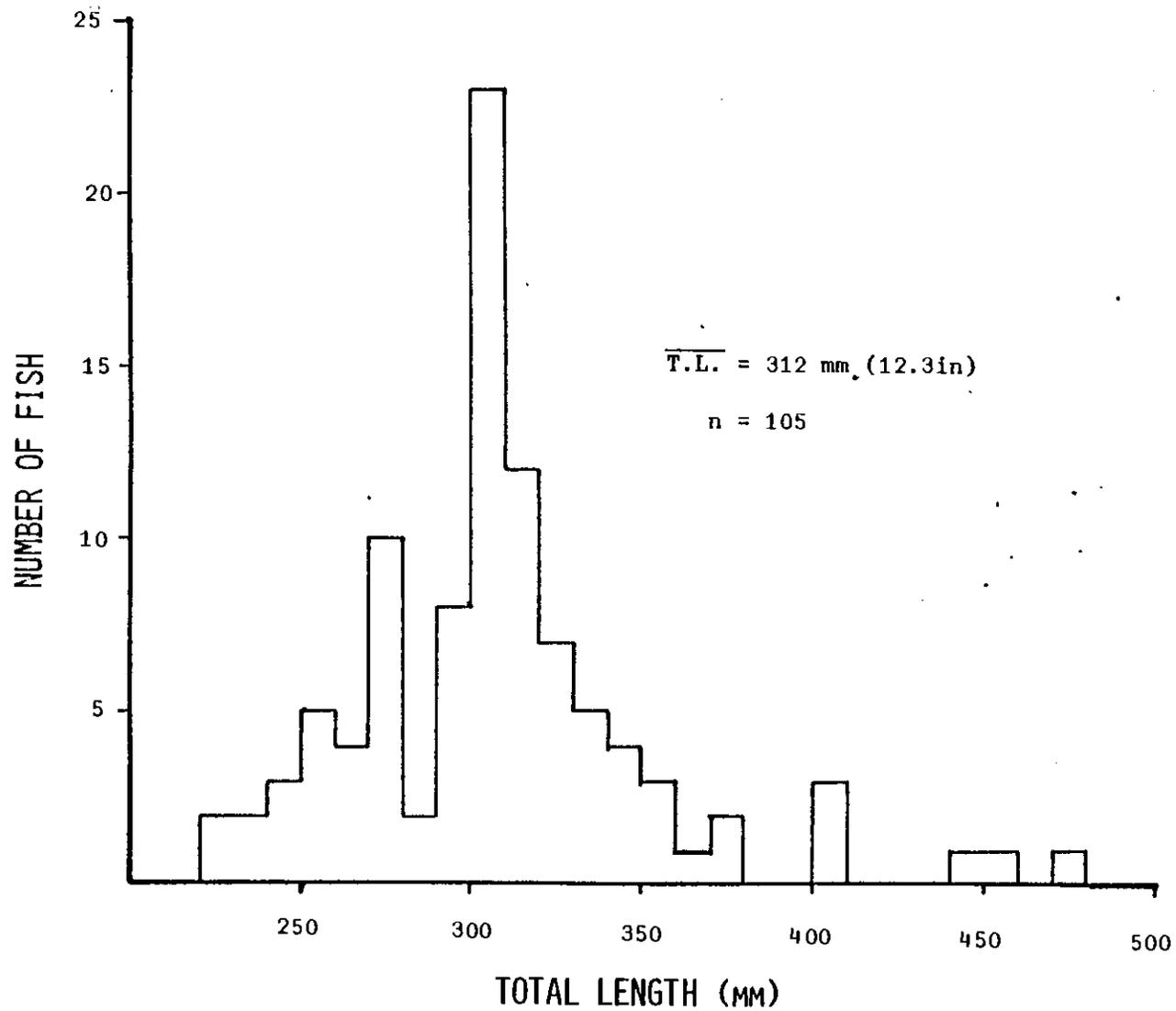


Figure 10. Length frequency of mountain whitefish found in angler creels, South Fork Snake River below Palisades Dam, 3 March 1979 to 29 February 1980.

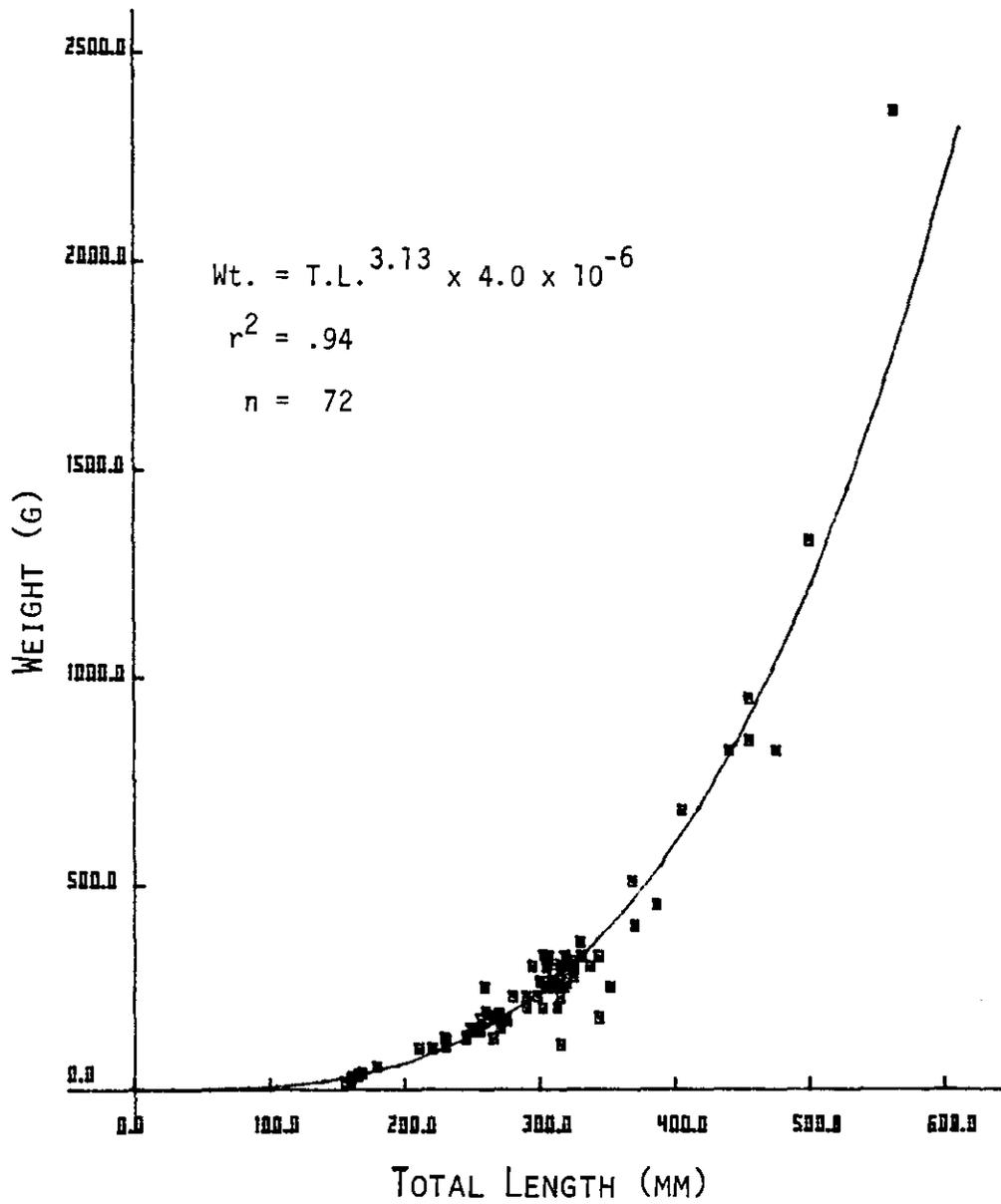


Figure 11. Length-weight relationship for mountain whitefish from angler creels South Fork Snake River below Palisades Dam, 3 March 1979 to 29 February 1980.

Browns from Section 2 were the largest at 395 mm (15.6 in) while those from Section 6 were the smallest at 311 mm (12.2 in) with the upper sections having the larger fish and the lower section the smaller (Table 9). The largest brown trout reported caught in 1979 was a 760 mm (30 in) fish weighing 7.7 kg (17 lb). The largest brown trout ever recorded caught from the South Fork was a 940 mm (37 in) fish weighing 11.6 kg (25 lb 10 oz) taken in 1970. This was only 70 g (2 oz) short of the state record (Post-Register 1970). Catches of brown trout over 510 mm (20 in) were common representing 8% of the catch with 30% being larger than 405 mm (16 in).

### Condition Factors

Condition factors (K) were calculated using  $K = W/L^3 \times 10^5$  where W = weight, in grams and L = total length in mm. K is a relative indicator of body plumpness as compared to length (Lagler 1956).

#### Cutthroat

Mean K for wild cutthroat was 1.1 with a trend of decreasing K (K = .88 at 500 mm) with increase in length (Fig. 9). This may have been caused by many of the larger cutthroat being caught shortly after spawning. Cutthroat from the Snake River above Palisades Reservoir in Wyoming displayed a mean K = .95 for 1967 to 1975 along with a decrease in K with increasing length (Keifling 1972, 1978, Wiley 1969).

#### Whitefish

Mountain whitefish taken from the angler creels displayed a mean K of .84. This compares to a mean K of .85 for whitefish in 1969 (Jeppson 1970). K for whitefish from the South Fork Boise River was found to be .92 (Moore et. al. 1978).

#### Brown trout

Brown trout had a mean K of 1.1, the same as the cutthroat. K declined slightly with increasing length, K = 1.05 at 600 mm (Fig. 13). Insufficient number of fish were available for trend determination over 600 mm, but the condition factor for the largest brown caught in 1979 (760 mm) was fairly high, K = 1.7.

### Tributary Stream Surveys

Most major tributaries to the South Fork (Fig. 1) were surveyed in cooperation with Targhee National Forest personnel. Some fisheries information was gathered but due to time constraints and equipment problems density and abundance estimates were not obtained. These will hopefully be completed in 1980. Quantitative habitat measurements were taken at selected transect sites in most tributaries. This data is presently being analyzed by Targhee National Forest personnel and will be available in 1980. Qualitative observations were also made on the tributaries in 1979 and are reported here. Several of the tributaries were surveyed in 1956 (Miller and Roby 1957) and 1969 (Jeppson 1970). Conditions in those tributaries below Palisades Dam have generally not changed much since its construction.

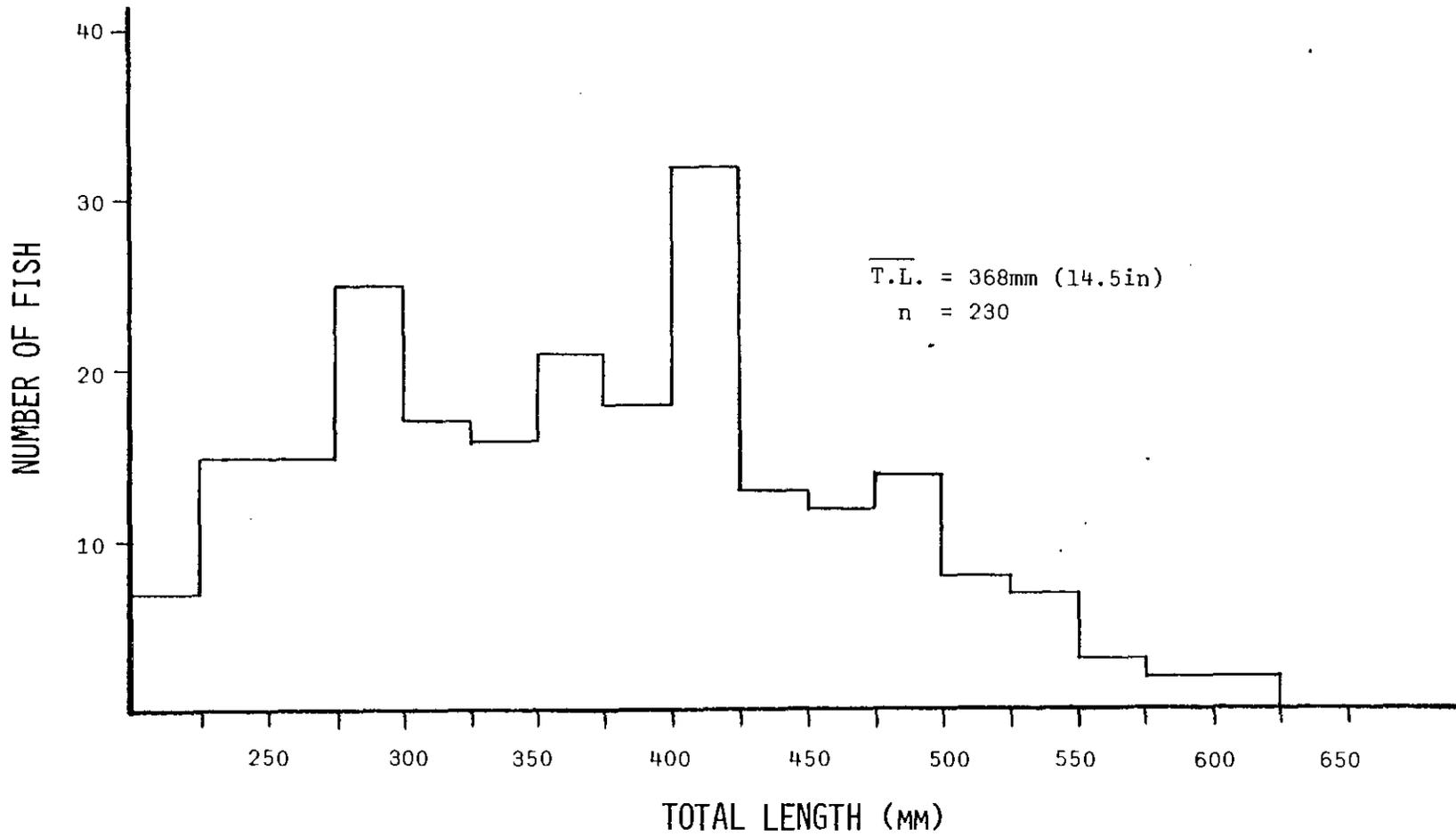


Figure 12. Length frequency of brown trout from angler creels, South Fork Snake River below Palisades Dam, 3 March 1979 to 29 February 1980.

