

IDAHO

FISH & GAME DEPARTMENT

Joseph C. Greenley, Director

EVALUATION OF ANGLING REGULATIONS IN MANAGEMENT OF CUTTHROAT TROUT
Job Performance Report

Project F-59-R-6



Period Covered: 1 March 1974 to 28 February 1975 by

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July, 1975

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JOB COMPLETION REPORT
RESEARCH PROJECT SEGMENT

State of Idaho Name: EVALUATION OF ANGLING REGULATIONS IN MANAGEMENT OF CUT-THROAT TROUT
Project No. F-59-R-6
Job No. 1 Title: Same as above.
Period Covered: March 1, 1974 to February 28, 1975
(also summarizes 6 years of pertinent data)

ABSTRACT:

We report here the effects of special angling regulations on native cutthroat trout populations in three Northern Idaho streams. The Kelly Creek drainage has been under a catch-and-release regulation since 1970. A trophy-fish regulation was initiated on the upper St. Joe River in 1971. The drainage of the North Fork of the Clearwater River above Kelly Forks has a standard catch-and-keep regulation and serves as a control stream.

Cutthroat trout abundance and mean size has increased in the streams with special regulations. We counted 5 times more cutthroat per snorkeling transect on Kelly Creek in 1974 compared to 1970. In the upper St. Joe River, there has been a 2- to 8-fold increase in cutthroat numbers since 1970. The numbers of cutthroat counted in the North Fork have remained virtually unchanged since 1970.

Cutthroat caught by project personnel from Kelly Creek in 1974 averaged 36 millimeters (1.4 inches) longer than fish caught in 1970. Cutthroat trout caught from the sections of the St. Joe River under the trophy-fish regulation averaged 33 millimeters (1.3 inches) longer in 1974 than in 1969-1970.

We observed large numbers of age I and II cutthroat trout in the St. Joe River transects for the first time in 1974. These fish are the offspring of cutthroat first saved by the trophy-fish regulation and/or the result of good spawning success in 1973. We observed trout fry and juvenile cutthroat in newly established transects in upper Kelly Creek in 1974, but did not find trout fry or juvenile cutthroat in the North Fork transects.

The catch of cutthroat per hour on the St. Joe River in 1974 was 6 times the rate of 1968. Three percent (3%) of the cutthroat we captured were "keepers" (longer than 13 inches) in 1974 while only 0.1% were "keepers" in 1969-1970. Project personnel caught 1 "keeper"/angler/day in 1974.

Cutthroat move down out of the three study areas in the fall and many return the next summer. Fish tagged in the summer remain close to the point of tagging all summer. Multiple recaptures of tagged cutthroat is common during the summer.

Squawfish were present in Kelly Creek and the North Fork for the first time in 1974.

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RECOMMENDATIONS:

We recommend that the evaluation of the catch-and-release and trophy-fish regulations continue through 1975. Full impact of the regulations will not be apparent until offspring of the fish saved beginning in 1970 and 1971 have had a chance to reproduce and contribute to the population.

OBJECTIVES:

We intend to:

- I. Assess the impact of catch-and-release and trophy-fish angling regulations on native cutthroat trout populations in Northern Idaho rivers.

To do this we will:

- A. Assess fish species composition, age structures, and abundance of major indigenous populations.
 - B. Assess fish movements and determine fish growth.
 - C. Assess size classes of fish in the catch and catch rates.
 - D. Determine angler fishing habits, preferences, and opinions.
- II. Compare fish populations and fisheries managed with catch-and-release, trophy-fish, and normal angling regulations.

TECHNIQUES USED:

Stream dwelling populations of native cutthroat have declined in recent years. The primary cause of decline was the increase in fishing pressure and cutthroat harvest wherever roads improved angler access. Changes in the management of the cutthroat populations and their fisheries were necessary to halt the declining trends. The management alternatives considered include: (1) Supplemental stocking of cutthroat fry or fingerlings which has not proven effective; (2) Habitat improvement

which is costly or infeasible in most Western streams; and (3) special angling regulations such as catch-and-release and trophy-fish programs to reduce mortality. This project was undertaken to assess the biological changes in stream dwelling cutthroat trout populations caused by catch-and-release and trophy-fish regulations.

We are studying the fish and fisheries of three Northern Idaho streams. The Kelly Creek drainage (Figure 1) has been under a catch-and-release regulation since 1970. A trophy-fish regulation was initiated on the St. Joe River above Prospector Creek in 1971 (Figure 2). The St. Joe River from the town of Avery to Prospector Creek has a standard catch-and-keep regulation and is supplementally stocked with rainbow trout. The drainage of the North Fork of the Clearwater River above Kelly Forks has a standard catch-and-keep regulation with no supplemental stocking and serves as a control stream (Figure 1). We are studying 22 miles of Kelly Creek, 4 miles of one of Kelly Creek's major tributaries (Cayuse Creek), 23 miles of the North Fork of the Clearwater River, and 44 miles of the St. Joe River.

The type of access to streams affects the amount of angling and the cutthroat harvest. We divided each study area into sections based upon the presence or absence of roads or trails along the streams to allow comparisons between similar sections of the three study streams (Figures 1 and 2).

Within each section of each stream we located and marked longitudinal trend count stations (transects) varying from 46 meters to 185 meters (50 yards to 200 yards) in length at sites which we considered good cutthroat habitat (Figures 3 and 4). We took photographs of each transect and recorded the transect location and description to allow

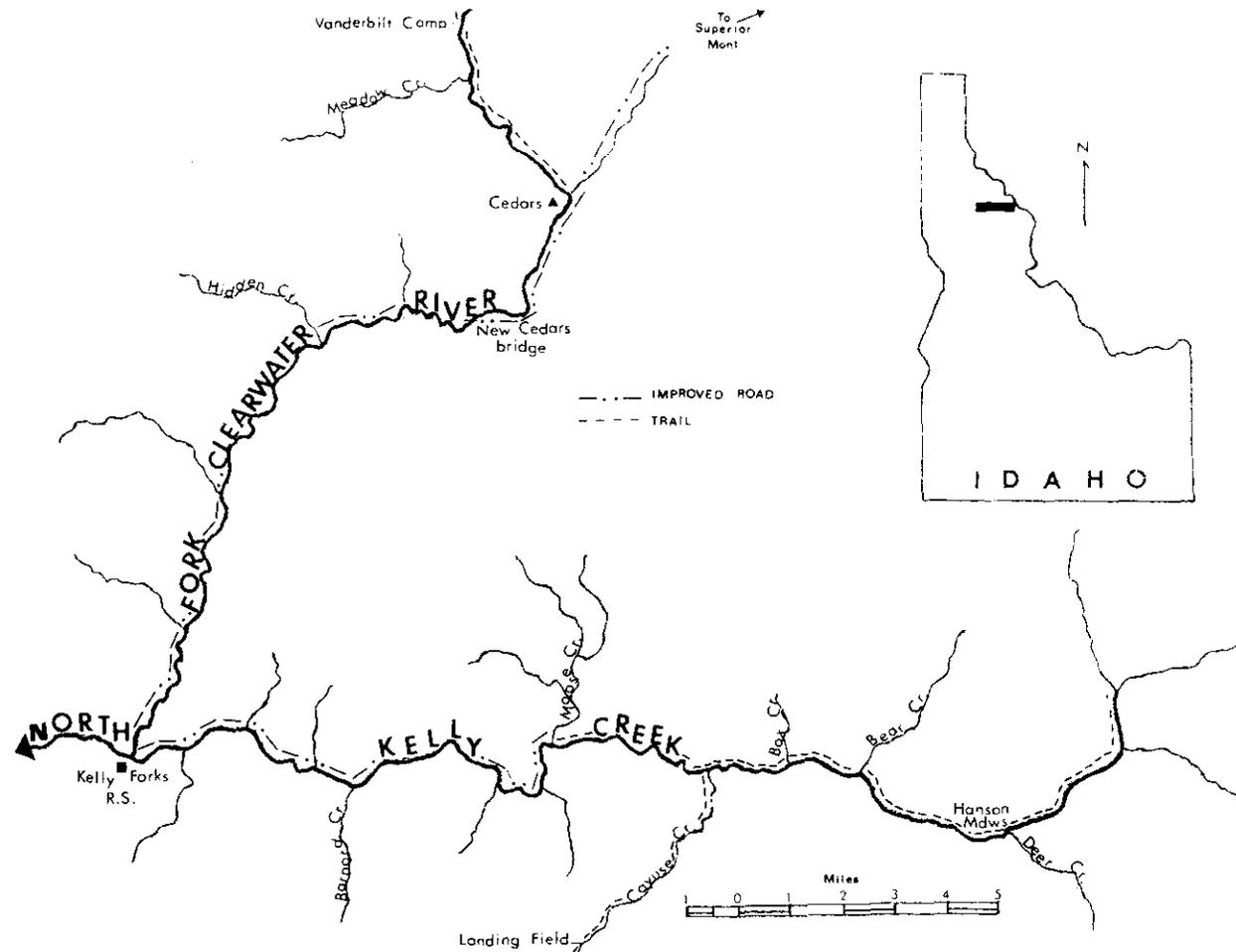


Figure 1. Location of the Kelly Creek - North Fork study area showing type of access to the streams. The Kelly Creek drainage is under a special (catch-and-release) regulation and the North Fork of the Clearwater River drainage has a standard (3 fish bag, no size limit) regulation.

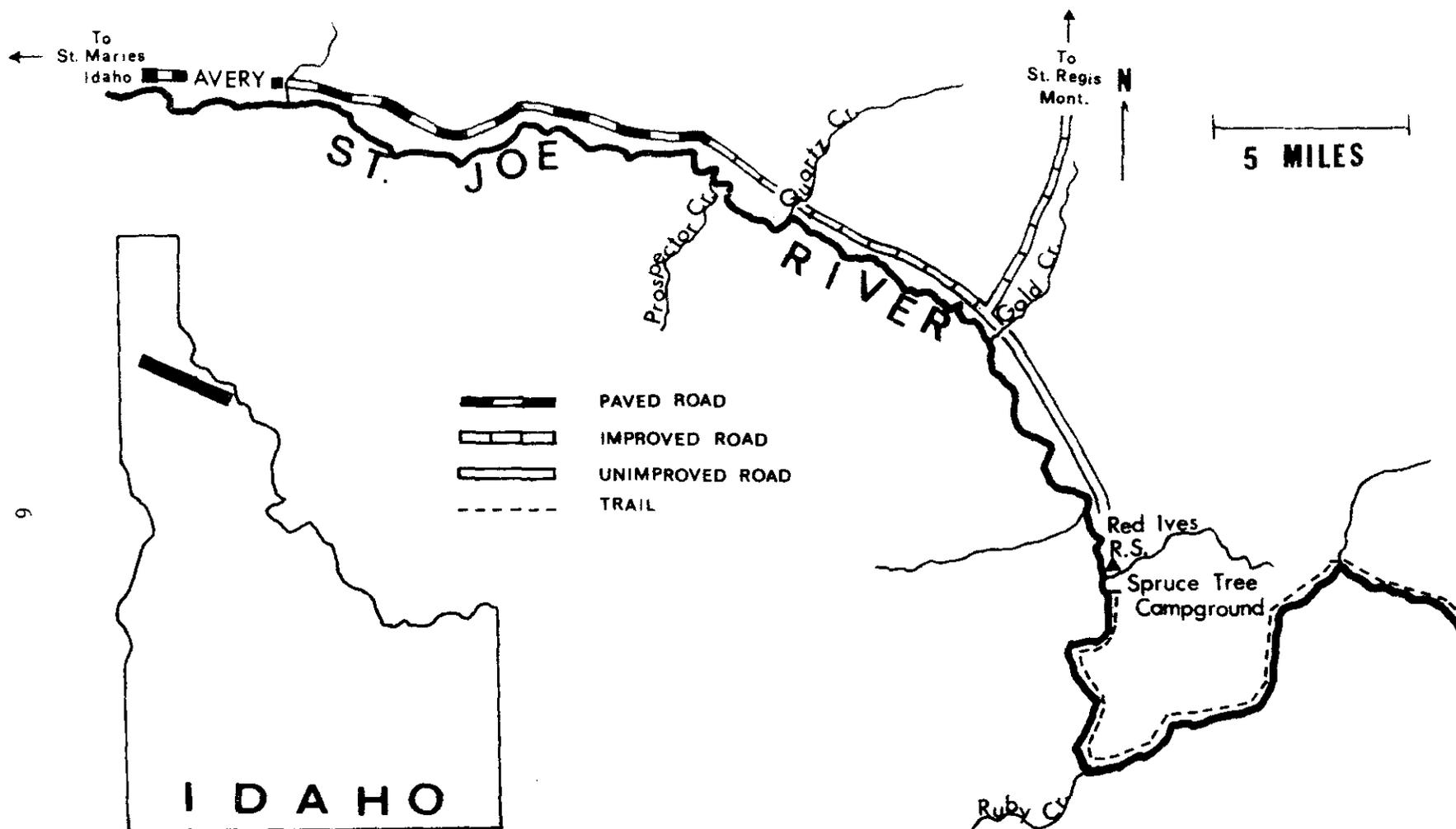


Figure 2. Location of the St. Joe River study area showing type of access. The St. Joe River below Prospector Creek is under a standard (10 fish bag, no size limit) regulation and is supplementally stocked with rainbow trout. Above Prospector Creek, a special (trophy-fish) regulation is in effect which sets a 3 fish daily bag limit provided each fish in the bag is 13 inches in length or longer.