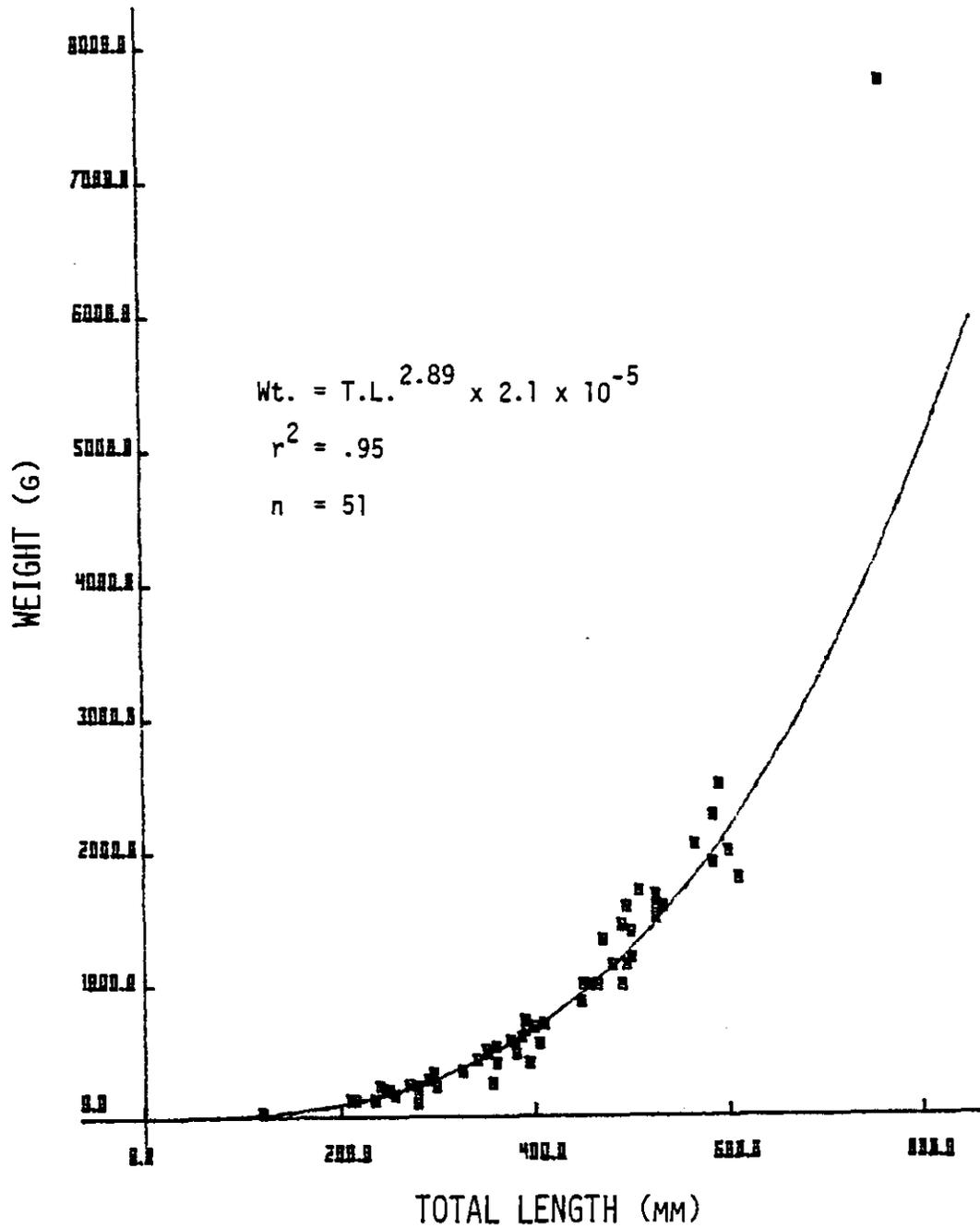


Figure 13. Length-weight relationship for brown trout from angler creels, South Fork Snake River below Palisades Dam, 3 March 1979 to 29 February 1980.

### Birch Creek

Birch Creek drains an area of 54.4 km<sup>2</sup> (21 mi<sup>2</sup>) and supports a minor trout fishery. Since Birch Creek no longer drains into the South Fork due to an intersecting irrigation canal, its fishery value to the river is minimal. We will be taking samples in Birch Creek to help identify the native cutthroat of the area.

### Antelope Creek

Antelope Creek drains an area of intense agricultural use on the south side of the river. Water quality and habitat are severely impacted in the lower creek but in the headwaters there is presently a self-sustaining population of trout. There is adequate spawning and rearing habitat in the headwaters, but whether trout can negotiate the steep gradient from the canyon to Antelope Flat is presently unknown. Recruitment to the river will be monitored in 1980 and 1981.

### Burns Creek

Burns Creek drains an area 54.6 km<sup>2</sup> (21.1 mi<sup>2</sup>) and has flows ranging from 8.8 m<sup>3</sup>/S (331 ft<sup>3</sup>/S) to .1 m<sup>3</sup>/S (4 ft<sup>3</sup>/S) and a gradient of 3-6%. It is considered to be a second order stream. Although Burns Creek is one of the smaller drainages on the South Fork it has been found to be the most important spawning tributary below Palisades Dam (Jeppson 1970). Stream improvement work was done during 1969 to increase spawning activity below the one irrigation diversion on the creek. Since substantial loss of fry has resulted to this diversion a fish screen is being installed and should be complete by June 1980.

Spawners enter Burns Creek in late May and June with spawning activity during 1979 peaking about 24 June. Cutthroat were still noted on redds in late July. Jeppson (1970) found 312 spawners in the lower 1.5 km (1 mi) of Burns Creek in 1969. There is about 5 km (3 mi) of good spawning habitat in Burns Creek. Because of the late run of the cutthroat up Burns Creek and the concentration of spawners, fishing is open only from 1 September to 30 November. We will be attempting to quantify the cutthroat production from Burns Creek in 1980 by using a weir to monitor migration. Redd counts will be made and correlated to total run size. The Burns Creek drainage has felt little impact from development due to lack of roads.

### Table Rock Creek

Table Rock Creek is a small first order stream which is intermittent near its mouth during the late summer and fall. A migration barrier was found about 10 m (30 ft) from its mouth at the South Fork. No fish have been observed in the headwaters.

### Black Canyon Creek

Black Canyon is a first order stream flowing into the South Fork from the north. Although no migration barriers exist there is no definite mouth into the river due to infiltration into the alluvium and riparian forest. Further survey work is planned for 1980 as no spawning surveys or shocking was undertaken in 1979.

### Pine Creek

Pine Creek drains an area of  $163.7 \text{ m}^2$  ( $63.2 \text{ mi}^2$ ), the largest tributary usable by spawners below Palisades Dam. Mean flows vary from  $22.6 \text{ m}^3/\text{S}$  ( $799 \text{ ft}^3/\text{S}$ ) to  $.06 \text{ m}^3/\text{S}$  ( $2 \text{ ft}^3/\text{S}$ ). Pine Creek is a third order stream and displays good stream habitat with much spawning area about 6 km (3.8 mi) from its mouth. The lower 6 km flow through a steep sided canyon with fair to poor spawning habitat of boulder-rubble bottom with abundant silt deposits. The creek above the canyon flows through a flat valley with moderate gradient. Riffle pool structure is good but some bank damage due to grazing is present. Pine Creek has three forks which all have suitable spawning habitat. No season restrictions (other than general season) are presently in effect on Pine Creek and catchable rainbow are stocked annually.

Electrofishing surveys and angler checks show good populations of fingerling cutthroat present and some spawners in angler creels. Pine Creek has a self-sustaining population of cutthroat but their contribution to the South Fork is unknown. Few fry were taken in a fry trap during August 1979 near its mouth. Fish sampled ( $n = 16$ ) by rod near the mouth were 125 to 250 mm (4.9 to 9.8 in) total length with a mean of 168 mm (6.6 in).

Pine Creek will be weired in 1980 to determine its contribution to the South Fork fishery. Population estimates will be undertaken to determine if the cutthroat in Pine Creek are residential or migratory. Descriptions of Pine Creek by Miller and Roby (1957) in 1956 indicates few changes have occurred in the drainage except increased siltation.

### Pritchard Creek

Pritchard Creek is a small second order stream draining an area of  $82.9 \text{ km}^2$  (32 mi) south of the river near Conant Valley. Pritchard Creek has excellent habitat and a good population of cutthroat. About 1 km (.6 mi) from its mouth Pritchard Creek is dammed forming a reservoir of about 1.6 ha (4 acres) from which water is diverted to adjacent fields for irrigation. Only for about 3 weeks in May and June does water spill and flow in the natural channel to the river. The spillway is a migration barrier preventing fish from the river from entering the creek above the dam. Whether fish migrate out of Pritchard Creek is unknown at this time. Cutthroat from Pritchard Creek will be used for taxinomial comparisons to South Fork cutthroat.

### Rainey Creek

Rainey Creek drains an area of  $145.8 \text{ m}^2$  ( $56.3 \text{ mi}^2$ ) which includes the northern half of Swan Valley. Flows vary from  $10 \text{ m}^3/\text{S}$  ( $347 \text{ ft}^3/\text{S}$ ) to  $.6 \text{ m}^3/\text{S}$  ( $20 \text{ ft}^3/\text{S}$ ), most of which is diverted at one of five headgates. Rainey Creek is divided into Upper and Lower areas, because as it flows out of the mountains it enters a porous alluvium and the five diversions become nearly dry. It picks up flow again in the valley from springs before reaching the river. Several of the irrigation diversions create downstream migration problems (Miller and Roby 1957). Upper Rainey Creek has a good population of wild cutthroat ranging from 75 to 275 mm (3.0 to 10.8 in). Hatchery catchable rainbow are presently planted in Pritchard Creek (Appendix 3). Degradation to Lower Rainey Creek is severe from dewatering and siltation. Rainey Creek was considered by Miller and Roby (1957) to possess the greatest potential for substantial increases in recruitment to the South Fork. Rainey Creek has changed little since their description of 1956.

Table 11. Brown trout redd counts (air), South Fork Snake River below Palisades Dam

	Distance		11-13-79	11-20-79	12-11-79	2-7-80 <sup>(1)</sup>
	km	(mi)				
Afterbay of Palisades Dam	.8	( 0.5)	6	no count	45	34
Afterbay to Irwin	11.3	( 7.0)	0	0	0	0
Irwin to Conant Valley Boat Ramp	16	( 9.9)	9	9	6	9
Conant Valley to Burns Creek	16.3	(10.1)	7	19	89	49
Burns Creek to Anderson Diversion (near Heise)	20.8	(12.9)	3	0	14	8
Anderson Diversion to Heise Bridge	5.6	( 3.5)	0	0	4	1
Heise Bridge to Twin Bridges (Hiway 48)	6.6	( 4.1)	0	0	2	10
Twin Bridges to Mouth	<u>24.0</u>	<u>(14.9)</u>	<u>3</u>	<u>6</u>	<u>12</u>	<u>7</u>
	101.2	(62.9)	28	34	172	118

1) Flew downstream instead of upstream because of glare

### Fall Creek

Fall Creek drains an area of 201 km<sup>2</sup> (77.6 mi<sup>2</sup>) and has flows of 8.3 m<sup>3</sup>/S (292 ft<sup>3</sup>/S) to .2 m<sup>3</sup>/S (8 ft<sup>3</sup>/S), the largest tributary below Palisades Dam. Because of a vertical 10-m (33-ft) drop at its mouth it is inaccessible to river spawners. Whether production from the Fall Creek's trout population furnishes substantial recruitment to the South Fork is unknown. Tagging of fish in the creek will be undertaken to determine if movement into the river occurs.

### Indian Creek

Indian Creek is a short second order stream flowing into the South Fork from the south near Irwin. Although small and severely degraded by cattle grazing, Indian Creek has a viable population of cutthroat. We surveyed Indian Creek on 11 July 1979 and noted 8 to 10 active redds with cutthroat approximately 200 to 250 mm (7.9 to 9.8 in) in length on them. Electrofishing revealed good population structure with all size classes from 75 to 350 mm (3.0 to 13.8 in) represented. There appear to be no migration barriers in this tributary and further sampling will be undertaken to determine its value to the South Fork fishery.

### Palisades Creek

Palisades Creek is the first creek with a fishery to enter the South Fork below Palisades. It drains an area of 156 km<sup>2</sup> (60.2 mi<sup>2</sup>) and has flows of 17.3 m<sup>3</sup>/S (611 ft<sup>3</sup>/S) to .2 m<sup>3</sup>/S (7 ft<sup>3</sup>/S). Two mountain lakes with wild cutthroat are in the headwaters. Palisades Creek has excellent spawning and rearing habitat with no major migration barriers. The potential for Palisades to produce recruitment to the South Fork appears high but due to a diversion about 1 km (.6 mi) from its mouth most fish are lost (Miller and Roby 1957). The Palisades Canal diverts approximately 95% of the flow during irrigation season, resulting in large losses to the fishery (Jeppson 1970). This has long been a high priority diversion for screening but has not yet been funded. We will be weiring Palisades Creek above the canal in 1980 to quantify its present recruitment potential to the river as well as spawner movement upstream. Shocking transects will be established to determine the extent of the resident population.

### Brown Trout Redd Counts

Brown trout redds were observed by boat while conducting angler counts, 11 November 1979. Four aerial surveys were subsequently conducted during November, December and February. No flights were undertaken in January due to unfavorable flying weather.

Spawning activity peaked in early December with a maximum of 172 redds counted from Palisades Dam to Henrys Fork mouth (Table 11).

The highest density of brown trout redds were found in the .8 km (.5 mi) directly below Palisades Dam. The afterbay has historically produced many large trout (Jeppson 1979). The largest number of redds were counted in the canyon area from Conant Valley to Burns Creek. Redds were concentrated above Pine Creek (20), near Dry Canyon (10), and at the mouth of Black Canyon (16). No redds were counted in the area from the afterbay to Irwin (Section 1), lack of good habitat and spawning gravel (U.S. Fish and Wildlife Service 1958a) may account for this. In those sections open where fishing pressure occurs during November many mature brown trout are caught (Appendix 8).

Table 12. Trout counted in snorkel transects, South Fork Snake River, 1979.

Date	Transect	Distance	Trout counted			Trout/Km	Comments
			Cutthroat	Brown	Rainbow		
3 Oct	Eagle Rock Canal headgate to Heise bridge (Sec 5)	2.4 km (1.5 mi)	78	1	1	33	North Bank
3 Oct	Rapps Ferry to Eagle Rock Canal (Sec 5)	1.8 km (1.1 mi)	12	0	0	7	South Bank
26 Oct	UP railroad bridge to Archer-Ririe Highway Bridge (Sec 6)	2.4 km (1.5 mi)	174	25	5	85	North Bank
8 Nov	From 3.2 Km (2 mi) above Wolf Flat access to the access (sec 4)	3.2 km (2 mi)	110	5	2	37	Alternate sides in best holding water
16 Nov	Palisades Dam (closed area cable) to Irwin gauging station (Sec 1)	1.9 km (1.2 mi)	22 (species unknown)			12	4 men counting in different areas, visibility poor

We will monitor movement and redd densities of brown trout in 1980.

### Snorkel Transects

Snorkel transects were established during October 1979 in low flows of about  $93 \text{ m}^3/\text{S}$  ( $1,000 \text{ ft}^3/\text{S}$ ). All trout seen were counted in the established transects. Visibility was limited to about 3 to 5 m (10 to 15 ft), making deep pools difficult to count. Snorkeling was terminated in November due to the large amounts of plant material suspended in the water which made visibility extremely poor. The highest density of trout counted was the transect in Section 6 below the Union Pacific Railroad Bridge (Table 12). This area has no road access and many snags and undercut banks. The lowest counts were in Section 1 below the dam which may be due to low visibility. Most trout counted were associated with pools below riffles, snags in the river, or banks with good riparian vegetation. Whitefish were not counted because of their high densities. Whitefish were noted in shallower water at the middle or tail ends of a run. Many juvenile white fish, 75-150 mm (3.0-5.9 in), were seen inhabiting areas of swift, shallow ( $< .3 \text{ m}$ ) water at the very tail ends of runs before they broke into a riffle. Large numbers of suckers (two species) were noted in all transects except below Palisades Dam.

We also noted trout moving out of our field of vision as we approached them, often before they were counted. This made it difficult to get total counts when cutthroat were schooled and to determine species composition. Juvenile cutthroat tended to be found in schools in the slower water of pools and shallow water along runs.

Further snorkel work will be undertaken with more transects established, but the value of snorkeling in the South Fork for trend counts appears somewhat limited.

### Angler Residence and Opinion Survey

Idahoans comprised 92% of the anglers interviewed on the South Fork in 1979 (Table 13 and Appendix 6). Residents who lived in the counties adjacent to the South Fork (Bonneville, Madison, Jefferson) comprised 79% of all anglers interviewed, with Bannock and Bingham (Pocatello and Blackfoot) represented by 19% of the anglers. Nonresidents from 19 states represented only 8% of the anglers interviewed.

Angler opinions were surveyed as time and conditions allowed. Of those anglers asked if they would favor a restriction on motorized boats, 60% were in favor, 29% were opposed and 11% had no opinion (Table 14). Those anglers questioned if they would favor a restriction on fishing from all boats 20% were in favor, 67% were opposed and 13% had no opinion. Anglers were also asked if they would favor or oppose some form of restrictive regulation if overharvest were found to be a problem. The majority (55%) were in favor of this, 28% were opposed and 17% had no opinion.

### Contribution of Palisades Reservoir Trout on the South Fork Snake River Fishery

Hatchery cutthroat trout from Palisades Reservoir comprised 6% (1,256 fish) of the cutthroat harvested from the South Fork. The majority (58%) of these fish were caught from Section 1 (the upper 11.9 km of the river immediately below Palisades Dam) where they provided 41% of the cutthroat harvested (Table 7).

Table 13. Angler residency by county and state from anglers interviewed, South Fork Snake River, 1979.

County	City	%	no.
Bonneville	Idaho Falls	60	1,288
Jefferson	Rigby	14	309
Bannock	Pocatello	5	109
Bingham	Blackfoot	5	98
Madison	Rexburg	5	98
Teton	Driggs	1	22
Ada	Boise	1	16
Fremont	St. Anthony	4	7
Others		<u>1</u>	<u>31</u>
		92	1,978
California		3	54
Utah		2	48
Colorado		1	15
Other States (16 represented)		<u>3</u>	<u>55</u>
		8	172

Table 14. Angler opinion survey, South Fork Snake River, 1979.

Question	Yes	No	No Opinion
If fishing from motorized boat is shown to be a major cause of a decline in the South Fork fishery, would you favor a restriction on fishing from boats with a motor attached?	60%	29%	11%
Number interviewed = 384			
If fishing from all types of boats is shown to be a major cause of the decline in the South Fork fishery, would you favor a restriction on boat fishermen?	20%	67%	13%
Number interviewed = 287			
	<u>Favor</u>	<u>Opposed</u>	<u>No Opinion</u>
Would you be in favor of or opposed to some form of restrictive regulation if we find overharvest on the South Fork is a problem?	55%	28%	17%
Number interviewed = 264			

Although the cutthroat from Palisades Reservoir are not extremely important to the whole river fishery they do provide a significant portion of the catch in the area immediately below Palisades Dam. Any increased mortality created by changes in the Palisades Dam and Powerplant could adversely affect this segment of the South Fork cutthroat fishery.

## DISCUSSION

### Creel Census

Fishing effort on the South Fork Snake River has declined since the mid-sixties while the overall catch rate has remained about the same. The decrease in effort appears related to anglers moving to Ririe Reservoir when it was opened to fishing in 1976, and not to a decline in the South Fork fishery. Since different methods were used to estimate angler effort in the past the changes seen may not be real, but we feel they are. The intensity of effort in Section 1 and 5 appear related to access as these are not the areas of best fishing. The areas of best access on the Snake River above Palisades Reservoir were shown to provide the most fishermen use but were not the best fishing (Wiley 1969). Conversely Section 7 had the lowest effort and the poorest access for public use.

Changes in catch rate have been used by many investigators as an indication of the well being of a fishery (Moore, et. al. 1979; Wiley 1969; Keifling 1972; Bjornn, et. al. 1979). Decreases in catch rates over several years have been suggested to indicate declines in fisheries (Lagler 1952). The annual catch rates of the South Fork have remained fairly constant since 1966 (Table 5) and indicate little change in the fishery. There is a large amount of variation in catch rates by section and time (Table 6 and Appendix 1). These variations appear related to the differences in terminal tackle used in each section and seasonal changes in flow. Higher catch rates have been correlated to lower flows in the South Fork (Keifling 1978, Miller and Roby 1957). The emergence of the stoneflies in late June and early July also had an effect on catch rate, especially of larger cutthroat. This time period was also the peak in effort and river flows (Fig. 4 and 6).

The sections with the highest catch rates were those in which anglers using boats predominated; Sections 2, 3 and 4 (Table 6). This was mainly due to the fact that the majority of boat anglers used flies as terminal tackle. Bait anglers were most effective during the winter and spring. We found anglers using flies to have catch rates of .73 fish/hr while those using bait and lures had catch rates 50% less, .34 and .35 trout/hr, respectively. The fact that boat anglers and fly fishermen were the most successful anglers, was also found by Jeppson (1970), Wiley (1969), and Keifling (1972) for the South Fork in previous years.

Changes in mean length of a population of fish have also been used as indicators of the well being of trout fisheries (Wiley 1969; Keifling 1978; Royce 1972; Moore et. al. 1979). We found no evidence of substantial changes in the mean length of South Fork cutthroat since 1969. I believe that the present mean length of cutthroat in the South Fork, 309 mm (12.2 in), indicates these fish are not being over-exploited. Wiley (1969) suggested that the cutthroat fishery in Wyoming on the South Fork would not approach over-exploitation until 75% of the fish caught were under 280 mm (11 in). We found less than 40% of the fish harvested from the South Fork were under 280 mm in length. Wyoming presently considers the South Fork above Palisades Reservoir to be one of the best fisheries in the state and in a healthy condition (Keifling 1978).

The mean total length of cutthroat in 129 km (80 mi) of river in Wyoming is 287 mm (11.3 in) (Keifling 1972) as compared to 309 mm (12.2 in) in Idaho.

The reasons for differences in mean length of cutthroat in the creel between sections are not clear. I believe they are related to distribution and movement of juvenile fish and the location of adult fish near major spawning areas. Section 5, which had the smallest mean length and the most intensive harvest, is so short that it is unlikely fish caught there were produced in that area. I feel that recruitment of juvenile cutthroat from other areas is the reason for Section 5's ability to withstand the intense pressure found there.

Anglers selectively releasing small fish could increase mean length in the creel (Moore, et. al. 1979 and Keifling 1972). This does not appear to be the case with the South Fork as no correlation exists between release rate and mean size in those sections with similar fishing intensity (Table 6). There is a negative correlation between length of wild cutthroat and intensity (effort/km) by section with the exception of Section 3. Section 3 has the highest release rate for wild cutthroat (68%) but the second smallest mean length, 301 mm (11.8 in). This may indicate that Section 3 had large numbers of juvenile cutthroat since its catch rate for cutthroat was the highest (.59 fish/hr) of any section on the South Fork.