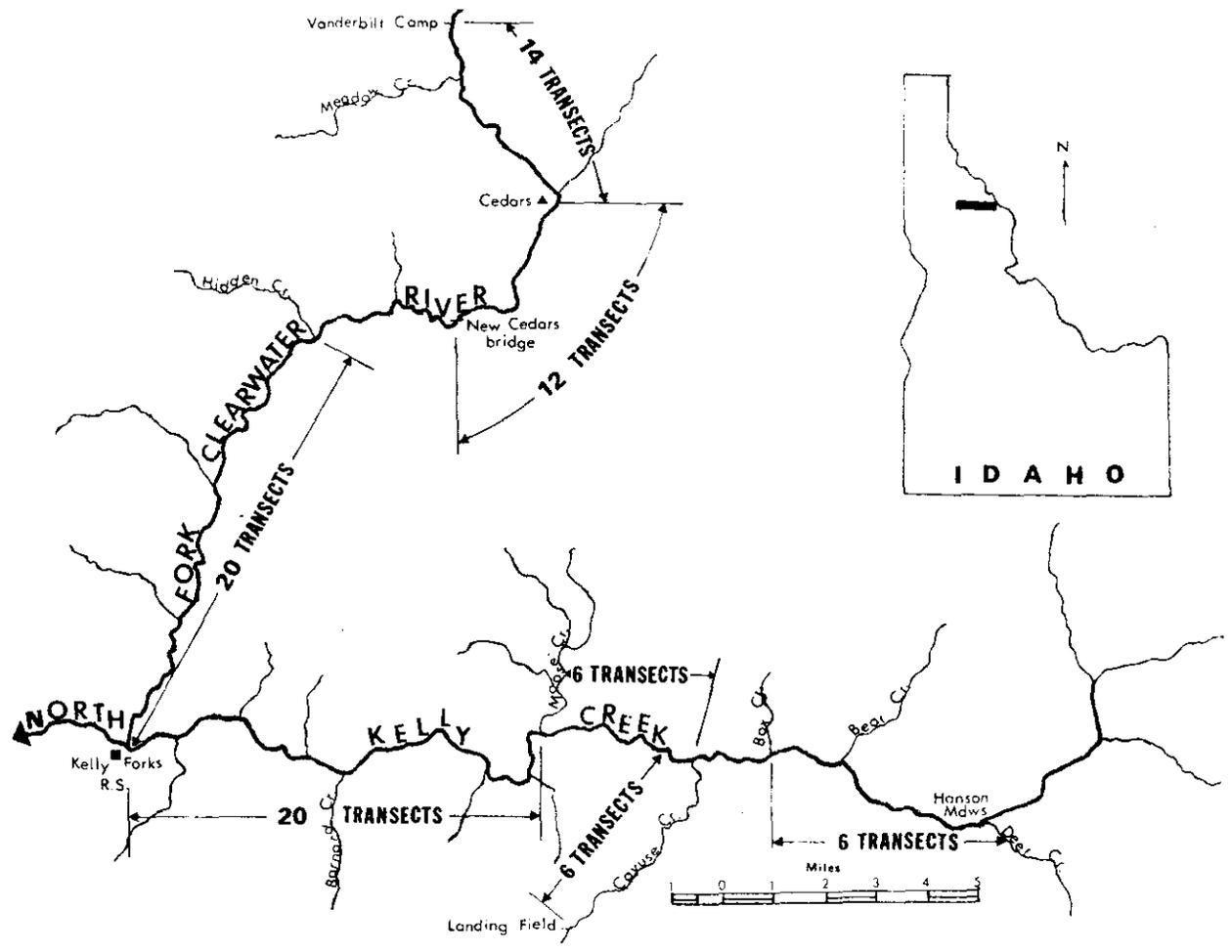


Figure 3. Number of snorkeling transects per study section in the Kelly Creek - North Fork study areas.

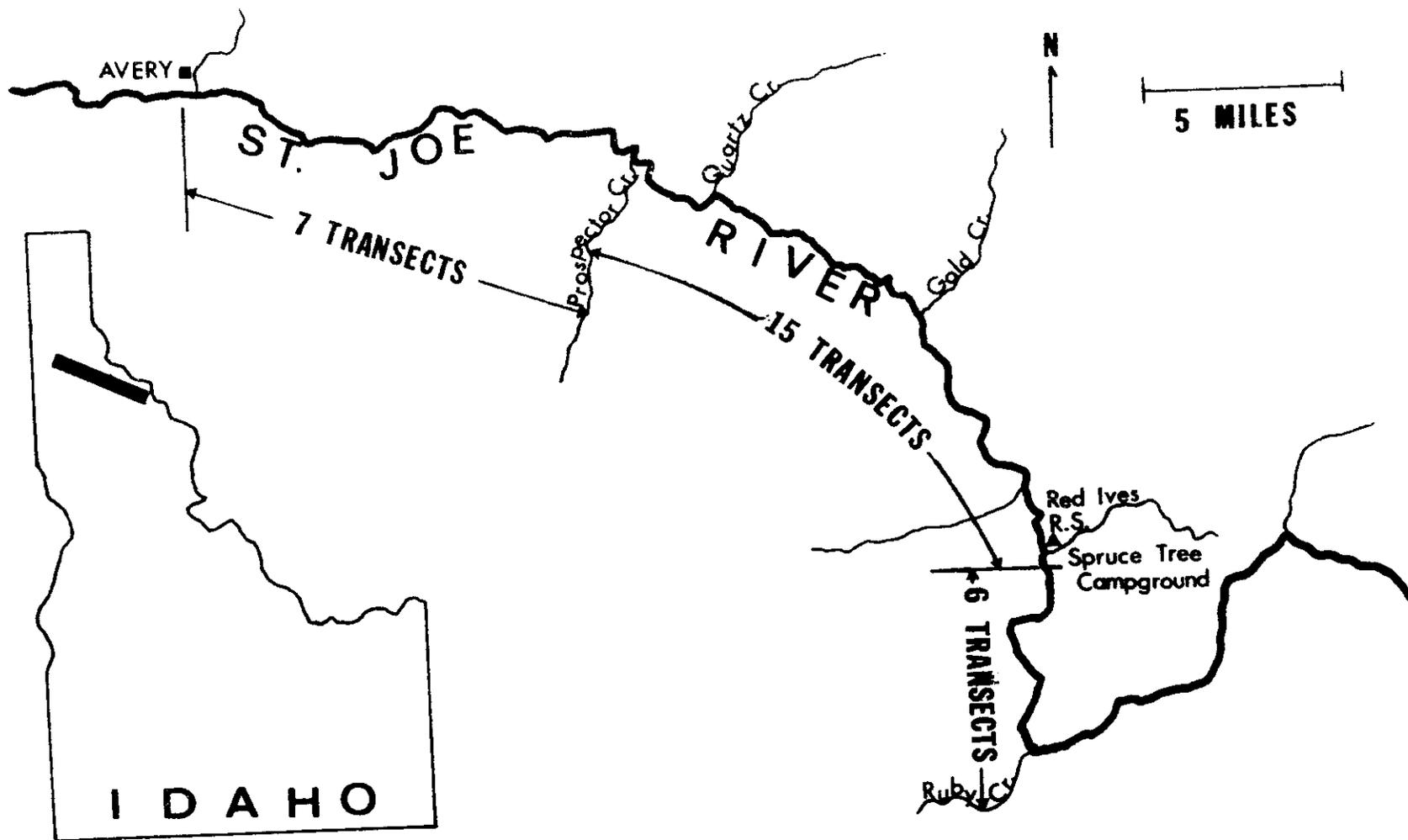


Figure 4. Number of snorkeling transects per study section in the St. Joe River study area.

the counting of the same transects each year. Using wet suits and snorkels, two divers simultaneously floated down opposite sides of each transect and counted to the middle of the stream. By remaining as motionless as possible while floating we observed the fish without alarming them. We enumerated all of the fish by species and separated cutthroat and rainbow trout into size classes.

We endeavored to count fish in the transects on clear days with minimum cloud cover between the hours of 0930 and 1630 when visibility was maximum. We floated all of the St. Joe River transects and the lower 20 transects of Kelly Creek and the North Fork at times comparable to previous years. We counted all of the newly established Kelly Creek and North Fork transects during the month of August. We believe that movement of fish from section to section was negligible in August of 1974. We will assess the species composition, age structures, and abundance of the major indigenous fish populations using transect counts.

We captured fish by hook-and-line, tagged the cutthroat trout and rainbow trout with monel metal mandible tags, measured total and fork lengths, and released all fish at the capture site. Angler cooperation in the return of information from tagged fish to assess fish movement and growth is an important part of the study and was encouraged by project personnel. We placed posters in the study areas requesting the return of tag information and talked to as many anglers as possible.

Scales were taken from above the lateral line and below the insertion of the dorsal fin on the left side of the fish. The scales will be analyzed to determine fish age and growth history.

We interviewed anglers on the three study streams to assess angler effort, catch, methods, party size, residence, preferences for fish size, and angler opinions as to the desirability of catch-and-release and trophy-fish regulations. We asked anglers to report only the actual time spent fishing, not time spent driving or participating in other activities. When multiple fishing methods were used we recorded a single method based upon the most successful method or the method most often used. We contacted anglers in the course of other project activities or while on trips up and down the streams, but did not make special efforts to conduct an in-depth creel census in 1974. Many anglers interviewed were those that left notes or stopped to talk to us at our residence.

FINDINGS:

Transects

Cutthroat trout populations in Kelly Creek and the St. Joe River have increased in abundance as a result of the catch-and-release and trophy-fish regulations. Cutthroat trout have not increased in abundance in the North Fork of the Clearwater River where various standard regulations have been in effect.