Based on catch rates as an indicator it appears the greatest densities of wild cutthroat occur in Sections 2 and 3 with the lowest densities in Section 1. This conforms to the areas that we felt had the best and poorest trout habitat. Wyoming personnel found the area immediately below Jackson Dam had the lowest catch rates, while those areas with the most braiding and holding water had the highest catch rates (Keifling 1978). Further work will be necessary to elucidate the true population structure of wild cutthroat in the South Fork.

The low percentage of cutthroat larger than 405 mm (16 in) and 510 mm (20 in) (Table 10) in the angler creels has not changed dramatically since completion of Palisades Dam. Work done in 1957 after the gates closed showed cutthroat collected had similar length frequencies (Miller and Roby 1957) to those found presently. The lack of large cutthroat, 1.4 to 2.3 kg (3 to 5 lb), was a common complaint of South Fork anglers who had fished the river since before construction of Palisades Dam. Keifling (1978) states there has been a decline in the catch of 3 to 5 lb cutthroat since the early fifties in the South Fork above Palisades Reservoir. Miller (1957) describes the congregation of cutthroat below Palisades Dam shortly after its completion. It is possible the larger cutthroat reputed to be in the South Fork migrated from the lower river in Idaho up into the Jackson Hole area to spawn. The completion of Palisades Dam would have then interrupted this migration resulting in the elimination of these fish after one generation (3 to 5 years). This corresponds to what several long time residents have described: that for 3 to 5 years (1955-1959) after completion of Palisades Dam fishing for large cutthroat was good in the Swan Valley area. We do not presently know if the productivity of the South Fork and life cycle of the cutthroat will allow production of more larger and older cutthroat.

## Angler Opinions

Anglers generally felt that the fishery on the South Fork has declined. They feel motorized boaters who use their craft to repeatedly fish through good water take excessive numbers of large fish. This practice is looked upon as unsportsmanlike by most anglers, including many anglers who use motorized boats. Although the majority of anglers would favor restrictions on fishing from motorized boats, they were not in favor of restrictions on all boaters even if they were the cause of overharvest. This appears to indicate a prejudice against motorized boat anglers by most South Fork anglers.

Motorized boat anglers did harvest trout at a slightly higher rate (.34 trout/hr) than bank anglers (.30 trout/hr) and nonmotorized boat anglers (.24 trout/hr), (Table 8) but because they expended less than 25% of the total effort (Table 3) they did not harvest as many trout (7,478) as bank anglers (14,023). The canyon area (Conant Valley to Heise) was the only area that motorized boat anglers expended the majority of the effort and with their lower release rate they did harvest more trout than bank or nonmotorized boat anglers.

If overharvest is found to be a problem, restrictions on fishing from motorized boats may decrease effort in the canyon. But if effort from float boat traffic increased the savings could be offset. A more realistic approach might be regulations which are attuned to the life history of the cutthroat in the area so as to decrease harvest of the spawners and increase recruitment.

It is my opinion that most people want motorized boats off the South Fork, especially in the canyon, to increase the esthetics of their trip. This is evidenced by their response to restriction on all boat anglers. It would be unwise for fishing restrictions to be instituted solely on public opinion, without evidence that gains can be realized in the fishery resource. We do not presently have that evidence.

## Tributaries

The tributaries on the South Fork do not appear to have changed much since completion of Palisades Dam. The problems which these streams have were present prior to construction of the Dam and are primarily related to irrigation diversions and agricultural practices. Substantial increase in recruitment to the river could probably be realized with screening and improved passage. Quantification of tributary potential is being undertaken. Any changes which occurred in the South Fork fishery in the past 10-20 years are probably related to other factors than the tributaries.

## Hatchery Rainbow

Based on returns to the creel, releasing hatchery rainbow trout catchables in the South Fork below Heise is not beneficial. Only 11% (453 fish) of those fish planted in 1979 were returned to the creel. This amounted to only 2% of the total catch of 18,346 fish in that area. I recommend that the release of hatchery rainbow below Heise be terminated as it is not necessary for the maintenance of the fishery and very costly in terms of fish returned to the creel per dollars expended.

Table 15. Comparison of the South Fork Snake River to other important streams in Idaho.

Stream	Effort (hr/km)	Catch (trout/km)	Major species	Source
Silver Creek	1,195	1,198	Rainbow	Thurrow 1979
South Fork Boise R.	987	1,625	Rainbow	Moore, et. al. 1979
Henry's Fork, Snake River	2,375	1,616	Rainbow	Jeppson 1973
South Fork, Snake River, Wyoming	300	400	Cutthroat	Keifling 1978
Blackfoot River	303	103	Cutthroat	Thurrow 1979
South Fork Snake R.	810	380	Cutthroat	present study

Presently rainbow trout are introduced into Pine Creek, Rainey Creek and Fall Creek. All of these fisheries need to be investigated to determine if recovery of hatchery fish is adequate to justify their use. All of these tributaries have natural populations of cutthroat trout which might sustain a fishery.

### Brown Trout

Brown trout were present in the South Fork prior to the construction of Palisades Reservoir. They provide an opportunity for anglers to take very large trout in the river. Brown trout have increased in recent years from about 1% of the catch in the mid-sixties to 9% during 1979 (Table 5). This may be a result of hatchery introduction which began in 1968 (about 50,000 fingerling/yr) (Idaho Department of Fish and Game 1979). Spawning ground surveys indicate there is presently some spawning in the main river. The contribution of hatchery versus wild produced fish to the fishery is presently unknown. Based on the maximum size of the brown trout taken in the South Fork since 1970, the river is capable of producing some of the largest browns in the state. Since these large fish appear to be long lived, 10 years for the 7.7-kg (17-lb) brown caught in 1979, their maximum potential in the river has probably not been realized.

Caution should be taken in enhancing brown trout in the South Fork. In the Rio Grande River trout densities have been correlated to increases in numbers of brown trout (McCleaskey 1972). When brown trout were removed the cutthroat trout again regained their dominant position (Moody 1973). The preferred habitat for large cutthroat trout and brown trout is similar (Keifling 1978) with brown trout often replacing cutthroat trout in larger western rivers (Behnke 1979). Whether the increasing number of brown trout are detrimental to the South Fork cutthroat trout is unknown, but the potential should be assumed until complete life history information is available for both species.

The South Fork Snake River below Palisades Dam presently sustains an important fishery both in terms of angler use and angling experience. It is in the same category as many of our other important stream and river fisheries in Idaho (Table 15). It supports one of the better consumptive cutthroat trout fisheries in the state and offers the opportunity to catch very large brown trout.

#### LITERATURE CITED

- Bardach, J.E., J.H. Byther and W.O. McLarney. 1972. Aquaculture. Wiley-Interscience, New York. 868 pp.
- Behnke, R.J. 1971. The zoogeography, systematics, and management of cutthroat trout. Amer. Fish. Soc. Exhibit Salt Lake City. 8 pp.
- \_\_\_\_\_. 1973. Rare and Endangered Report: Westslope cutthroat trout. Colorado Coop. Fish Unit, CSU. 7 pp.
- \_\_\_\_\_. 1974. Summary and supplement to thesis: Systematics of the Westslope cutthroat trout. Colorado State Univ. 8 pp.
- \_\_\_\_\_. 1979. Monograph of the native trouts of the genus Salmo of Western North America. U.S. Fish and Wildlife Service, Fishery Resources, Region 6. 215 pp.
- Behnke, R. and R.L. Wallace. 1979. Review of cutthroat trout taxonomy, evolution and distribution. Symposium IV: The status of the cutthroat trout. Paper presented at 109th Annual Meeting Amer. Fish. Soc. Sept. 12-15, 1979 West Yellowstone, Mont.
- Bjornn, T.C., T.H. Johnson, and R.F. Thurow. 1979. Angling versus natural mortality in northern Idaho cutthroat trout populations. Idaho Coop. Fish. Res. Unit, Univ. Idaho Moscow. 14 pp.
- Braaten, D. 1969. Robustness of the DeLury population estimator, J. Fis Res. Board Canada. 26:339-335.
- Costley, R.J. 1941. A stream and lake stocking plan for the Targhee National Forest. USDA-Targhee National Forest. 24 pp.
- Idaho Dept. Fish and Game. 1958. Catalog of the streams and lakes of Idaho. IFG, Boise. 157 pp.
- \_\_\_\_\_. 1968. Catalog of the streams and lakes of Idaho. IFG, Boise. 157 pp.
- \_\_\_\_\_. 1979a. Summary: 1979 fish planting records. IFG, Boise. 62 pp.
- \_\_\_\_\_. 1979b. Catalog of the streams and lakes of Idaho. IFG, Boise. 166 pp.
- Jeppson, P. 1970. South Fork of Snake River investigations. Idaho Dept. Fish and Game, Test for Increasing the Returns of Hatchery Trout, Job Comp. Rep. F-32-R-12, Job No. 2.
- \_\_\_\_\_. 1973. Snake River Fisheries Investigations Job 111-a-Survey of angler use, harvest and fish distribution in the Snake River, South Fork and North Fork. March 1, 1973 to February 28, 1974. Project F-63-R-3 Idaho Dept. Fish and Game. 21 pp.

- Jeppson, P. and K. Ball. 1978. Regional Fishery Management Investigations Job VI-C Region 6 Stream Investigations. Job Performance Report, Project F-71-R-2 Idaho Dept. Fish and Game. 33 pp.
- \_\_\_\_\_. 1979. Regional Fisheries Management Investigations, Job IV-C. Region 6 Stream Investigations, 1 January 1978 to 31 December 1978. Project F-71-R-3, Job Performance Report. Idaho Dept. Fish and Game. 43 pp.
- Keifling, J.W. 1972. An analysis of stock densities and harvest of the cutthroat trout of the Snake River, Teton County, Wyoming. M.S. Thesis, Univ. Wyoming, Laramie. 184 pp.
- \_\_\_\_\_. 1978. Studies on the ecology of the Snake River cutthroat. Fish. Tec. Bull. No. 3, Wyoming Game and Fish Dept. 198 pp.
- Lagler, K.F. 1956. Freshwater fishery biology. Wm. C. Brown Co. Pub., Dubuque, Iowa. 421 pp.
- Laundenslager, E.J. 1979. Electrophoretic identification of interior cutthroat trout subspecies and their hybrids with introduced rainbow. Symposium III: Electrophoresis and biochemistry in fisheries. Paper presented at the 109th Annual Meeting Amer. Fish. Soc. Sept. 12-15, 1979, West Yellowstone, Montana.
- McCleskey, R.N. Statewide fisheries investigations, Project F-22-R-13, Brown trout: Rio Grande cutthroat trout relationship, Job I-2. New Mexico Game and Fish, Santa Fe, N.M. 8 pp.
- Miller, T.W. and E.R. Roby. 1957. A progress report: South Fork Snake River; Upper Snake River progress report. U.S. Dept. Int. Fish and Wild. Serv. Portland. 31 pp.
- Murphy, T.C. 1974. A study of Snake River cutthroat trout. M.S. Thesis, Colorado State Univ. 65 pp.
- Moody, T.M. 1973. Statewide fisheries investigations, Project F-22-R-14, Brown trout: Rio Grande cutthroat trout relationship, Job I-2. New Mexico Dept. Game and Fish, Santa Fe, M.M. 7 pp.
- Moore, V.K., D.R. Cadwallader, and S.M. Mate. 1979. South Fork Boise River creel census and fish population studies. Annual Report to U.S. Bureau of Reclamation Project No. 08-07-10-S-0062. Idaho Dept. Fish and Game. 65 pp.
- Pettit, S.W. and R.L. Lindland. 1979. Clearwater River steelhead investigations. Idaho Dept. Fish and Game, River and Stream Investigations, Project No. F-73-R-1, IV Study III. 70 pp.
- Royce, W.F. 1972. Introduction of the fishery sciences. Academic Press, New York. 351 pp.
- Thurrow, R. 1978. Silver Creek fisheries investigations. River and Stream Investigations. Project F-66-R. Job No. III. Job Completion Report. Idaho Dept. Fish and Game. 71 pp.

- U.S. Fish and Wildlife Service. 1947. Palisades Reservoir Project, Idaho; Report on fish and wildlife resources. U.S. Dept. Int. Fish Wild. Serv. River Basin Studies Wash. D.C. 10 pp.
- \_\_\_\_\_. 1958a. Downstream affects of various water releases from Palisades Dam, South Fork Snake River November-December 1957. River Basin Studies, Bureau of Sport Fisheries and Wildlife.
- \_\_\_\_\_. 1958b. A study of the effects of release changes at Palisades Dam on downstream fish habitat, South Fork Snake River - Idaho. U.S. Dept. Int. Fish Wild. Serv., Portland. 24 pp.
- \_\_\_\_\_. 1960. A preliminary survey of fish and wildlife resources; Upper Snake River Basin. U.S. Dept. Int. Fish and Wild. Serv., Portland. 61 pp.
- \_\_\_\_\_. 1970. Preliminary Draft, Upper Snake River Project, Idaho - Wyoming Lynn Crandall Division, Snake River, Bonneville County, Idaho. U.S. Dept. Int. Fish Wild. Serv., Portland. 30 pp.
- \_\_\_\_\_. 1980. Preliminary draft of the Environmental Assessment for the South Fork of the Snake River study area. U.S. Dept. Int. Fish Wild. Serv., Boise. 72 pp.
- U.S. Forest Service. 1976. General Aquatic Wildlife System U.S.F.S. Intermountain Region, Wildlife Management, Ogden, Utah. 34 pp.
- U.S.G.S. 1956. Compilation of records of surface waters of the United States through September 1950. Geological Survey Water-Supply Paper 1317. 566 pp.
- \_\_\_\_\_. 1963. Compilation of records of surface waters of the United States, October 1950 to September 1970, Part 13. Snake River Basin. U.S. Geological Survey-Water Supply Paper 1737. 282 pp.
- \_\_\_\_\_. 1974. Surface Water Supply of the United States 1966-1970. Part 13. Snake River Basin. Geological Survey Water-Supply Paper 2134. 821 pp.
- \_\_\_\_\_. 1977. Water Resources data for Idaho; Water Year 1977. U.S. Geological Survey Water-Data Report ID-77-1. 639 pp.
- \_\_\_\_\_. 1979. Water Resource Data for Idaho, Vol. 1: Great Basin and Snake River above King Hill. U.S. Geological Survey Water-Data Report ID-78-1 Water Year 1978. 457 pp.
- Varley, J. 1979. Yellowstone and fine-spotted Snake River cutthroat. Symposium IV: The status of the cutthroat trout. Paper presented at 109th Annual Meeting, Amer. Fish. Soc. Sept. 12-15, 1979. West Yellowstone, Montana.
- Wiley, R.W. 1969. Snake River cutthroat trout study, Part II-An Ecological evaluation on the Snake River cutthroat trout fishery with emphasis on harvest. Coop. Research Project 4, Wyoming Game and Fish Commission - Univ. Wyoming. 106 pp.

A P P E N D I X

Appendix 1. Catch rates (fish/hr) for all trout (T) and all game fish (G) caught by interval and section, South Fork Snake River, 1979-80.

Interval beginning		Census section							All sections
		1	2	3	4	5	6	7	
1. 3/3	T					.70	.06	.28	.61
	G					.90	.07	.31	
2. 3/17	T					.33	.06	.28	.30
	G					.35	.07	.31	
3. 3/31	T	.35				.86	.48	.26	.54
	G	.37				.94	.49	.29	
4. 4/14	T	.10				.19	.47	.28	.19
	G	.12				.22	.47	.31	
5. 4/28	T	.12				.44	.32	.24	.29
	G	.18				.44	.34	.24	
6. 5/12	T	.18				.32	.11	.12	.25
	G	.21				.34	.13	.12	
7. 5/26	T	.11	.48	.36	.49	.18	.11	.17	.45
	G	.16	.53	.38	.49	1.02	.13	.22	
8. 6/9	T	.05	.23	.40	.20	.18	.72	.17	.39
	G	.11	.29	.42	.20	1.02	.76	.22	
9. 6/23	T	.14	.35	.37	.34	.19	.66	.33	.39
	G	.15	.35	.39	.40	.43	.69	.36	
10. 7/7	T	.14	.35	.32	.36	.17	.36	.50	.46
	G	.15	.38	.56	.41	.19	.37	.50	
11. 7/21	T	.26	.94	.65	.31	.17	.24	.30	.62
	G	.27	1.15	.74	.39	.18	2.11	.33	
12. 8/4	T	.30	.41	.50	.40	.17	.25	.71	.67
	G	.33	.52	.50	.67	.18	2.11	.80	
13. 8/18	T	.19	.69	.62	1.06	.26	.42	.75	.68
	G	.24	.77	1.06	1.19	.30	.50	.77	
14. 9/1	T	.22	.42	.81	.42	.30	.44	.67	.50
	G	.26	.51	.86	.49	.34	.44	.70	
15. 9/16	T	.38	.34	.61	.41	.43		.48	.53
	G	.40	.45	.62	.51	.49		.52	

Appendix 1. (Continued)

Interval beginning	Census section							All sections	
	1	2	3	4	5	6	7		
16. 9/29	T	.37	.56	.72	.52	.50	.52	.48	.56
	G	.40	.58	.72	.53	.57	.60	.52	
17. 10/13	T		.48	.57	.54	.46	.89	.43	.80
	G		.49	.64	.66	.46	1.20	.47	
18. 10.27	T		.53	1.15	.33	.64	1.00	.42	.71
	G		.53	1.15	.60	.66	2.44	.46	
19. 11.12	T		1.02	1.01	.39	.51	.35	.41	.64
	G		1.02	1.01	.39	.68	.35	.45	
20. 11.24	T		1.08			.51	.38	.39	.59
	G		1.08			.68	.38	.43	
21. 12.8	T					.12		.07	.19
	G					.24		.08	
22. 12/22	T					.12		.07	.19
	G					.24		.08	
23. 1/5	T					1.36	1.00	.66	1.59
	G					1.62	5.00	.80	
24. 1.19	T					.39		.11	.31
	G					.39		.13	
25. 2/2	T					1.31	1.00	.60	1.62
	G					1.31	5.00	.73	
26. 2/16	T					.17	1.00		.46
	G					.46	5.00	.21 .25	

Appendix 2. Estimated catch (C) and harvest (H) by section and interval for game fish, South Fork Snake River, 1979-80.

Interval beginning	Census section							Total	
	1	2	3	4	5	6	7		
1. 03/03/79	H				1,654	27	335	2,016	
	C				1,927	33	369	2,329	
2. 03/17/79	H				345	20	206	671	
	C				445	25	227	697	
3. 03/31/79	H	526			1,181	149	268	2,124	
	C	596			1,181	152	295	2,224	
4. 04/14/79	H	96			203	74	68	441	
	C	127			205	74	71	447	
5. 04/28/79	H	132			349	100	87	668	
	C	185			367	119	87	758	
6. 05/12/79	H	278			370	16	24	688	
	C	327			370	16	24	737	
7. 05/26/79	H	119	552	105	805	510	7	11	2,109
	C	196	577	175	805	510	7	14	2,284
8. 06/09/79	H	69	168	47	292	720	216	50	1,562
	C	69	178	84	292	720	239	65	1,647
9. 06/23/79	H	125	352	284	786	221	235	361	2,364
	C	185	375	477	824	528	267	371	3,027
10. 07/07/79	H	54	192	831	1,012	206	120	488	2,903
	C	76	513	1,752	1,084	242	144	488	4,302
11. 07/21/79	H	272	759	541	532	99	177	69	2,449
	C	330	2,259	844	621	121	466	78	4,719

12.	08/04/79	H	533	437	391	233	65	251	246	2,176
		C	886	891	1,995	743	79	638	382	5,614
13.	08/18/79	H	312	539	579	316	153	254	199	2,352
		C	398	1,422	1,705	1,344	221	393	384	5,867
14.	09/01/79	H	116	235	313	377	133	109	403	1,686
		C	172	353	714	608	178	137	477	2,636
15.	09/16/79	H	194	103	200	296	162	0	125	1,080
		C	257	192	652	317	216	0	173	1,807
16.	09/29/79	H	45	227	167	226	249	209	239	1,362
		C	72	284	373	336	287	295	332	1,973
17.	10/13/79	H		70	243	184	160	152	162	971
		C		91	581	319	215	458	239	1,903
18.	10/27/79	H		56	49	44	209	58	123	539
		C		67	117	109	306	183	185	967
19.	11/12/79	H		280		40	179	78	83	660
		C		386	0	71	205	78	131	871
20.	11/24/79	H		30			80	67	10	187
		C		77	0	0	92	68	16	253
21.	12/08/79	H					30		5	35
		C					30	0	5	35
22.	12/22/79	H					28		5	33
		C					28	0	5	33
23.	01/05/80	H					269	93	60	422
		C					280	93	71	444
24.	01/19/80	H					39		6	45
		C					39	0	6	45
25.	02/02/80	H					281	272	92	645
		C					281	272	92	645

Appendix 2  
continued  
Page 3

26.	02/16/80	H					238	136	62	436
		C					238	136	62	436
	03/03/79 to	H	2,891	4,000	3,750	5,143	8,133	2,820	3,848	30,585
	02/29/80	C	3,877	7,665	9,469	7,467	9,311	4,293	4,742	46,824

H = fish harvested, those fish kept by the angler  
C = all fish hooked and landed, includes fish harvested

Appendix 3 Hatchery Introductions South Fork Snake River, Tributaries and Palisades Reservoir 1979.

<u>Species</u>	<u>Size (in)</u>	<u># lbs</u>	<u># fish</u>	<u>Source</u>	<u>Area planted</u>
Large Spot Cutthroat	0-3	34	102,000	Henrys Lake	Heise Bridge
Fine Spot Cutthroat	3-6	1,125	100,125	Jackson NFH	Burns Creek
Brown	0-3	300	35,000	American Falls	Cottonwood Access
Rainbow	6+	---	4,200	Ashton	below Heise
Rainbow	6+	750	2,380	Ashton	Rainey Creek
Rainbow	6+	1,200	3,780	Ashton	Pine Creek
Rainbow	6+	750	2,550	Ashton	Fall Creek
Rainbow	6+	250	850	Ashton	Yeaman Creek
Fine Spot Cutthroat	6+	59,000	252,000	Jackson NFH	Palisades Reservoir
Lake Trout	6+	8,163	50,045	Jackson NFH	Palisades Reservoir

Source: Idaho Fish and Game County Fish Planting, 1979.

Appendix 4. River mileage of prominent locations, South Fork Snake River, Idaho.

<u>Section</u>	<u>River Mile</u>	<u>Location</u>
	837.4	Henrys Fork (historical)
<hr/>		
7	838.8	Present mouth of Henrys Fork
	844.9	Lorenzo Bridge (US-20 Highway)
27.6 km	845.0	Union Pacific Railroad Bridge
(14.9 mi)	848.3	Texas Canal (R bank)
	851.8	Len Root Canal (R bank)
	850.5	Reid Canal
<hr/>		
6	853.7	Twin Bridges (Archer-Ririe Highway Bridge)
	855.3	Union Pacific Railroad Bridge
7.6 km	856.9	Sunnydell Canal (R bank)
(4.1 mi)	857.8	Heise Hot Springs Bridge
<hr/>		
5	858.5	Jefferson County Sportsman Access
	859.2	Great Feeder Canal (L bank)
7.0 km	859.4	Eagle Rock Canal
(3.8 mi)	860.5	Rapps Ferry (Grassy Banks)
	861.0	Anderson Canal
<hr/>		
4	861.6	Heise Gauging Station & Cable
	862.8	Rush Beds Dam Site
	865.0	Spring Creek (R bank)
	866.0	Antelope Creek (L bank)
	868.3	Table Rock Creek (R bank)
23.3 km	869.3	Wolverine Creek (R bank)
(12.6 mi)	870.4	Mud Creek (R bank)
	872.5	Burns Creek Dam Site
	872.9	Pole Creek (R bank)
	873.2	Burns Creek (R bank)
	874.2	Black Canyon Creek (R bank)
<hr/>		
3	877.5	Gormer Canyon Creek (R bank)
	879.3	Dry Creek (R bank)
18.2 km	883.5	Pine Creek (R bank)
(9.8 mi)	884.0	Granite Creek (L bank)
<hr/>		
2	886.0	Pritchard Creek (Conant Valley Access)
	888.0	State Highway 26 Bridge
	888.4	Rainey Creek (R bank)
18.9 km	889.2	Fall Creek (L bank)
(10.2 mi)	890.0	Falls Campground
	893.1	Indian Creek
<hr/>		
1	894.2	Irwin Abutment
	898.1	Palisades Creek (R bank)
13.7 km	898.8	Irwin Access and Yeaman Creek (L bank)
(7.4 mi)	900.2	Gauging Station near Irwin
	900.8	Sheep Creek (R bank)
	901.6	Palisades Dam
<hr/>		
116.3 km		South Fork Snake River in Idaho (from present mouth)
(62.8 mi)		

Appendix 5 . Interval and seasons, South Fork Snake River, 1979-80.