Kelly Creek - North Fork

In Kelly Creek from Kelly Forks to Moose Creek, we counted the side of the transect nearest the road as in previous years and also counted the entire transect as described earlier. Our counts of the entire transects averaged 7 cutthroat, 3 adult rainbow, and 14 whitefish per transect on July 22 and 8 cutthroat, 4 adult rainbow, 1 juvenile rainbow, and 30 whitefish per transect by August 12. Using the method of previous years we counted an average of 4 cutthroat, 3 rainbow, and 7 whitefish per transect on July 22 and 3 cutthroat, 1 adult rainbow, 1 juvenile

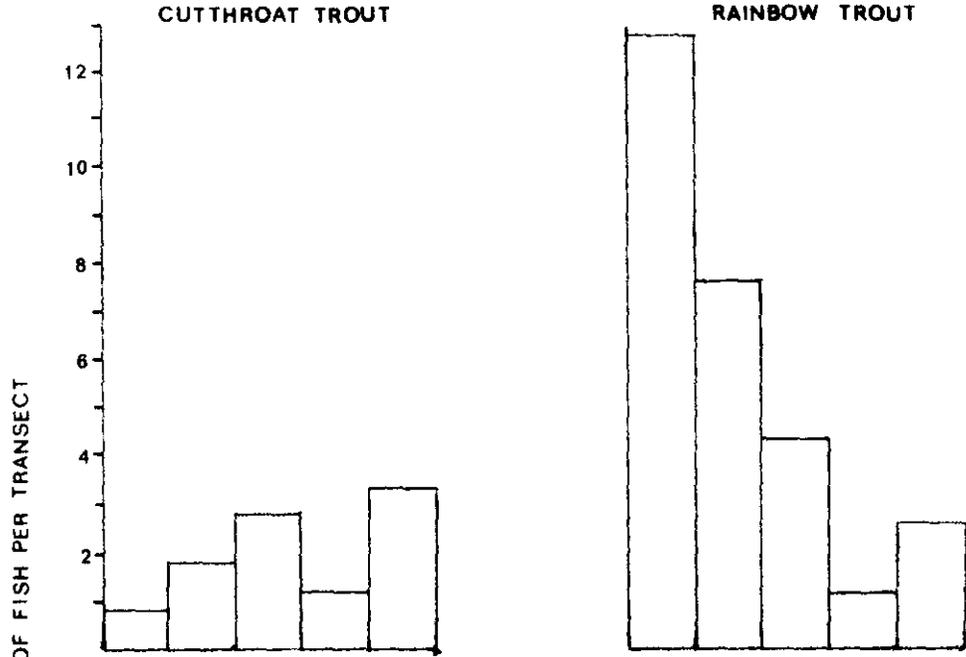
rainbow, and 15 whitefish per transect on August 12. The 1974 counts of cutthroat in Kelly Creek were 4.6 times larger than the 1970 counts and the abundance of rainbow has decreased slightly since 1972 (Figure 5).

In Kelly Creek we counted more adult cutthroat and adult rainbow as we moved upstream (Figure 6). We counted an average of three times more adult cutthroat and up to twice as many adult rainbow in the Box Creek to Deer Creek transects compared to the Kelly Forks to Moose Creek transects. We counted 47 juvenile cutthroat (cutthroat less than 6 inches long when viewed under water) from Box Creek to Deer Creek while none were counted from Kelly Forks to Moose Creek. Juvenile rainbow, scarce from Kelly Forks to Moose Creek, were present in large numbers from Moose Creek to Deer Creek and outnumbered the adult rainbow in these sections. We noted a few trout fry (not identified to species) in the river from Moose Creek to Deer Creek, but none were counted below Moose Creek. Cutthroat trout outnumbered rainbow trout throughout the Kelly Creek study area (Figure 6).

In the North Fork of the Clearwater River, we counted an average of 1 cutthroat, 2 adult rainbow, and 12 whitefish per entire transect from Kelly Forks to Hidden Creek on July 24 and 1 cutthroat, 2 adult rainbow, 1 juvenile rainbow, and 24 whitefish per transect on August 10. On the side of the transect nearest the road, we counted, per transect, fewer than 1 cutthroat, 1 rainbow, and 6 whitefish on July 24 and fewer than 1 cutthroat, 1 rainbow, and 13 whitefish on August 10. The abundance of cutthroat in the North Fork has not changed since 1970 and the rainbow have decreased in abundance compared to 1972 (Figure 5).

As we moved upstream in the North Fork we found no change in cutthroat or rainbow numbers (Figure 6). No trout fry, juvenile cutthroat, or

**KELLY CREEK
(special regulations)**



**NORTH FORK
(standard regulations)**

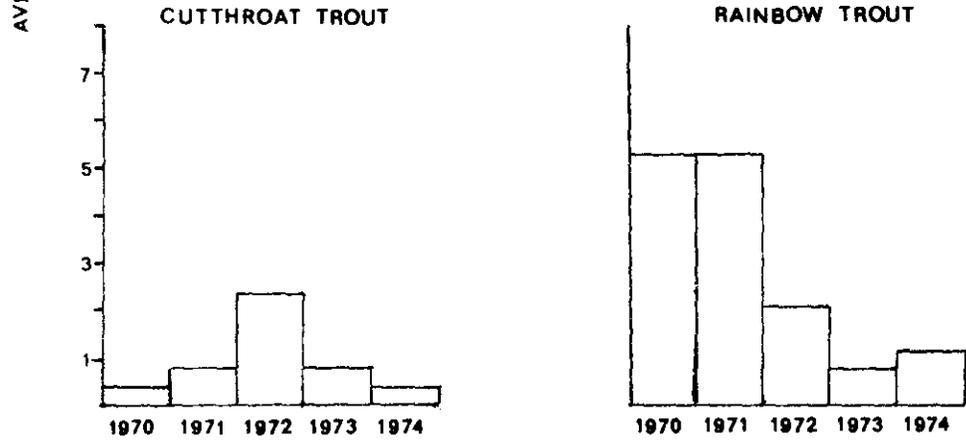


Figure 5. Average number of cutthroat and rainbow trout counted on the roadside of each snorkeling transect in lower Kelly Creek (Kelly Forks to Moose Creek) and the lower North Fork of the Clearwater River (Kelly Forks to Hidden Creek) from 1970 to 1974.

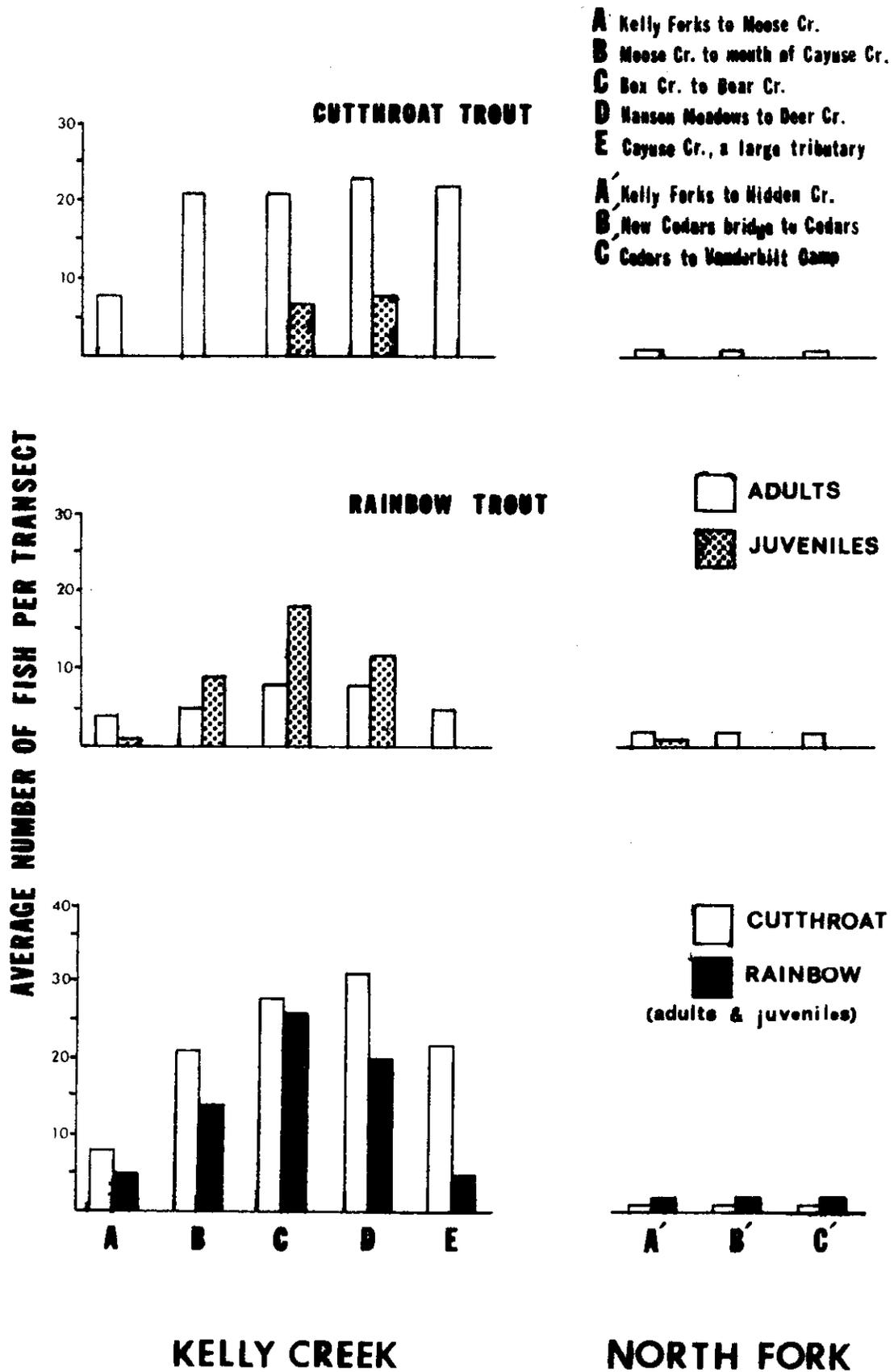


Figure 6. The abundance of adult and juvenile cutthroat and rainbow trout in Kelly Creek (catch-and-release regulations) and the North Fork of the Clearwater River (standard regulations) by study section in 1974.

juvenile rainbow were counted above Hidden Creek. Rainbow trout outnumbered cutthroat throughout the North Fork study area (Figure 6).

Dolly Varden were more abundant in the North Fork study area than in the Kelly Creek study area. We counted 41 Dolly Varden in 46 transects in the North Fork and 12 Dolly Varden in 38 transects in Kelly Creek.

St. Joe River

In the St. Joe River from Avery to Prospector Creek, we counted an average of 4 cutthroat, 1 wild rainbow, 16 hatchery rainbow, and 39 whitefish per transect in 1974. Cutthroat trout were 8 times more abundant in this section in 1974 compared to 1970 (Figure 7). In 1974, we counted 27 cutthroat, 1 wild rainbow, 3 hatchery rainbow, and 25 whitefish per transect in the river from Prospector Creek to Spruce Tree Campground, nearly 5 times more cutthroat than in 1970 (Figure 7). We counted 47 juvenile cutthroat in the top three transects in this section. In the transects from Spruce Tree to Ruby Creek, we counted an average of 39 adult cutthroat, 20 juvenile cutthroat, no rainbow, and 28 whitefish per transect in 1974. Cutthroat abundance in this upper roadless section of the river more than doubled over 1970 (Figure 7). We counted 12 age I cutthroat in the transect at the mouth of Ruby Creek in 1974, a noticeable increase over past years.

This is the first year that age I and age II cutthroat have been counted in large numbers in St. Joe River transects. We believe these small fish are the offspring of the cutthroat trout saved by the trophy-fish regulation when first put into effect (Figure 8). Cutthroat of age groups III and IV were the most abundant in 1971. Age III cutthroat were 119 mm (4.7 inches) long and age IV cutthroat were 187 mm (7.8 inches) long at the start of 1971 (Rankel, 1971). Spawning occurs at ages V and VI