Interval	Dates	
1	3 March - 16 March	Heise Gauging station to Henrys Fork
2	17 March - 30 March	(Sections 5, 6, 7) open year-round
3	31 March - 13 April	Palisades Dam to Irwin (Sec 1) open 1 April
4	14 April - 27 April	
5	28 April - 11 May	
6	12 May - 25 May	
7	26 May - 8 June	Irwin to Heise Gauging Station
8	9 June - 22 June	(Sec 2, 3, 4) open 26 May
9	23 June - 6 July	
10	7 July - 20 July	
11	21 July - 3 August	
12	4 Aug - 17 Aug	
13	18 Aug - 31 Aug	
14	1 Sept - 14 Sept	
15	15 Sept - 28 Sept	
16	29 Sept - 12 Oct	Sec. 1 closes 30 September
17	13 Oct - 26 Oct	
18	27 Oct - 9 Nov	
19	12 Nov - 23 Nov	
20	24 Nov - 17 Dec	General Season closed Nov 30 (Sec 2, 3, 4)
21	8 Dec. - 21 Dec	
22	22 Dec - 4 Jan	
23	5 Jan 1980 - 18 Jan	
24	19 Jan - 1 Feb	
25	2 Feb - 15 Feb	
26	16 Feb - 29 Feb	

Appendix 6. License classes recorded during creel census interviews, South Fork Snake River, 1979.

Code	Title	Number	Percent
01	Resident Combination	1,137	55
03	Resident Fishing	485	24
04 & 92	Senior Resident	88	4
07	Jr. Resident Combination (age 14-17)	43	2
09	Jr. Resident Fishing	20	1
--	Juvenile (under age 14)	120	6
22	Non-Resident Season Fishing	34	2
23	Non-Resident Fishing (7 day)	95	5
24	Non-Resident Fishing (1 day)	25	1
94	Disabled	4	>1
95	Blind	<u>2</u>	>1
		2,053	

Appendix 7. Water quality characteristics of the South Fork Snake River at the Heise Gauging Station for the 1978 water year (USGS, 1979).

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	Range for year
Dissolved oxygen	12.4 - 8.6 mg/l (120% - 104% saturation)
Specific conductance	562 - 272 $\mu$ mhos
pH	8.2 - 7.2
Turbidity	1 - 4.2 NTu
Total hardness (CaCO <sub>3</sub> )	260 - 130 mg/l
Total dissolved solids	159 - 324 mg/l
Total alkalinity (CaCO <sub>3</sub> )	115 - 170 mg/l
Dissolved silica (SiO <sub>2</sub> )	8.1 - 9.7 mg/l
Nitrogen total (NO <sub>3</sub> )	16.0 - 1.3 mg/l
Phosphorus total (P)	.00 - .04 mg/l

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Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 1. Motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
3. 4/01-4/13	H	10						1	11	108
	C	10						1	11	
4. 4/14-4/27	H	2							2	18
	C	2							2	
5. 4/28-5/11	H	9						1	10	95
	C	9						1	10	
6. 5/12-5/25	H	6						1	7	69
	C	6						1	7	
7. 5/26-6/08	H								0	5
	C								0	
8. 6/09-6/22	H	1							1	12
	C	1							1	
9. 6/23-7/06	H	5						1	6	54
	C	5						1	6	
10. 7/07-7/20	H	24						2	26	258
	C	24						2	26	
11. 7/21-8/03	H	39						3	42	413
	C	39						3	42	
12. 8/04-8/17	H	18						2	20	199
	C	18						2	20	
13. 8/18-8/31	H	20						2	22	212
	C	20						2	22	
14. 9/01-9/14	H	11						1	12	114
	C	11						1	12	
15. 9/15-9/28	H	3							3	26
	C	3							3	
16. 9/29-9/30	H	1							1	13
	C	1							1	
Totals 4/01-9/30	H	149	0	0	0	0	0	14	163	1596
	C	149	0	0	0	0	0	14	163	

H = fish harvested, those fish caught and kept.

C = all fish caught (all fish hooked and landed), includes fish released unharmed.

Appendix 3. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 1. Non-motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
3. 4/01-4/13	H	15	4	9	6			3	37	243
	C	75	4	15	10			4	108	
4. 4/14-4/27	H	1		1	1				3	18
	C	6		1	1				8	
5. 4/28-5/11	H	12	3	7	5			2	29	189
	C	59	3	11	7			3	83	
6. 5/12-5/25	H	7	2	4	3			2	18	119
	C	37	2	7	4			2	52	
7. 5/26-6/08	H	8	2	5	3			2	20	132
	C	41	2	8	5			2	58	
8. 6/09-6/22	H									0
	C									
9. 6/23-7/06	H	13	4	8	5			2	32	208
	C	64	4	13	8			3	92	
10. 7/07-7/28	H	5	1	3	2			1	12	76
	C	24	1	5	3			1	34	
11. 7/21-8/03	H	4	1	2	1			1	9	59
	C	18	1	3	2			1	25	
12. 8/04-8/17	H	54	15	35	23			12	139	895
	C	277	15	54	34			16	396	
13. 8/18-8/31	H	18	5	12	8			4	47	303
	C	93	5	18	12			5	133	
14. 9/01-9/14	H	12	3	8	5			2	30	193
	C	60	3	12	8			3	86	
15. 9/15-9/28	H	13	4	9	6			3	35	223
	C	69	4	13	8			4	98	
16. 9/29-9/30	H	5	2	3	2			1	13	90
	C	28	2	5	4			1	40	
Totals 4/01-9/30	H	167	46	106	70	0	0	35	424	2748
	C	851	46	165	106	0	0	45	1213	

H = fish harvested, those fish caught and kept.

C = all fish caught (all fish hooked and landed), includes fish released unharmed.

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 2. Bank Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
7. 5/26-6/07	H	133	25	50	42				250	620
	C	133	25	50	42				250	
8. 6/08-6/22	H	25		40					65	208
	C	35		40					75	
9. 6/23-7/06	H	28							28	208
	C	28							28	
10. 7/07-7/20	H	19							19	136
	C	19							19	
11. 7/21-8/03	H	44		0					44	118
	C	60		33					93	
12. 8/04-8/17	H	160		0					160	435
	C	220		120					340	
13. 8/18-8/31	H	24		95	24	23			166	402
	C	24		142	24	23			213	
14. 9/01-9/14	H	9		37	9	10			65	157
	C	9		55	9	10			83	
15. 9/15-9/23	H	44			6				50	86
	C	49			6				55	
16. 9/29-10/12	H	167			21				188	323
	C	187			21				208	
17. 10/13-10/26	H	47			6				53	90
	C	53			6				59	
18. 10/27-11/09	H	44			5				49	85
	C	49			6				55	
19. 11/10-11/23	H	253			23				276	363
	C	346			23				369	
20. 11/24-11/30	H	19			1				20	27
	C	26			1				27	
Totals 5/26-11/30	H	1016	25	222	137	33	0	0	1433	3258
	C	1238	25	440	138	33	0	0	1874	

H = fish harvested, those fish kept by angler.

C = all fish caught (all fish hooked and landed), includes fish harvested and released.

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 2. Motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
7. 5/06-6/07	H	201			17				218	285
	C	201			17				218	
8. 6/08-6/22	H	77							77	247
	C	77							77	
9. 6/23-7/06	H	229							229	446
	C	241							241	
10. 7/07-7/20	H	56							56	758
	C	111							111	
11. 7/21-8/03	H	495	20	62	21				598	1342
	C	1506	20	309	41				1876	
12. 8/04-8/17	H	139			20	0			159	258
	C	218			20	20			258	
13. 8/18-8/31	H	155		0	0	8			163	416
	C	210		15	8	8			241	
14. 9/01-9/14	H	111		0	0	5			116	297
	C	151		11	5	5			172	
15. 9/15-9/28	H	21		0					21	94
	C	33		9					42	
16. 9/29-10/12	H	19		0					19	85
	C	30		8					38	
17. 10/13-10/26	H	6		0					6	30
	C	10		3					13	
18. 10/27-11/09	H	2		0					2	7
	C	2		1					3	
19. 11/10-11/23	H								0	0
	C								0	
20. 11/24-11/30	H								0	0
	C								0	
Totals 5/26-11/30	H	1511	20	62	58	13	0	0	1664	4000
	C	2790	20	356	91	33	0	0	3290	

H = fish harvested, those fish caught and kept.

C = all fish caught (all fish hooked and landed), includes fish released.

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 2. Non-motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
7. 5/26-6/07	H	61	11	2	10				84	183
	C	82	11	6	10				109	
8. 6/08-6/22	H	13			13				26	154
	C	13			13				26	
9. 6/23-7/06	H	83			12				95	408
	C	83			23				106	
10. 7/07-7/20	H	59		44	14				117	454
	C	324		44	15				383	
11. 7/21-8/03	H	66		31	17			3	117	501
	C	200		69	17			4	290	
12. 8/04-8/17	H	66		31	17			4	118	506
	C	202		70	17			4	293	
13. 8/18-8/31	H	187	11	11	11	0		0	210	1021
	C	842	11	11	21	11		83	968	
14. 9/01-9/14	H	36			18				54	237
	C	80			18				98	
15. 9/15-9/28	H	26		0	6			0	32	252
	C	38		38	13			6	95	
16. 9/29-10/12	H	10		3	7				20	81
	C	27		3	7				37	
17. 10/13-10/26	H	9						2	11	65
	C	18						2	20	
18. 10/27-11/09	H	5							5	34
	C	9							9	
19. 11/10-11/23	H	1			3				4	15
	C	7			10				17	
20. 11/24-11/30	H	2			8				10	45
	C	20			30				50	
Totals 5/26-11/30	H	625	22	111	136	0		9	903	3956
	C	1945	22	230	194	11		109	2501	

H = fish harvested, those fish caught and kept.

C = all fish caught (all fish hooked and landed), includes fish released unharmed.

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 3. Bank Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
7. 5/26-6/07	H	31	5			5			41	160
	C	87	5			5			97	
8. 6/08-6/22	H	18	3			3			24	93
	C	50	3			3			56	
9. 6/23-7/06	H	37	6			6			49	192
	C	104	6			6			116	
10. 7/07-7/20	H	11	2			2			15	61
	C	33	2			2			37	
11. 7/21-8/03	H	17	3			3			23	88
	C	48	3			3			54	
12. 8/04-8/17	H	19	3			3			25	99
	C	54	3			3			60	
13. 8/18-8/31	H	31	6			5			42	167
	C	90	6			5			101	
14. 9/01-9/14	H	23	4			4			31	120
	C	65	4			4			73	
15. 9/15-9/28	H	17	3			3			23	90
	C	48	3			3			54	
16. 9/29-10/12	H	9	1			2			12	46
	C	25	1			2			28	
17. 10/13-10/26	H	10	2			1			13	52
	C	28	2			1			31	
18. 10/27-11/09	H	16	2			3			21	82
	C	44	2			3			49	
19. 11/10-11/23	H									0
	C									
20. 11/24-11/30	H									0
	C									
Totals	H	239	40	0	0	40	0	0	319	1250
	C	676	40	0	0	40	0	0	756	

H = fish harvested, those fish kept by the angler.

C = all fish caught (all fish hooked and landed), includes fish harvested and released.

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 3. Motorized Boat Anglers

Interval beginning		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
7. 5/26	H	45		11		3			59	213
	C	59		11		3			73	
8. 6/08	H	16		4		1			21	77
	C	21		4		1			26	
9. 6/23	H	45	6	113	17				181	427
	C	79	6	113	17				215	
10. 7/07	H	416		0	43	14			473	1432
	C	416		215	43	14			688	
11. 7/21	H	421							421	1357
	C	497							497	
12. 8/04	H	180	8	0	0	8			196	723
	C	473	8	538	8	8			812	
13. 8/18	H	156	10	45	5	5		5	226	438
	C	262	10	45	40	10		5	372	
14. 9/01	H	109		7	15	7			138	484
	C	153		7	22	7			189	
15. 9/15	H	70			0				70	428
	C	173			35				208	
16. 9/29	H	71		12	21	3		3	110	338
	C	188		12	34	9		3	246	
17. 10/13	H	123			0			0	123	152
	C	282			15			7	304	
18. 10/27	H	28			0	0			28	34
	C	63			3	2			68	
19. 11/10	H									0
	C									
20. 11/24	H									0
	C									
Totals	H	1680	24	192	101	41	0	8	2046	6103
	C	2666	24	945	217	54	0	15	3921	

H = fish harvested, those fish kept by the angler.

C = all fish caught (all fish hooked and landed), includes fish harvested and released.

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 3. Non-motorized Boat Anglers

Interval beginning		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
7. 5/26	H	2			2	1			5	88
	C	2			2	1			5	
8. 6/08	H	1			1				2	31
	C	1			1				2	
9. 6/23	H	54		0					54	238
	C	55		91					248	
10. 7/07	H	343							343	879
	C	1027							1027	
11. 7/21	H	97							97	251
	C	293							293	
12. 8/04	H	129	7	7	27				170	1059
	C	566	7	293	34				900	
13. 8/18	H	300		0	10	1			311	1313
	C	1126		58	38	10			1232	
14. 9/01	H	138			6				144	546
	C	440			12				452	
15. 9/15	H	87			8	12			107	390
	C	358			20	12			390	
16. 9/29	H	45		0					45	204
	C	72		27					99	
17. 10/13	H	64			43				107	300
	C	203			43				246	
18. 10/27	H									0
	C									
19. 11/10	H									0
	C									
20. 11/24	H									0
	C									
Totals	H	1260	7	7	97	14			1385	5359
	C	4143	7	469	150	23			4792	

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

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 4. Bank Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
7. 5/26-6/07	H	288	19						307	822
	C	288	19						307	
8. 6/08-6/22	H	73	51		26	26			181	887
	C	78	51		26	26			181	
9. 6/23-7/06	H	49		48					97	450
	C	73		48					121	
10. 7/07-7/20	H	82		33	33				148	546
	C	82		33	33				148	
11. 7/21-8/03	H	77			38				115	508
	C	77			39				116	
12. 8/04-8/17	H	20							20	170
	C	20							20	
13. 8/18-8/31	H	119		0	0				119	443
	C	356		14	14				384	
14. 9/01-9/14	H	132			22	22			176	447
	C	242			22	22			286	
15. 9/15-9/28	H	46							46	154
	C	67							67	
16. 9/29-10/12	H	112							112	373
	C	162							162	
17. 10/13-10/26	H	45		0					45	188
	C	62		50					112	
18. 10/27-11/09	H	44		0					44	184
	C	60		49					109	
19. 11/10-11/23	H	40		0	0				40	181
	C	61			10				71	
20. 11/24-11/30	H								0	0
	C								0	0
Totals	H	1132	70	81	119	48			1450	5353
5/26-11/30	C	1628	70	194	144	48			2084	

H = fish harvested, those fish kept by the angler.

C = all fish caught (all fish hooked and landed), includes fish harvested and released.

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 4. Motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
7. 5/26-6/07	H	124	104						228	373
	C	124	104						228	
8. 6/08-6/22	H	78							78	332
	C	78							78	
9. 6/23-7/06	H	390	0	50	98				538	1219
	C	390	0	50	98				538	
10. 7/07-7/20	H	687	14	14	28				743	1743
	C	687	14	19	28				748	
11. 7/21-8/03	H	188		84	13				285	739
	C	214		84	19				317	
12. 8/04-8/17	H	155							155	486
	C	243							243	
13. 8/18-8/31	H	50			0	13			63	253
	C	582			50	38			670	
14. 9/01-9/14	H	83			12	12			107	475
	C	95			12	12			119	
15. 9/15-9/28	H	78			16				94	189
	C	78			16				94	
16. 9/29-10/12	H	43		7	27	0			77	169
	C	77		7	27	2			113	
17. 10/13-10/26	H	31		5	19	0			55	119
	C	54		5	19	2			80	
18. 10/27-11/09	H								0	0
	C								0	
19. 11/10-11/23	H								0	0
	C								0	
20. 11/24-11/30	H								0	0
	C								0	
Totals 5/26-11/30	H	1907	118	160	213	25	0	0	2423	6097
	C	2622	118	165	269	54	0	0	3228	

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

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 4. Non-motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
7. 5/26-6/07	H	147	123						270	441
	C	147	123						270	
8. 6/08-6/22	H	28			5				33	231
	C	28			5				33	
9. 6/23-7/06	H	124	14	14					152	381
	C	124	14	23					166	
10. 7/07-7/20	H	75		39	7				121	364
	C	92		88	7				187	
11. 7/21-8/03	H	113		0	19				132	348
	C	122		47	19				188	
12. 8/04-8/17	H	51		7					58	458
	C	182		298					480	
13. 8/18-8/31	H	13	4	108	9	0		0	134	438
	C	104	4	130	39	9		4	290	
14. 9/01-9/14	H	9	3	75	6	0		0	93	308
	C	73	3	91	27	6		3	203	
15. 9/15-9/28	H	98		58					156	283
	C	98		58					156	
16. 9/29-10/12	H	15			22				37	77
	C	33			22				55	
17. 10/13-10/26	H	34			50				84	177
	C	76			51				127	
18. 10/27-11/09	H									0
	C									
19. 11/10-11/23	H									0
	C									
20. 11/24-11/30	H									0
	C									
Totals 5/26-11/30	H	707	144	301	118	0	0	0	1270	3506
	C	1079	144	740	170	15	0	7	2155	

H = fish harvested, those fish caught and kept.

C = all fish caught (all fish hooked and landed), includes fish released unharmed.

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 5. Bank Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
1. 3/03-3/16	H	1146		340	43	71			1600	2018
	C	1330		410	43	71			1854	
2. 3/17-3/31	H	336		0					336	1191
	C	390		32					422	
3. 4/01-4/13	H	996		102	77				1175	1254
	C	996		102	77				1175	
4. 4/14-4/27	H	173		29					202	912
	C	173		29					202	
5. 4/28-5/11	H	278			54	11			343	792
	C	289			54	11			354	
6. 5/12-5/25	H	261	22	22	43	22			370	1077
	C	261	22	22	43	22			370	
7. 5/26-6/08	H	79	13	418					510	502
	C	79	13	418					510	
8. 6/09-6/22	H	111	18	591					720	709
	C	111	18	591					720	
9. 6/23-7/06	H	17		0			17		34	898
	C	17		286			17		320	
10. 7/07-7/20	H	99		0					99	1066
	C	99		20					119	
11. 7/21-8/03	H	66		11	22				99	664
	C	88		11	22				121	
12. 8/04-8/17	H	43		7	14				64	435
	C	57		7	15				78	
13. 8/18-8/31	H	112		0	16		16		144	700
	C	144		32	16		16		208	
14. 9/01-9/14	H	70		0	10		10		90	439
	C	90		20	10		10		130	
15. 9/15-9/28	H	106		19	10				135	265
	C	125		19	10				154	
16. 9/29-10/12	H	194		36	17				247	484
	C	229		36	17				282	

## Appendix 8. Continued.

## Section 5. Bank Anglers

17.	10/13-10/26	H	87						43		130	
		C	131						43		174	380
18.	10/27-11/09	H	153		0				56		209	
		C	222		14				70		306	459
19.	11/10-11/23	H	102		51				26		179	
		C	115		51				39		205	301
20.	11/24-12/07	H	45		23				12		80	
		C	52		23				17		92	135
21.	12/08-12/21	H			15				15		30	
		C			15				15		30	126
22.	12/22-1-04	H			14				14		28	
		C			14				14		28	117
23.	1/05-1/18	H	201		45			6	17		269	
		C	212		45			6	17		280	172
24.	1/19-2/01	H	39								39	
		C	39								39	99
25.	2/02-2/15	H	211						70		281	
		C	211						70		281	218
26.	2/16-2/29	H	62		150				26		238	
		C	62		150				26		238	517
Totals			H	4987	53	1873	585	110	43	0	7651	
3/3/79-2/29/80			C	5522	53	2347	618	110	43	0	8693	15,930

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Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 5. Motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
1. 3/03-3/16	H	33			8				41	54
	C	33			8				41	
2. 3/17-3/31	H								0	0
	C								0	
3. 4/01-4/13	H	5			1				6	9
	C	5			1				6	
4. 4/14-4/27	H								0	0
	C								0	
5. 4/28-5/11	H								0	0
	C								0	
6. 5/12-5/25	H								0	0
	C								0	
7. 5/26-6/08	H								0	0
	C								0	
8. 6/09-6/22	H								0	0
	C								0	
9. 6/23-7/06	H	139			33				172	230
	C	139			33				172	
10. 7/07-7/20	H	77			18				95	126
	C	77			18				95	
11. 7/21-8/03	H								0	0
	C								0	
12. 8/04-8/17	H								0	0
	C								0	
13. 8/18-8/31	H	6			1				7	9
	C	6			1				7	
14. 9/01-9/14	H	31			8				39	52
	C	31			8				39	
15. 9/15-9/28	H								0	0
	C								0	
16. 9/29-10/12	H								0	0
	C								0	

Appendix 8. Continued.

Section 5. Motorized Boat Anglers

17.	10/13-10/26	H	18						22		
		C	18	4					22	29	
18.	10/27-11/09	H							0		
		C							0	0	
19.	11/10-11/23	H							0		
		C							0	0	
20.	11/24-12/07	H							0		
		C							0	0	
21.	12/08-12/21	H							0		
		C							0	0	
22.	12/22-1/04	H							0		
		C							0	0	
23.	1/05-1/18	H							0		
		C							0	0	
24.	1/19-2/01	H							0		
		C							0	0	
25.	2/02-2/15	H							0		
		C							0	0	
26.	2/16-2/29	H							0		
		C							0	0	
<hr/>											
Totals		H	309	0	73	0	0	0	0	382	
3/3/79-2/29/80		C	309	0	73	0	0	0	0	382	509

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 5. Non-motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
1. 3/03-3/16	H	9		2		2			13	93
	C	27		3		2			32	
2. 3/17-3/31	H	6		2		2			10	66
	C	19		2		2			23	
3. 4/01-4/13	H								0	0
	C								0	
4. 4/14-4/27	H	1							1	9
	C	3							3	
5. 4/28-5/11	H	4		1		1			6	38
	C	11		1		1			13	
6. 5/12-5/25	H								0	0
	C								0	
7. 5/26-6/08	H								0	0
	C								0	
8. 6/09-6/22	H								0	0
	C								0	
9. 6/23-7/06	H	10		2		3			16	106
	C	31		2		3			37	
10. 7/07-7/20	H	8		2		2			12	81
	C	24		2		2			28	
11. 7/21-8/03	H								0	0
	C								0	
12. 8/04-8/17	H								0	0
	C								0	
13. 8/18-8/31	H	2							2	18
	C	6							6	
14. 9/01-9/14	H	2		1		1			4	26
	C	7		1		1			9	
15. 9/15-9/28	H	18		5		4			26	180
	C	53		5		4			61	
5. 9/29-10/12	H	2							2	15
	C	5							5	

Appendix 8. Continued. Section 5. Non-motorized Boat Anglers

17.	10/13-10/26	H	6		1		1		8	
		C	17		1		1		19	58
18.	10/27-11/09	H							0	
		C							0	0
19.	11/10-11/23	H							0	
		C							0	0
20.	11/24-12/07	H							0	
		C							0	0
21.	12/08-12/21	H							0	
		C							0	0
22.	12/22-1/04	H							0	
		C							0	0
23.	1/05-1/18	H							0	
		C							0	0
24.	1/19-2/01	H							0	
		C							0	0
25.	2/02-2/15	H							0	
		C							0	0
26.	2/16-2/29	H							0	
		C							0	0
<hr/>										
Totals		H	68	0	16	0	16	0	0	100
3/3/79-2/29/80		C	203	0	17	0	16	0	0	236
										690

Appendix 8. Continued. Estimated harvests (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 6. Bank Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
1. 3/03-3/16	H	7		0	20				27	456
	C	7		6	20				34	
2. 3/17-3/31	H	5		0	15				20	353
	C	5		5	15				25	
3. 4/01-4/13	H	75			25	25			125	269
	C	75			25	25			125	
4. 4/14-4/27	H	44			15	15			74	160
	C	44			15	15			74	
5. 4/28-5/11	H	22		4					26	196
	C	22		4					26	
6. 5/12-5/25	H	13		3					16	118
	C	13		3					16	
7. 5/26-6/08	H	6		1					7	58
	C	6		1					7	
8. 6/09-6/22	H	207		0					207	283
	C	207		14					221	
9. 6/23-7/06	H	127		0					127	173
	C	127		9					136	
10. 7/07-7/20	H	66		0					66	91
	C	66		5					71	
11. 7/21-8/03	H			137		14			151	152
	C			412		14			431	
12. 8/04-8/17	H			187		19			206	208
	C			562		19			581	
13. 8/18-8/31	H	83		0	12				95	388
	C	83		59	12				154	
14. 9/01-9/14	H	52			43				95	267
	C	69			43				112	
15. 9/15-9/28	H								0	0
	C								0	
16. 9/29-10/12	H	134		14	13	13			173	373
	C	160		40	13	13			226	

Appendix 8. Continued.