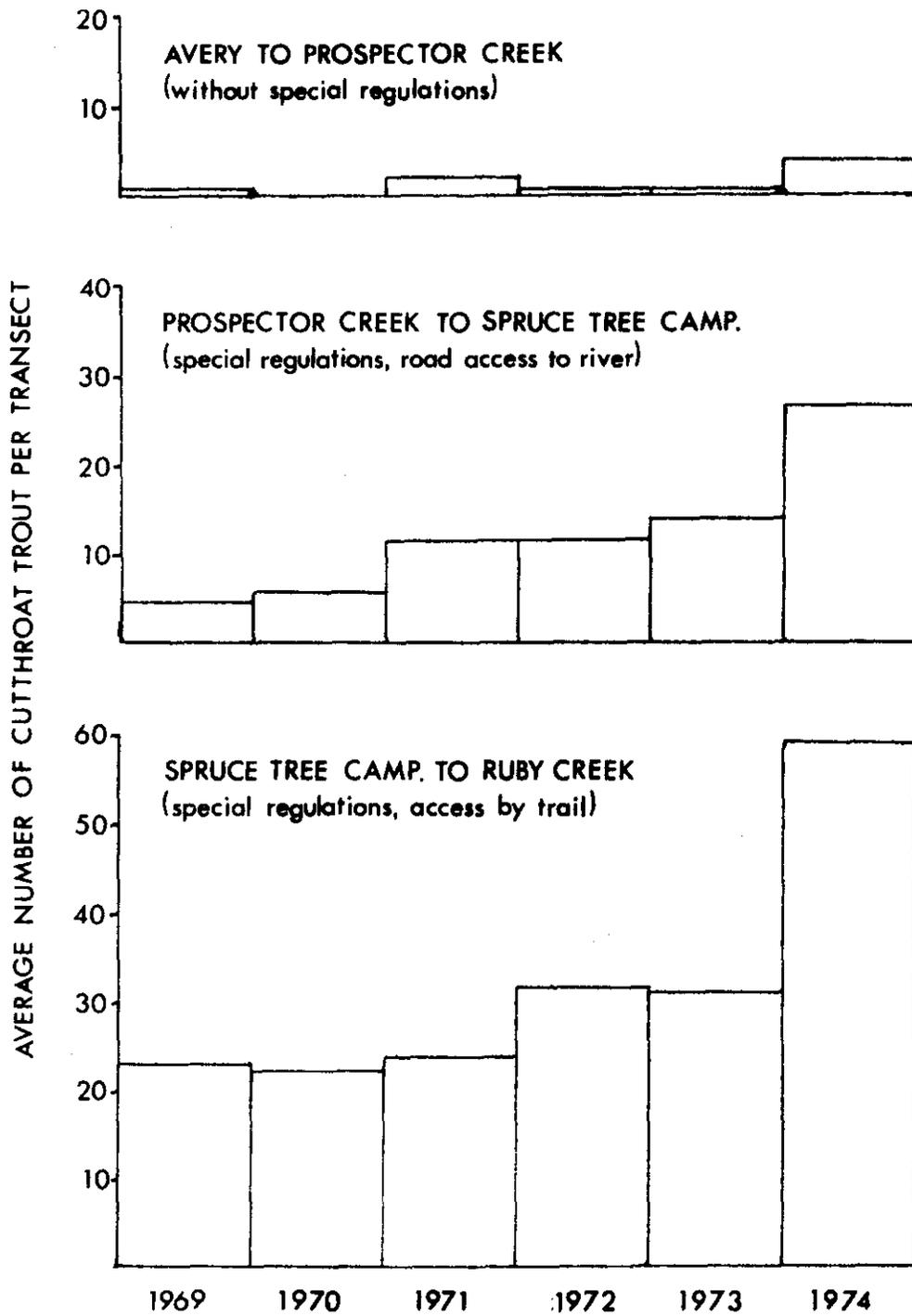
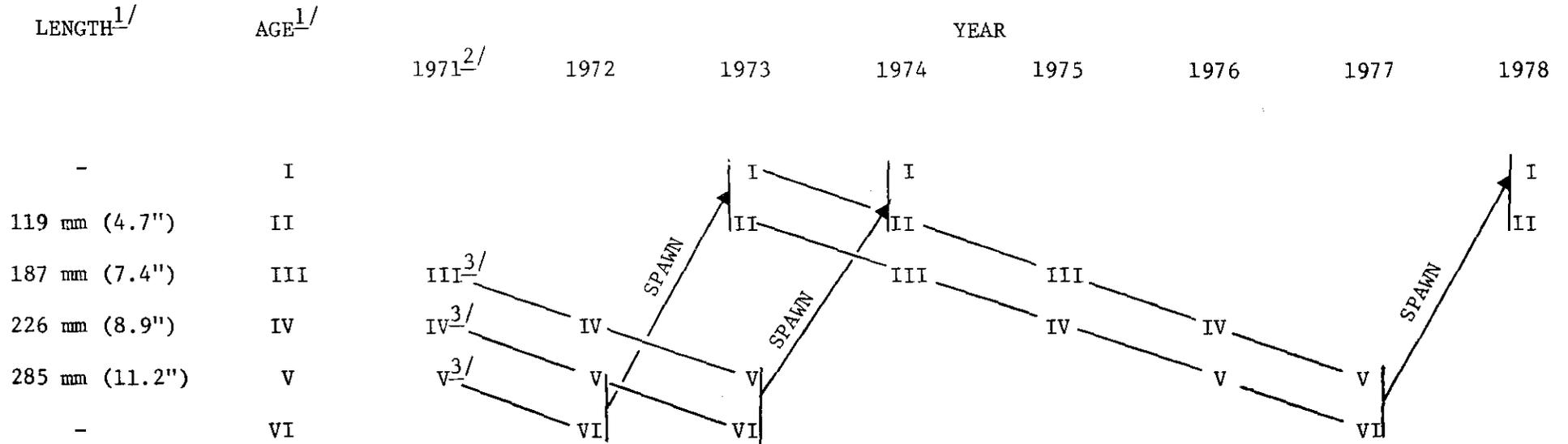


Figure 7. Average number of cutthroat trout per snorkeling transect for each study section of the St. Joe River from 1969 to 1974.



^{1/}Rankel, 1971

^{2/}First year of special regulation

^{3/}These fish were released if captured because of trophy-fish regulation

Figure 8. Cutthroat trout "saved" by the special regulation in 1971 spawned at age V and age VI in 1972 and 1973. The offspring of these fish were observed in the Ruby Creek transects in 1973 and 1974 as age I and age II trout. The full effect of the trophy-fish regulation will be more clearly known with the spawning of these offspring in 1977 and the number of age I and age II cutthroat observed in 1978.

(Rankel, 1971) so these age III and IV fish, protected by the trophy-fish regulation, were allowed to mature and spawned in 1972 and 1973. The progeny of these fish were ages I and II in 1974 and accounted for the increased number of small fish counted in the uppermost transects in 1974.

Species Composition

Kelly Creek - North Fork

The relative abundance of cutthroat and rainbow trout increased as we moved upstream in Kelly Creek and the North Fork. In Kelly Creek, the cutthroat and rainbow increased in abundance while the other species decreased in abundance as we moved upstream (Figure 9). In the North Fork, the cutthroat and rainbow numbers remained about the same, but the other species decreased in abundance as we moved upstream (Figure 10).

Species present in the entire Kelly Creek study area in decreasing order of abundance are: mountain whitefish, Prosopium williamsoni (Girard); cutthroat trout, Salmo clarki lewisi Richardson; largescale sucker, Catostomous macrocheilus Girard; rainbow steelhead, Salmo gairdneri gairdneri Richardson; northern squawfish, Ptychocheilus oregonensis (Richardson); redbelly shiner, Richardsonius balteatus (Richardson); and Dolly Varden, Salvelinus malma (Walbaum). Species present in the North Fork study area in decreasing order of abundance are: mountain whitefish; largescale sucker; rainbow steelhead; cutthroat trout; Dolly Varden; and northern squawfish.

Squawfish were present in Kelly Creek and the North Fork for the first time in 1974. Their presence is probably a result of Dworshak Reservoir. By August 21, we counted squawfish in 17 of 20 transects in Kelly Creek from Kelly Forks to Moose Creek, and as far upstream as one mile above Moose Creek. We observed only 6 squawfish in the North Fork

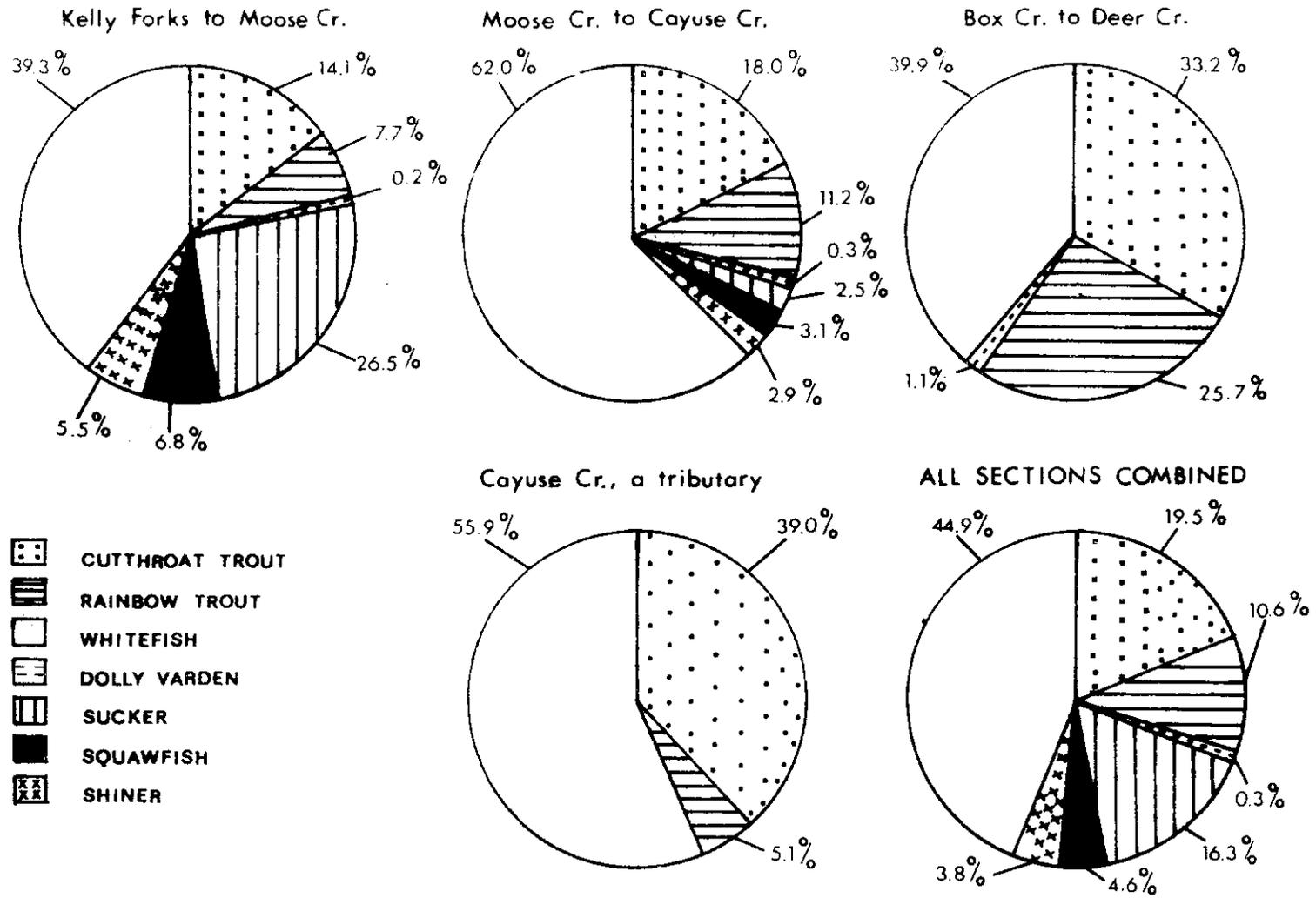


Figure 9. Species composition by section of the fish observed in the snorkeling transect counts in Kelly Creek in 1974.