Section 6. Bank Anglers

17.	10/13-10/26	H	39	0	57	20	19	135	174		
		C	58	251	77	20	19	425			
18.	10/27-11/09	H	17	0	25	8	8	58	75		
		C	26	108	33	8	8	183			
19.	11/10-11/23	H	36		42			78	220		
		C	36		42			78			
20.	11/24-12/07	H	26		31			57	162		
		C	26		31			57			
21.	12/08-12/21	H						0	0		
		C						0			
22.	12/22-1/04	H						0	0		
		C						0			
23.	1/05-1/18	H	19	74				93	19		
		C	19	74				93			
24.	1/19-2/01	H						0	0		
		C						0			
25.	2/02-2/15	H	54	218				272	55		
		C	54	218				272			
26.	2/16-2/29	H	27	109				136	27		
		C	27	109				136			
Totals		H	1059	0	747	298	68	73	0	2245	4277
3/3/79-2/29/80		C	1130	0	1880	326	68	73	0	3477	

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 6. Motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
1. 3/03-3/16	H C								0 0	0
2. 3/17-3/31	H C								0 0	0
3. 4/01-4/13	H C	23 25		0 1			1 1		24 27	43
4. 4/14-4/27	H C								0 0	0
5. 4/28-5/11	H C	61 67		0 2			2 2		63 71	115
6. 5/12-5/25	H C								0 0	0
7. 5/26-6/08	H C								0 0	0
8. 6/09-6/22	H C								0 0	0
9. 6/23-7/06	H C	93 102		0 3			3 3		96 108	174
10. 7/07-7/20	H C	38 42		0 1			1 1		39 44	71
11. 7/21-8/03	H C	11 12							11 12	20
12. 8/04-8/17	H C	35 39		0 1			1 1		36 41	66
13. 8/18-8/31	H C	81 90		0 3			3 3		84 96	154
14. 9/01-9/14	H C	2 2							2 2	4
15. 9/15-9/28	H C								0 0	0
16. 9/29-10/12	H C								0 0	0

Appendix 8. Continued.

Section 6. Motorized Boat Anglers

17.	10/13-10/26	H							0		
		C							0		0
18.	10/27-11/09	H							0		
		C							0		0
19.	11/10-11/23	H							0		
		C							0		0
20.	11/24-12/07	H	10						10		
		C	11						11		18
21.	12/08-12/21	H							0		
		C							0		0
22.	12/22-1/04	H							0		
		C							0		0
23.	1/05-1/18	H							0		
		C							0		0
24.	1/19-2/01	H							0		
		C							0		0
25.	2/02-2/15	H							0		
		C							0		0
26.	2/16-2/29	H							0		
		C							0		0
<hr/>											
Totals		H	354	0	0	0	0	11	0	365	
3/3/79-2/29/80		C	390	0	11	0	0	11	0	412	665

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 6. Non-motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
1. 3/03-3/16	H C								0 0	0
2. 3/17-3/31	H C								0 0	0
3. 4/01-4/13	H C								0 0	0
4. 4/14-4/27	H C								0 0	0
5. 4/28-5/11	H C	4 15			2 2	1 1	4 4		11 22	38
6. 5/12-5/25	H C								0 0	0
7. 5/26-6/08	H C								0 0	0
8. 6/09-6/22	H C	4 12			1 2	1 1	3 3		9 18	31
9. 6/23-7/06	H C	5 16			2 2	1 1	4 4		12 23	41
10. 7/07-7/20	H C	6 20			3 3	1 1	5 5		15 29	51
11. 7/21-8/03	H C	6 19			3 3	1 1	5 5		15 28	49
12. 8/04-8/17	H C	4 11			1 1	1 1	3 3		9 16	28
13. 8/18-8/31	H C	31 99			13 13	6 6	25 25		75 143	248
14. 9/01-9/14	H C	6 16			2 2		4 4		12 22	39
15. 9/15-9/28	H C								0 0	0
16. 9/29-10/12	H C	14 48			6 6	3 3	12 12		35 69	119

Appendix 8. Continued. Section 6. Non-motorized Boat Anglers

17.	10/13-10/26	H	7			3	1	6		17	
		C	23			3	1	6		33	58
18.	10/27-11/09	H								0	
		C								0	0
19.	11/10-11/23	H								0	
		C								0	0
20.	11/24-12/07	H								0	
		C								0	0
21.	12/08-12/21	H								0	
		C								0	0
22.	12/22-1/04	H								0	
		C								0	0
23.	1/05-1/18	H								0	
		C								0	0
24.	1/19-2/01	H								0	
		C								0	0
25.	2/02-2/15	H								0	
		C								0	0
26.	2/16-2/29	H								0	
		C								0	0
<hr/>											
Totals		H	87	0	0	36	16	71	0	210	
3/3/79-2/29/80		C	279	0	0	37	16	71	0	403	702

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 7. Bank Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
1. 3/03-3/16	H	126		28					154	522
	C	126		28					154	
2. 3/17-3/31	H	78		17					95	320
	C	78		17					95	
3. 4/01-4/13	H	101		22					123	416
	C	101		22					123	
4. 4/14-4/27	H	27		6					33	109
	C	27		6					33	
5. 4/28-5/11	H	65			22				87	358
	C	65			22				87	
6. 5/12-5/25	H	14			5				19	78
	C	14			5				19	
7. 5/26-6/08	H	6	1	2	2				11	61
	C	8	1	3	2				14	
8. 6/09-6/22	H	29	7	7	7				50	292
	C	36	7	14	7				64	
9. 6/23-7/06	H	137		27					164	315
	C	137		27					164	
10. 7/07-7/20	H	214							214	454
	C	214							214	
11. 7/21-8/03	H	6		2	1		3		12	15
	C	15		2	1		3		21	
12. 8/04-8/17	H	85		34	8		43		170	213
	C	221		34	8		43		306	
13. 8/18-8/31	H	48							48	253
	C	172							172	
14. 9/01-9/14	H	70		0		52	18		140	381
	C	87		18		52	18		175	
15. 9/15-9/28	H	30		0	7		3		40	154
	C	47		7	10		3		67	
16. 9/29-10/12	H	60		0	13		7		80	308
	C	93		13	20		7		133	

## Appendix 8. Continued.

## Section 7. Bank Anglers

17.	10/13-10/26	H	78	0	17	9	104	398			
		C	120	17	26	9	172				
18.	10/27-11/09	H	63	0	15	7	85	324			
		C	99	14	21	7	141				
19.	11/10-11/23	H	48	0	11	6	65	251			
		C	76	11	16	6	109				
20.	11/24-12/07	H	7	0	2	1	10	36			
		C	11	2	2	1	16				
21.	12/08-12/21	H	19	6	2		27	59			
		C	23	6	2		31				
22.	12/22-1/04	H	19	5	2		26	55			
		C	22	5	2		29				
23.	1/05-1/18	H	29	9	3		41	89			
		C	35	9	3		47				
24.	1/19-2/01	H	15	5	2		22	46			
		C	18	5	2		25				
25.	2/02-2/15	H	41	12	5	1	59	126			
		C	50	12	5	1	68				
26.	2/16-2/29	H	82	24	9	2	116	250			
		C	99	24	9	2	134				
Totals		H	1497	8	206	133	55	96	0	1995	5883
3/3/79-2/29/80		C	1995	8	296	163	55	96	0	2613	

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 7. Motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
1. 3/03-3/16	H	147			23	11			181	684
	C	170			34	11			215	
2. 3/17-3/31	H	90			14	7			111	421
	C	104			21	7			132	
3. 4/01-4/13	H	117			18	9			144	546
	C	135			27	9			171	
4. 4/14-4/27	H	15			2	1			18	68
	C	17			3	1			21	
5. 4/28-5/11	H								0	0
	C								0	
6. 5/12-5/25	H	5							5	59
	C	5							5	
7. 5/26-6/08	H								0	0
	C								0	
8. 6/09-6/22	H								0	0
	C								0	
9. 6/23-7/06	H	40							40	369
	C	50							50	
10. 7/07-7/20	H	127							127	311
	C	127							127	
11. 7/21-8/03	H	14		5	5		14		38	118
	C	14		5	5		14		38	
12. 8/04-8/17	H	24		8	8		24		64	199
	C	24		8	8		24		64	
13. 8/18-8/31	H	16			2				18	27
	C	25			2				27	
14. 9/01-9/14	H	50				10	20		80	60
	C	81				10	20		111	
15. 9/15-9/28	H								0	0
	C								0	
16. 9/29-10/12	H								0	0
	C								0	

## Appendix 8. Continued.

## Section 7. Motorized Boat Anglers

17.	10/13-10/26	H	17		4		3		24	
		C	17		4		3		24	44
18.	10/27-11/09	H	9		1		2		12	
		C	9		1		2		12	22
19.	11/10-11/23	H							0	
		C							0	0
20.	11/24-12/07	H							0	
		C							0	0
21.	12/08-12/21	H							0	
		C							0	0
22.	12/22-1/04	H							0	
		C							0	0
23.	1/05-1/18	H							0	
		C							0	0
24.	1/19-2/01	H							0	
		C							0	0
25.	2/02-2/15	H							0	
		C							0	0
26.	2/16-2/29	H							0	
		C							0	0
Totals		H	671	0	13	77	38	63	0	862
3/3/79-2/29/80		C	778	0	13	105	38	63	0	997
										2928

Appendix 8. Continued. Estimated harvest (H) and catch (C) for each angler type by section and interval, South Fork Snake River, 1979-80.

Section 7. Non-motorized Boat Anglers

Interval date		WCT	HCT	WF	Brn	WRB	HRB	Lake	Total	Estimated effort (hr)
1.	3/03-3/16								0	0
		H							0	
		C							0	
2.	3/17-3/31								0	0
		H							0	
		C							0	
3.	4/01-4/13								0	0
		H							0	
		C							0	
4.	4/14-4/27		9		8				17	
		H							17	
		C	9		8				17	69
5.	4/28-5/11								0	0
		H							0	
		C							0	
6.	5/12-5/25								0	0
		H							0	
		C							0	
7.	5/26-6/08								0	0
		H							0	
		C							0	
8.	6/09-6/22								0	0
		H							0	
		C							0	
9.	6/23-7/06		152		5				157	
		H							157	
		C	152		5				157	354
10.	7/07-7/20		132				15		147	
		H							147	
		C	132				15		147	220
11.	7/21-8/03		13				6		19	
		H							19	
		C	13				6		19	103
12.	8/04-8/17		8				4		12	
		H							12	
		C	8				4		12	66
13.	8/18-8/31		75	10	13	3	32		133	
		H							133	
		C	123	10	17	3	32		185	221
14.	9/01-9/14		129		18	5	31		183	
		H							183	
		C	138		18	5	31		192	241
15.	9/15-9/28		78	0			7		85	
		H							85	
		C	92	7			7		106	180
16.	9/29-10/12		146	0			13		159	
		H							159	
		C	173	13			13		199	338

Appendix 8. Continued. Section 7. Non-motorized Boat Anglers

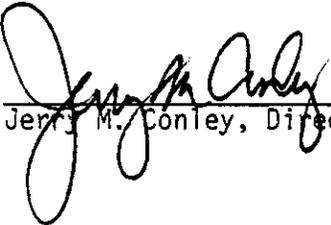
17.	10/13-10/26	H	31	0		3		34	72	
		C	37	3		3		43		
18.	10/27-11/09	H	24	0		2		26	55	
		C	28	2		2		32		
19.	11/10-11/23	H	16	0		2		18	39	
		C	19	2		2		23		
20.	11/24-12/07	H						0	0	
		C						0		
21.	12/08-12/21	H						0	0	
		C						0		
22.	12/22-1/04	H						0	0	
		C						0		
23.	1/05-1/18	H						0	0	
		C						0		
24.	1/19-2/01	H						0	0	
		C						0		
25.	2/02-2/15	H						0	0	
		C						0		
26.	2/16-2/29	H						0	0	
		C						0		
Totals		H	813	0	10	44	8	115	0	990
3/03/79-2/29/80		C	924	0	37	48	8	115	0	1132
1958										

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