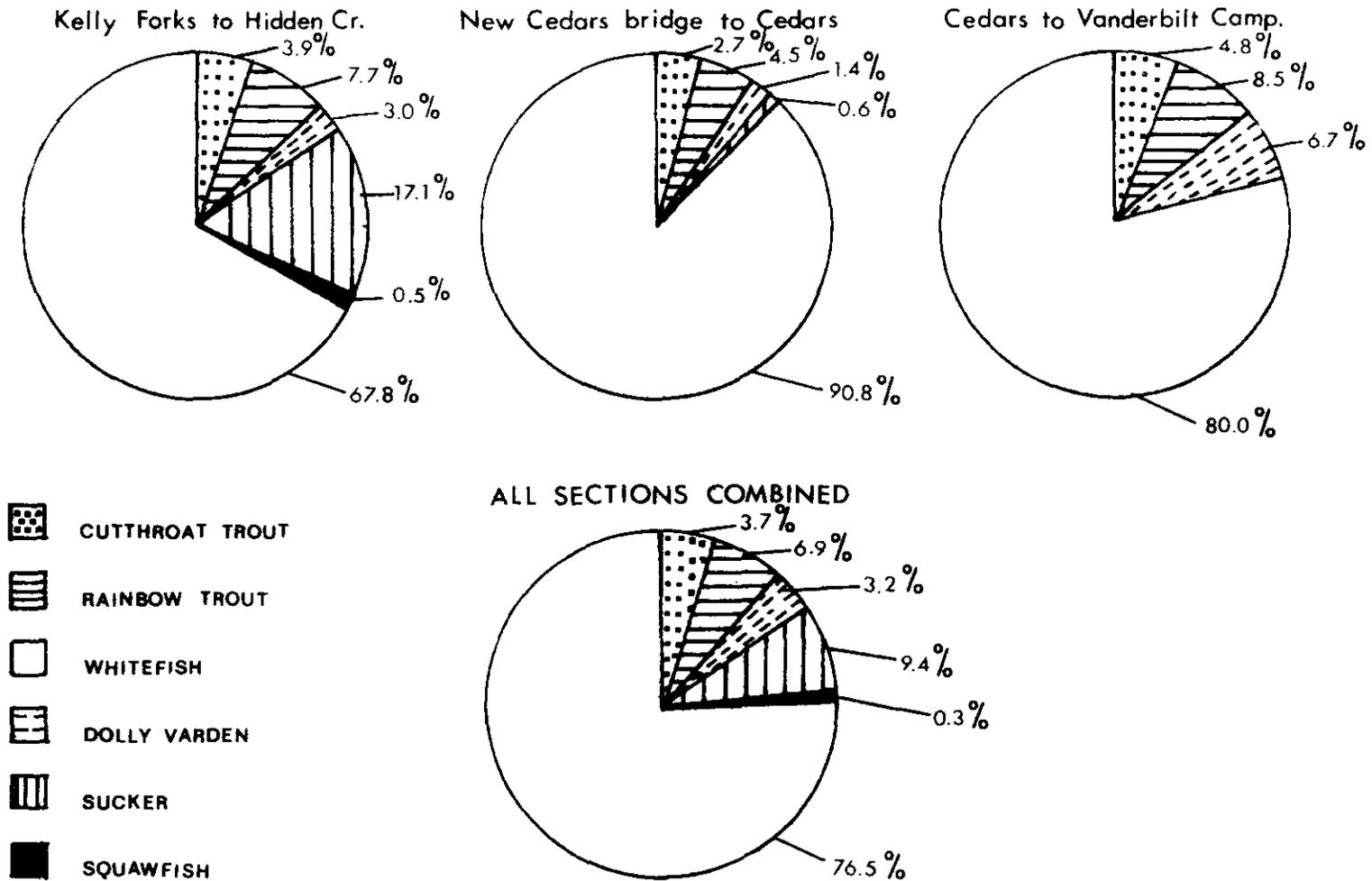


Figure 10. Species composition by section of the fish observed in the snorkeling transect counts in the North Fork of the Clearwater River in 1974.

and these fish were in transects within one mile of Kelly Forks. Redside shiners were present in smaller numbers in Kelly Creek and the North Fork in 1974 compared to 1973, possibly because of the water temperatures (Figure 11) and/or higher water flows in 1974 (Table 1).

St. Joe River

Cutthroat numbers increased and rainbow numbers decreased as we moved upstream in the St. Joe River (Figure 12). No rainbow are stocked above Prospector Creek and few moved above Prospector Creek from stockings made below.

Species present in the St. Joe River study area in decreasing order of abundance are: mountain whitefish, Prosopium williamsoni (Girard); cutthroat trout, Salmo clarki lewisi (Richardson); rainbow trout, Salmo gairdneri Richardson; and Dolly Varden, Salvelinus malma (Walbaum).

Speckled dace, Rhinichthys osculus (Girard); longnose dace, Rhinichthys cataractae (Valenciennes); and sculpins, Cottus spp. were present in the three study streams, but we did not assess their abundance. Kokanee, Oncorhynchus nerka (Walbaum) appeared in the three study areas on their spawning run in late summer and early fall, 1974.

The water flows of the St. Joe River were higher in 1974 than in recent years (Table 2).

Project Fishing

Kelly Creek - North Fork

The catch-and-release regulation has allowed the cutthroat trout in Kelly Creek to increase in size. The mean length of cutthroat and rainbow trout caught by project personnel from Kelly Creek and the North Fork increased from 1970 to 1973, but in 1974 there was a slight decrease in the mean length of fish measured (Table 3). The number of large

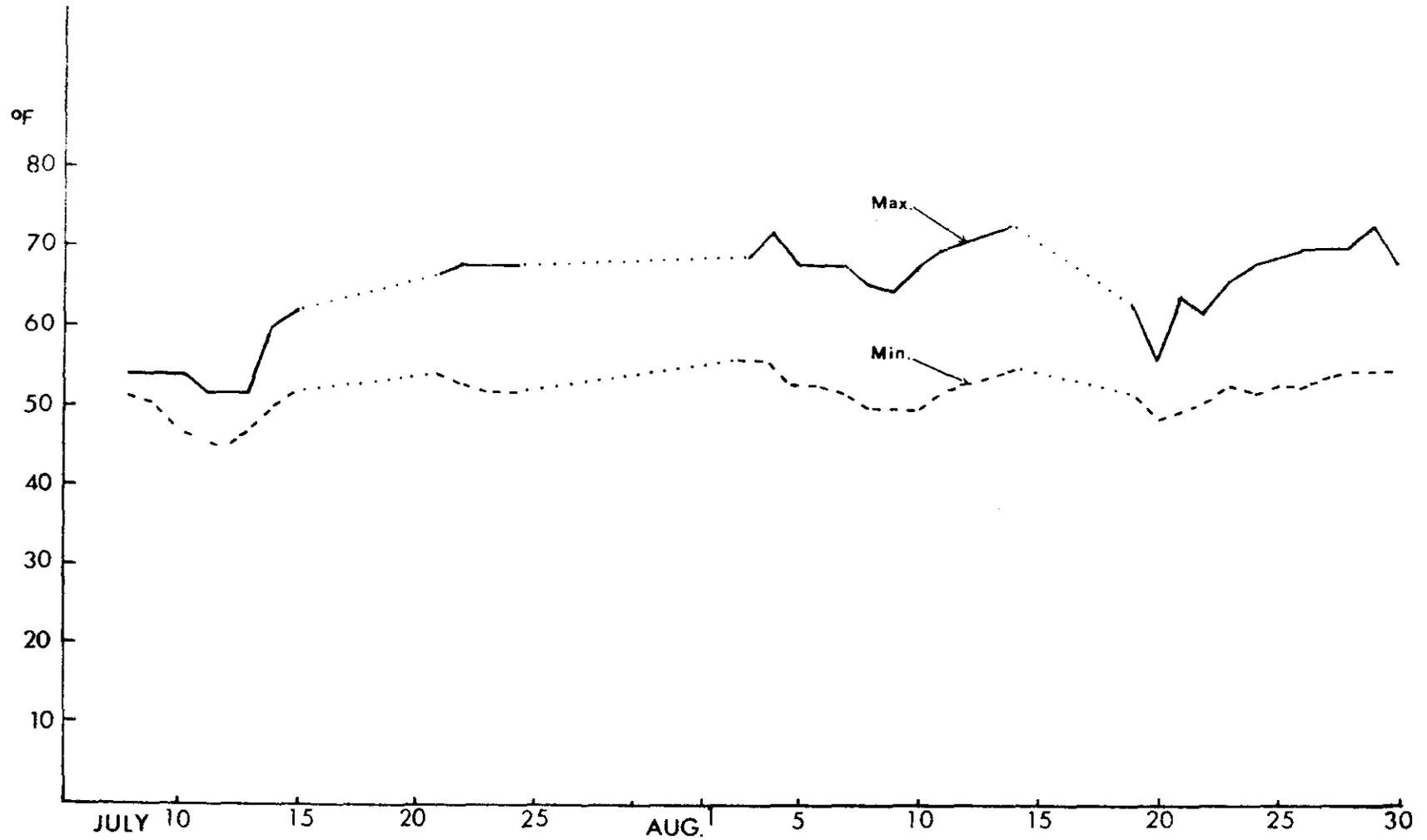


Figure 11. Water temperature profile of Kelly Creek in July and August, 1974. A maximum-minimum thermometer was placed in Kelly Creek above the confluence with Moose Creek. On September 21 and 22, the maximum temperature was 62 F and the minimum temperature was 44 F.

Table 1. Mean daily discharge in cubic feet per second (cfs) of the North Fork of the Clearwater River near Canyon Ranger Station from 1969 to 1974 (Source: U.S.G.S.).

Month	Mean daily discharge by year					
	1969	1970	1971	1972	1973	1974
May	13,270	11,260	17,580	19,600	6,580	^{1/} -
August	967	1,103	1,299	1,214	748	1,285

^{1/} Recorders inoperative

Table 2. Mean daily discharge in cubic feet per second (cfs) of the St. Joe River near Calder from 1969 to 1974 (Source: U.S.G.S.).

Month	Mean daily discharge by year					
	1969	1970	1971	1972	1973	1974
May	9,920	9,012	14,000	14,310	4,210	10,320
August	489	568	744	767	471	818

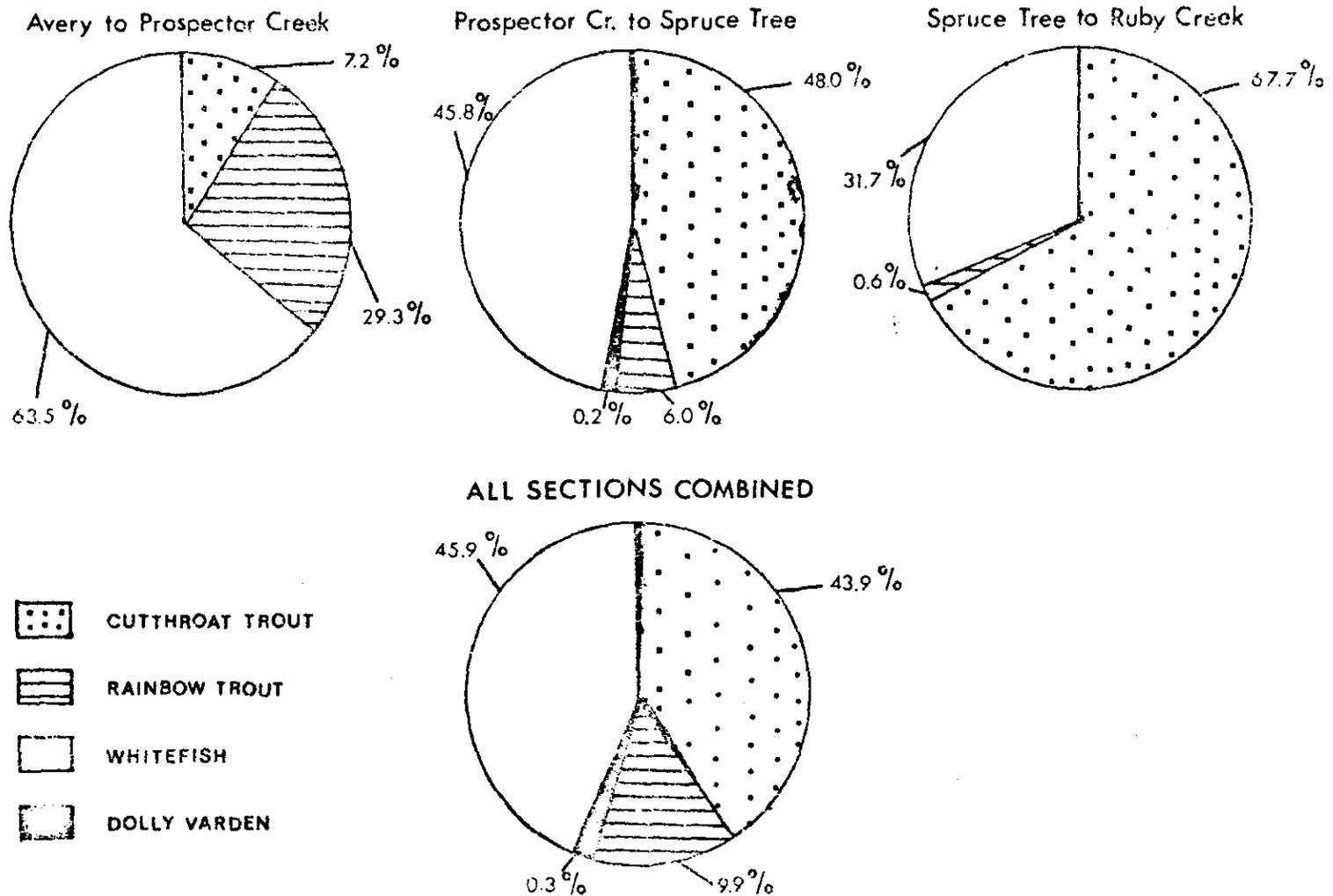


Figure 12. Species composition by section of the fish observed in the transect counts in the St. Joe River in 1974.

Table 3. Mean total length of cutthroat trout and rainbow trout captured by project personnel in Kelly Creek and North Fork of the Clearwater River, 1970 to 1974.

Year	Kelly Creek		North Fork	
	Number	Length	Number	Length
<u>Cutthroat Trout</u>				
1970	122	220mm (8.7")	21	217mm (8.5")
1971	217	240mm (9.4")	36	226mm (8.9")
1972	316	248mm (9.8")	50	262mm (10.3")
1973	286	265mm (10.4")	42	272mm (10.7")
1974	302	256mm (10.1")	9	223mm (8.8")
<u>Rainbow Trout</u>				
1970	38	185mm (7.3")	-	-
1971	49	249mm (9.8")	2	229mm (9.0")
1972	76	240mm (9.4")	19	264mm (10.4")
1973	143	259mm (10.2")	36	270mm (10.6")
1974	47	220mm (8.7")	7	223mm (8.8")

cutthroat trout in Kelly Creek has also increased . Of the cutthroat captured from Kelly Creek by project personnel in 1970, 19.8% were longer than 250 mm (10 inches), 2.6% were longer than 330 mm (13 inches), and the longest fish was 355 mm (14 inches). In 1974, 49% were longer than 10 inches, 8.6% were longer than 13 inches, and we caught and released several 14- to 17-inch cutthroat (Table 4, Figure 13). Cayuse Creek and the section of Kelly Creek from Moose Creek to the mouth of Cayuse Creek had the most large cutthroat trout, followed by the section from Kelly Forks to Moose Creek, and then the section from Box Creek to Deer Creek (Table 5, Figure 13). The length-frequency of rainbow trout captured by project personnel from Kelly Creek in 1974 is given in Figure 14.

St. Joe River

Cutthroat trout have increased in size in the sections of the St. Joe River under the trophy-fish regulation. The mean length of cutthroat trout from sections of the St. Joe River under the trophy-fish regulation increased from 1969 to 1973, but in 1974 the mean length of fish measured decreased slightly (Table 6). We believe the smaller size in 1974 was due to the larger number of juvenile cutthroat in the river in 1974.

Because of the trophy-fish regulation, the St. Joe River contained more cutthroat trout of the established trophy size of 13 inches in 1974 compared to 1969-70. Before the trophy-fish regulation (1969-1970), 2.5% of the cutthroat measured were longer than 250 mm (10 inches), only 0.1% were longer than 330 mm (13 inches) or were "keepers", and no fish captured by project personnel were 14 inches or longer. In 1974, 31.5% of the cutthroat trout we captured were longer than 10 inches, 3% were "keepers", and we caught and released 6 cutthroat longer than 14 inches (Table 7, Figure 15). Overall, there were more large fish in the section

Table 4. Numbers and percentages of cutthroat trout longer than specified total lengths captured by project personnel from Kelly Creek in 1970 and 1974.

Fish longer than:	1970		1974	
	Number (N=116)	Percentage	Number (N=302)	Percentage
250mm (10")	23	19.8	148	49.0
281mm (11")	11	9.5	85	28.1
305mm (12")	8	6.9	53	17.5
330mm (13")	3	2.6	26	8.6
355mm (14")	2	1.7	16	5.3
381mm (15")	0	0	7	2.3
406mm (16")	0	0	2	0.7
432mm (17")	0	0	2	0.7
457mm (18")	0	0	0	0

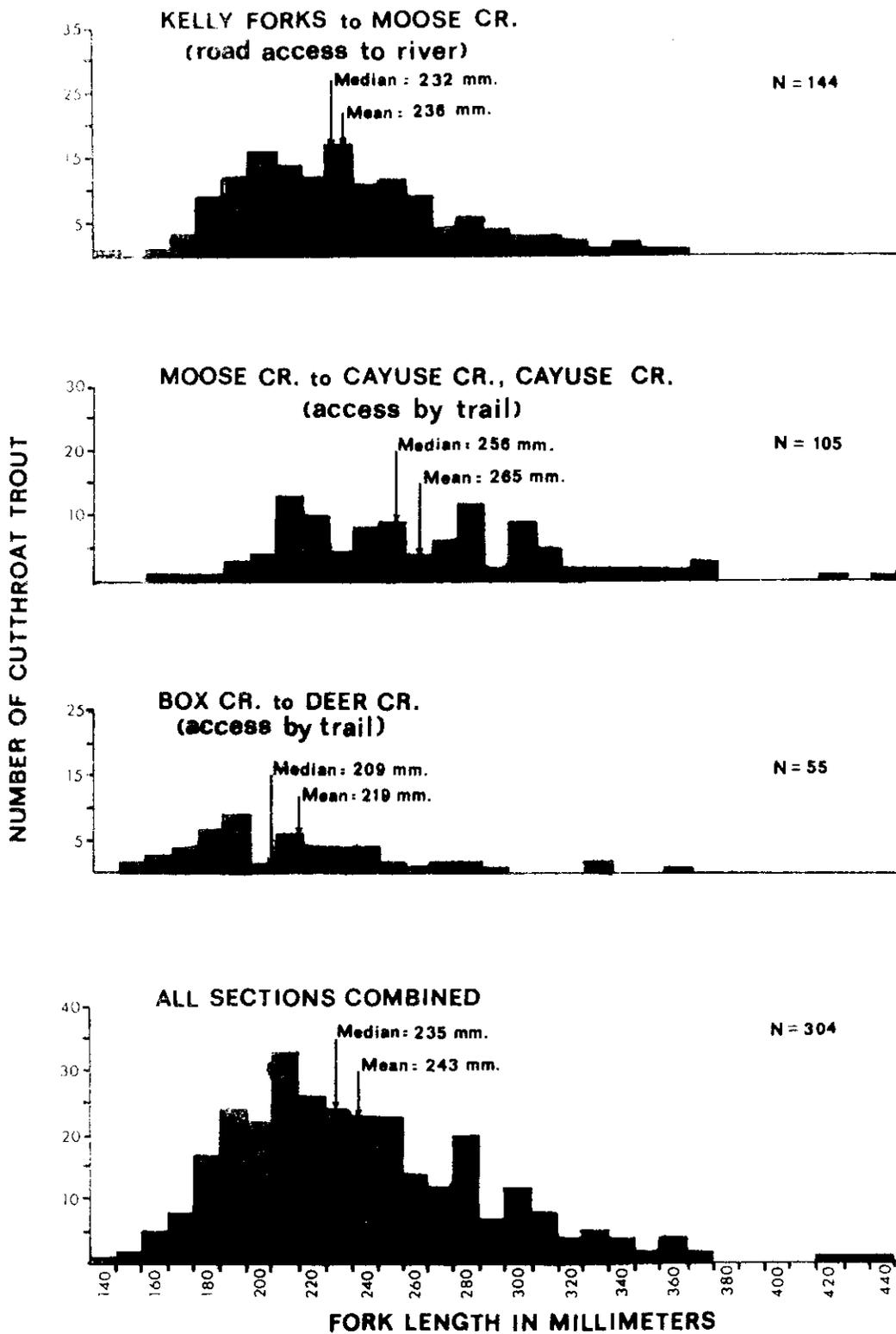


Figure 13. Length-frequency of cutthroat trout captured by project personnel in each study section of Kelly Creek in 1974.

Table 5. Numbers and percentages of cutthroat trout longer than specified total lengths captured by project personnel from study sections of Kelly Creek in 1974.

Fish longer than:	Kelly Forks-Moose Creek		Moose Creek-Kelly/Cayuse and Cayuse Creek		Box Creek-Deer Creek	
	Number (N=144)	Percentage	Number (N=105)	Percentage	Number (N=55)	Percentage
250mm (10")	62	43.1	70	66.7	15	27.3
281mm (11")	27	18.8	47	44.8	8	14.5
305mm (12")	17	11.8	29	27.6	4	7.3
330mm (13")	8	5.6	16	15.2	3	5.5
355mm (14")	4	2.8	9	8.6	1	1.8
381mm (15")	0	0	5	4.8	0	0
406mm (16")	0	0	2	1.9	0	0
432mm (17")	0	0	2	1.9	0	0
457mm (18")	0	0	0	0	0	0

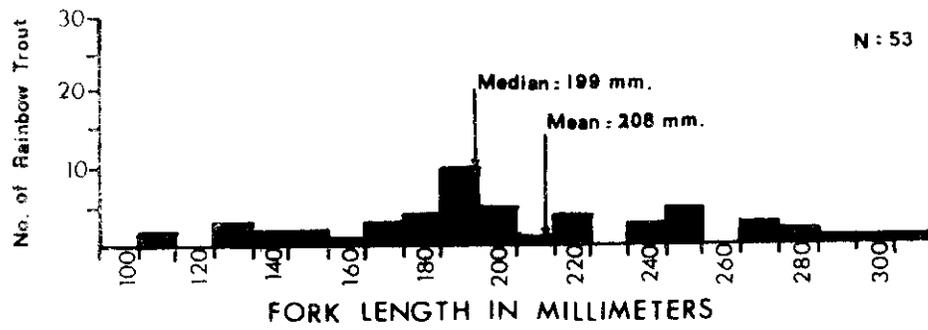


Figure 14. Length-frequency of rainbow trout captured by project personnel from Kelly Creek in 1974.

Table 6. Mean total length of cutthroat trout captured by project personnel in study sections of the St. Joe River under the trophy-fish regulation, 1969 to 1974.

Year	<u>Prospector Creek-Spruce Tree</u>		<u>Spruce Tree-Ruby Creek</u>	
	Number	Length	Number	Length
1969-1970	1152	185mm (7.3")	324	201mm (7.9")
1971	32	201mm (7.9")	20	170mm (6.7")
1972	143	254mm (10.0")	179	225mm (8.9")
1973	59	221mm (8.7")	80	246mm (9.7")
1974	296	219mm (8.6")	284	234mm (9.2")

Table 7. Numbers and percentages of cutthroat trout longer than specified total lengths captured by project personnel from the St. Joe River in 1969-1970 and 1974.

Fish longer than:	1969-1970		1974	
	Number (N=805)	Percentage	Number (N=596)	Percentage
250mm (10")	20	2.5	188	31.5
281mm (11")	7	0.9	94	15.8
305mm (12")	3	0.4	40	6.7
330mm (13")	1	0.1	18	3.0
355mm (14")	0	0	6	1.0
381mm (15")	0	0	1	0.2
406mm (16")	0	0	0	0

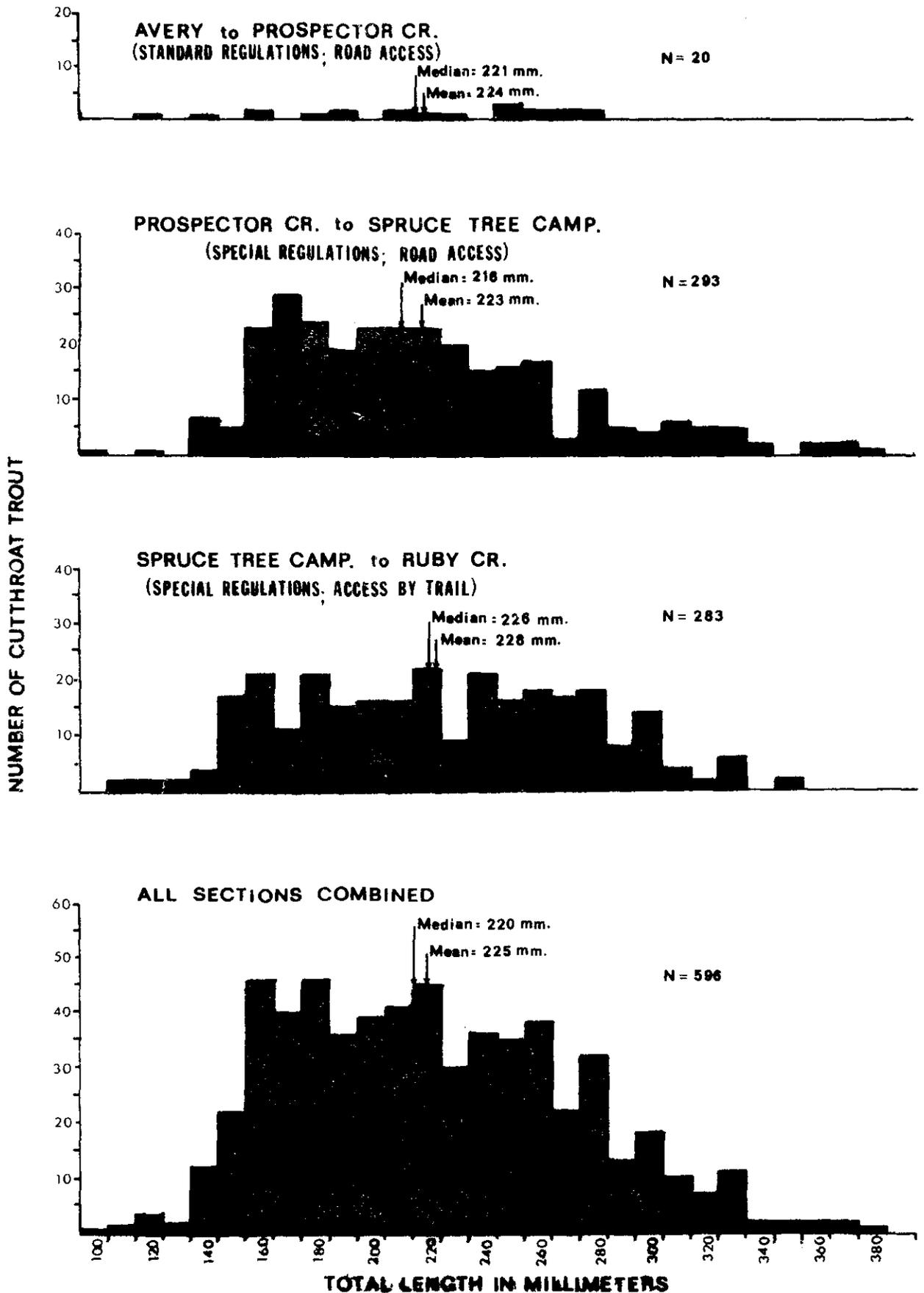


Figure 15. Length-frequency of cutthroat trout captured by project personnel in each study section of the upper St. Joe River in 1974.

from Spruce Tree Campground to Ruby Creek, but we caught more "keepers" from Prospector Creek to Spruce Tree (Table 8, Figure 15).

In 1974, we fished in the upper St. Joe River 132.5 hours and caught 663 cutthroat for an overall rate of 5.0 cutthroat/hour. The catch rate in 1974 was 6 times larger than in 1968 and a slight increase over 1973 (Table 9). In 1974, we caught more fish per hour as we moved upstream (Table 9). Two project anglers fishing 12 days at an average of 5.5 hours each per day caught 22 cutthroat "keepers" or nearly 1 "keeper"/angler/day. Project personnel tried to catch many fish rather than concentrating on the larger cutthroat.

Movement of Tagged Cutthroat

Kelly Creek - North Fork

From our tagging studies there appears to be a pattern of movement upstream in the spring, little movement during the summer, and movement downstream in the fall. Many of the fish tagged in Kelly Creek in 1973 and recaptured in spring or early summer 1974 were often recaptured downstream a considerable distance from the point of tagging. Fish tagged in July and August, 1974 and recaptured those same months did not move. Some fish tagged one summer were recaptured in the same location in subsequent summers (Figure 16). Many of the cutthroat tagged in the North Fork of the Clearwater River and tributaries of Kelly Creek also moved upstream in the spring and downstream in the fall as did fish in Kelly Creek (Figures 17 and 18).

A cutthroat trout tagged in June, 1973 in Kelly Creek 0.4 miles above Kelly Forks was recaptured in the North Fork above Kelly Forks in August, 1974. This is the only tagged cutthroat which is known to have changed drainages since the start of the project in 1969.

Table 8. Numbers and percentages of cutthroat trout longer than specified total lengths captured by project personnel from study sections of the St. Joe River under the trophy-fish regulation, 1974.

Fish longer than:	<u>Prospector Creek-Spruce Tree</u>		<u>Spruce Tree-Ruby Creek</u>	
	Number (N=293)	Percentage	Number (N=283)	Percentage
250mm (10")	77	26.3	102	36.0
281mm (11")	43	14.7	50	17.7
305mm (12")	24	8.2	16	5.7
330mm (13")	12	4.1	6	2.1
355mm (14")	5	1.7	1	0.3
381mm (15")	1	0.3	0	0
406mm (16")	0	0	0	0

Table 9. Angler catch of trout per hour for upper St. Joe River during July and August (includes fish released in 1972, 1973, and 1974).

Year	Prospector Creek to Gold Creek	Gold Creek to Spruce Tree Campground	Spruce Tree Campground Ruby Creek
1968	0.68 ^{1/}	0.82	-
1972	1.96	2.78	-
1973	3.39	4.85	-
1974 ^{2/}	2.11	4.36	6.71

^{1/}Avery to Gold Creek in 1968. The catch rate for 1968 is a minimum as anglers released fish which were not included as fish caught in that year.

^{2/}Project personnel fishing only.

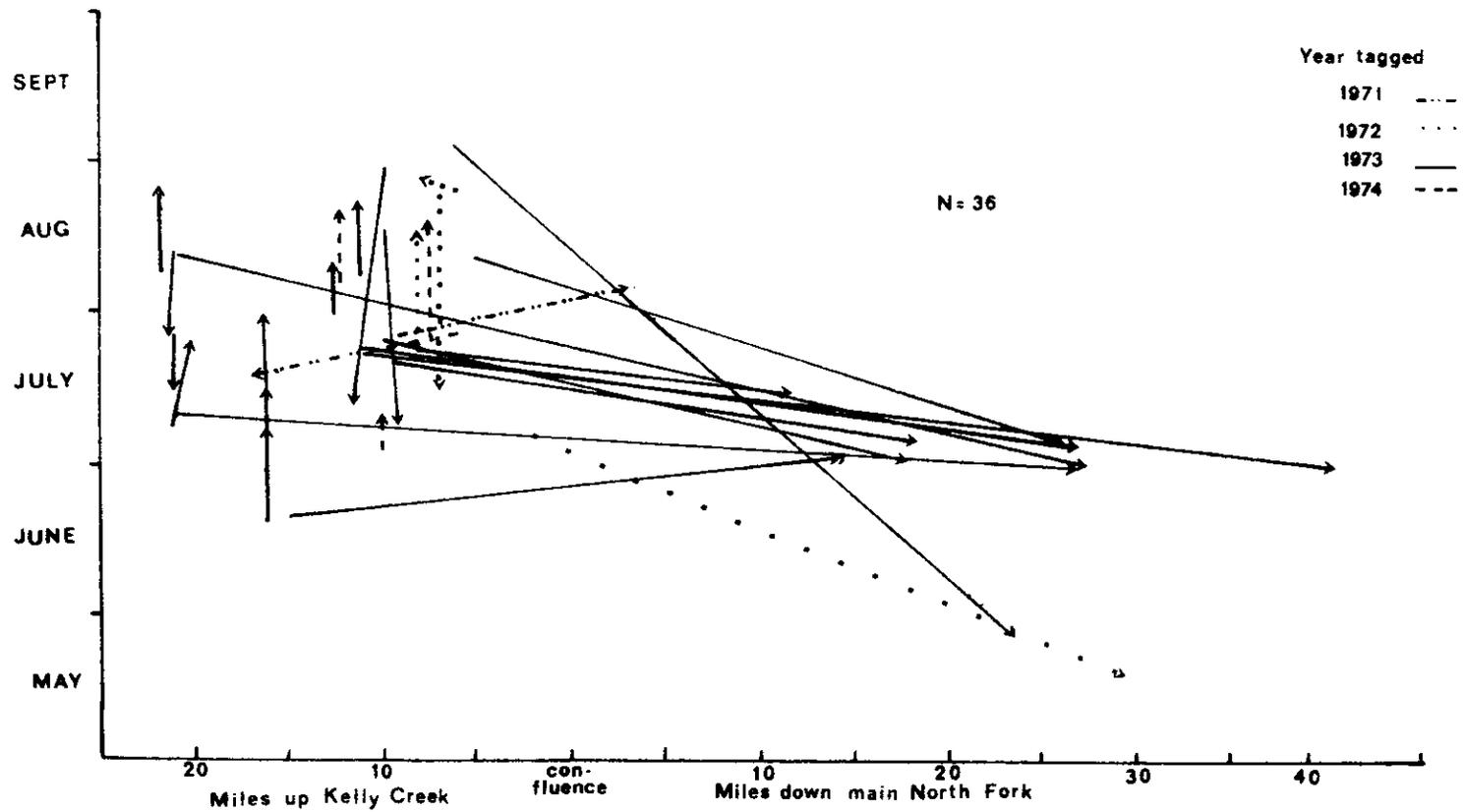


Figure 16. Movement of cutthroat trout tagged in Kelly Creek in 1974 or previous years and recaptured in 1974.

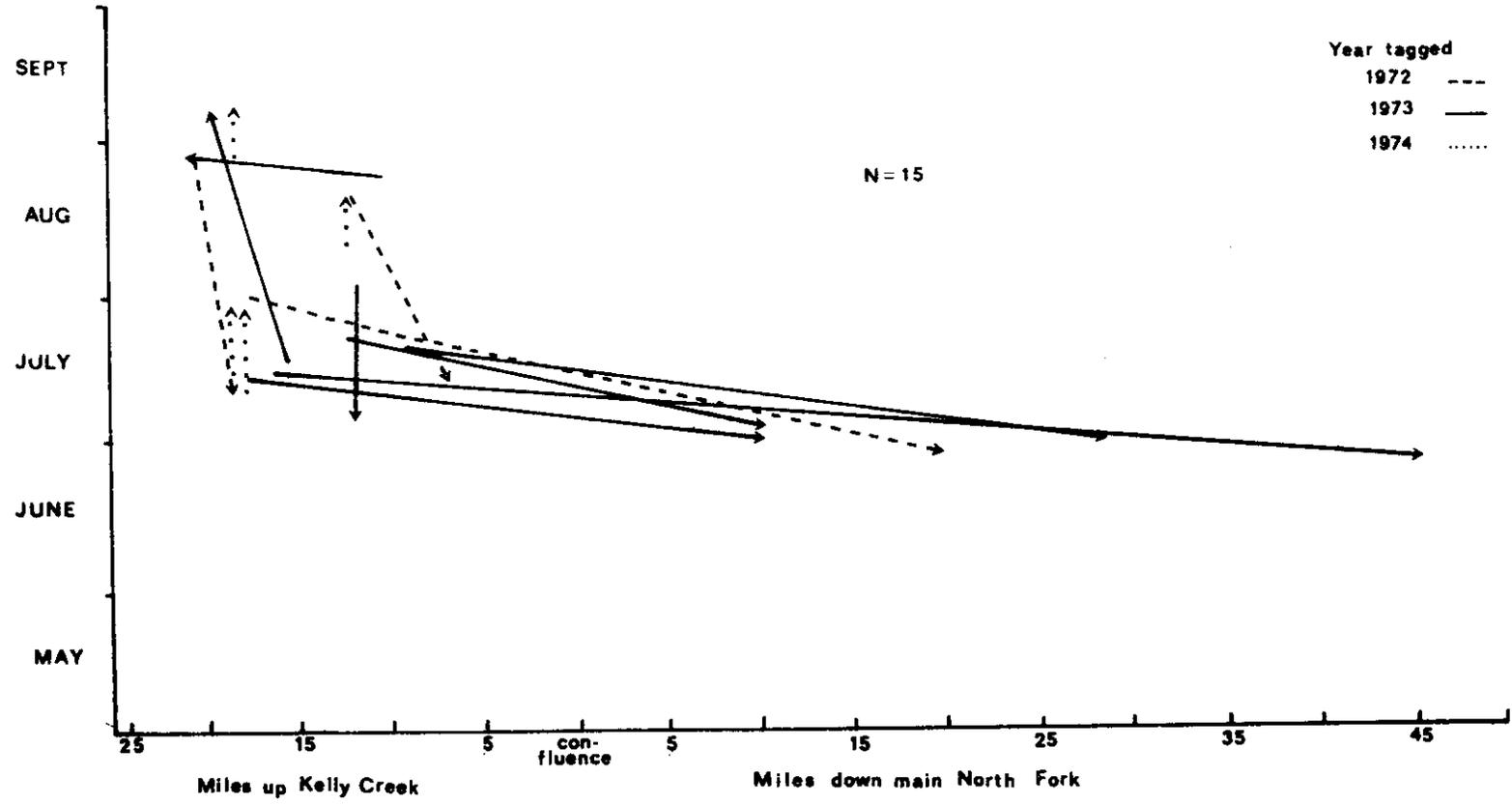


Figure 17. Movement of cutthroat trout tagged in tributaries of Kelly Creek in 1974 or previous years and recaptured in 1974.

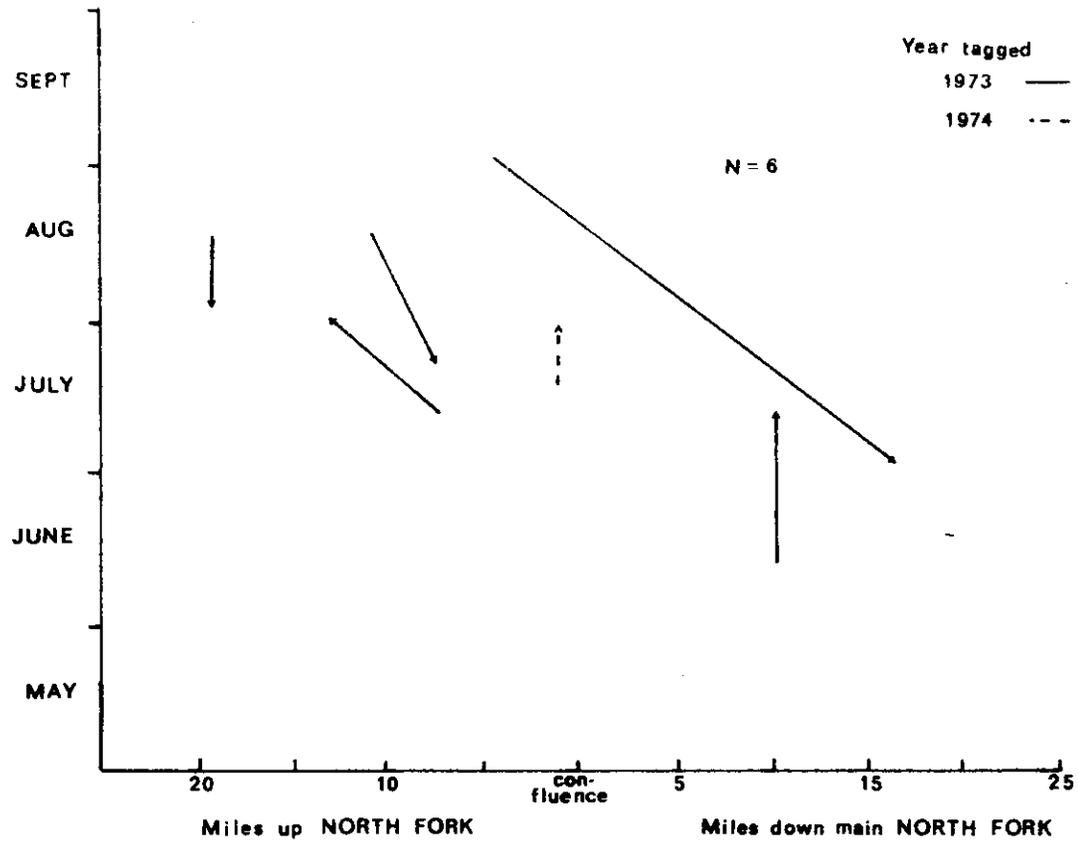


Figure 18. Movement of cutthroat trout tagged in the North Fork of the Clearwater River in 1974 or previous years and recaptured in 1974.

St. Joe River

In the St. Joe River, fish tagged in July and August, 1974, and recaptured those same months did not move. One cutthroat tagged in the upper St. Joe River on August 16 was recaptured 35 miles downstream on September 2 (Figure 19).

Growth of Tagged Cutthroat

To determine the growth of tagged cutthroat trout, we used only those cutthroat which were recaptured and then measured by project personnel. In 1974, cutthroat trout recaptured in Kelly Creek (N=13) grew an average of 47 millimeters (1.9 inches) per year while tagged cutthroat grew 39 millimeters (1.5 inches) per year in tributaries of Kelly Creek (Table 10).

Cutthroat trout recaptured and/or measured by project personnel in the St. Joe River in 1974 (N=4) grew 38.5 mm or 1.5 inches per year (Table 11). Two cutthroat trout less than seven inches long when tagged in the St. Joe River in 1970 were "keepers" (longer than 13 inches) when recaptured in 1974.

Creel Census

Kelly Creek - North Fork

Most anglers fishing Kelly Creek in 1974 were from Idaho or Washington, fished with flies and when questioned they preferred to catch a few large fish rather than many small fish. The catch-and-release regulation was acceptable to 95.8% of the anglers interviewed. The species composition of the angler catch was 93.4% cutthroat trout, 5.6% rainbow trout, and 1.0% whitefish (Table 12). The catch rates in Table 12 probably contain a positive bias since we did not interview a representative sample of the anglers in 1974.

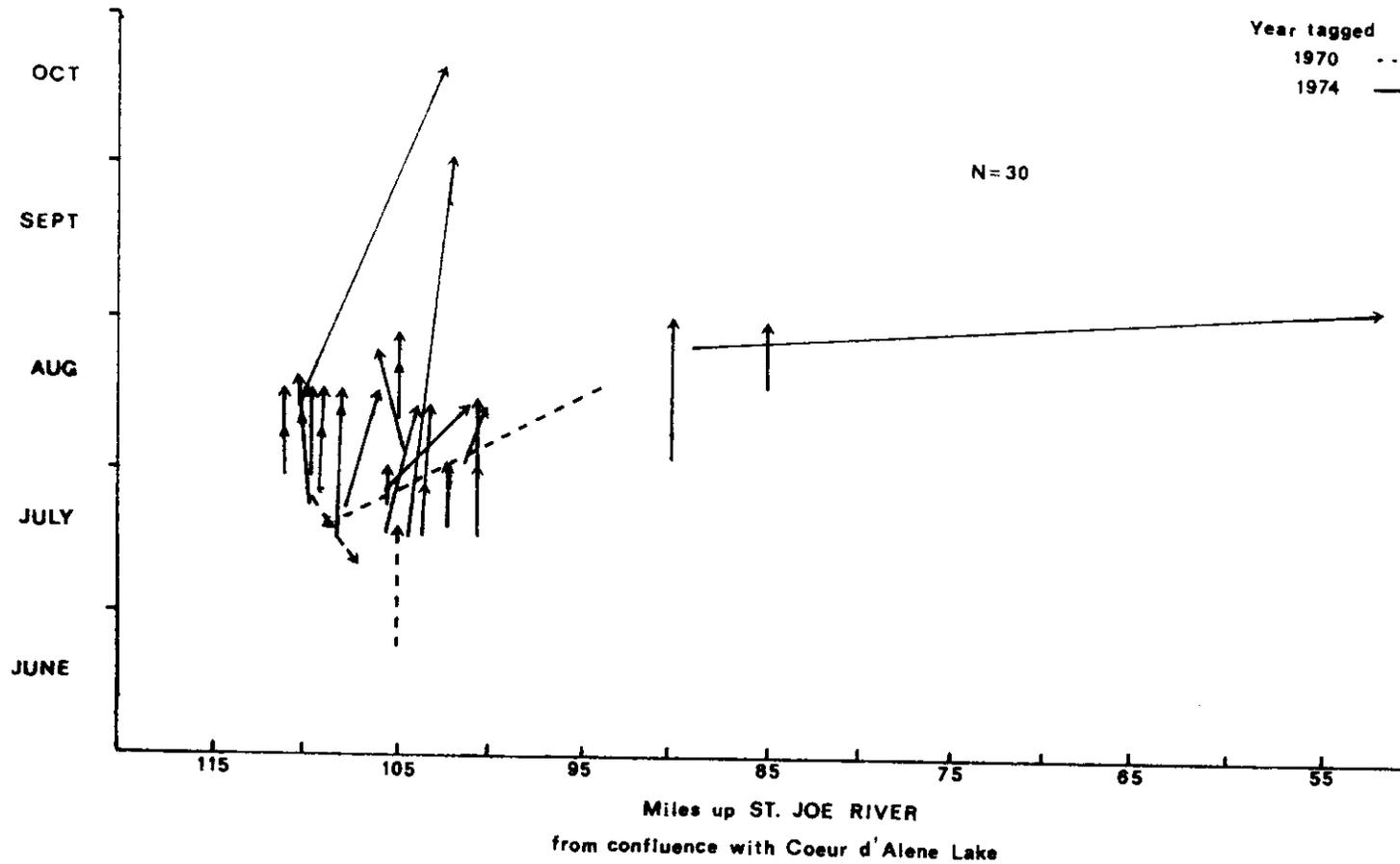


Figure 19. Movement of cutthroat trout tagged in the St. Joe River in 1974 or previous years and recaptured in 1974.

Table 10. Growth of cutthroat trout tagged and recaptured in Kelly Creek and its tributaries. Calculated percentage growth based on size of fish at time of tagging.

Period (Tag Yr.-Recap. Yr.)	Tag	Length (mm)		Increase (mm)	Increase per year (mm)	% Growth per year
		Start	End			
<u>Main River System</u>						
1972-1974	D961	233	305	72	36	15.5
	C908	237	320	83	41.5	16.8
	C512	237	322	85	42.5	17.9
1973-1974	B 65	223	254	31	31	13.9
	N781	276	352	76	76	27.5
	P677	280	323	43	43	15.4
	N 46	237	279	42	42	17.7
	C581	214	305	91	91	42.5
	C557	237	292	55	55	23.2
	J 21	242	247	5	5	2.1
	S737	313	334	21	21	6.7
	N710	260	310	50	50	19.2
	P620	268	343	75	<u>75</u>	<u>28.0</u>
				$\bar{x}=46.8$	$\bar{x}=19.0$	
<u>Tributaries</u>						
<u>Cayuse Creek</u>						
1972-1974	B194	248	322	74	37	15.6
<u>Moose Creek</u>						
1973-1974	Z533	248	312	64	64	25.8
<u>Osier Creek</u>						
1972-1974	R210	284	315	31	<u>15.5</u>	<u>5.5</u>
				$\bar{x}=38.8$	$\bar{x}=15.6$	

Table 11. Growth of cutthroat trout tagged and recaptured in the St. Joe River. Calculated percentage growth based on size of fish at time of tagging.

Period (Tag Yr.-Recap. Yr.)	Tag	Length (mm)		Increase (mm)	Increase per year (mm)	% Growth per year
		Start	End			
1970-1974	P 50	152	333	181	45.3	29.8
	N 62	238	287	49	12.3	5.1
	P375	168	393	225	56.3	33.5
1973-1974	N126	174	214	40	<u>40.0</u>	<u>23.0</u>
					$\bar{x}=38.5$	$\bar{x}=22.9$

Table 12. Results of creel census on Kelly Creek in 1974.

Total anglers interviewed	47
Average size of party	2.6
Used flies	83%
Used Lures	17%
Preferred few large fish	62%
Preferred many small fish	0%
No Preference	38%
Total hours fished	218
Total fish caught	853
Total cutthroat caught	787
Catch per hour	3.9
Cutthroat per hour	3.6
Hours per cutthroat	0.28
Hours per angler	4.6
<u>Species Composition of catch</u>	
Cutthroat trout	93.4%
Rainbow trout	5.6%
Whitefish	1.0%
<u>Opinion of catch-and-release</u>	
Acceptable	95.8%
Not Acceptable	4.2%
<u>Residence</u>	
Idaho	52.2%
Washington	31.7%
Colorado	11.7%
California	4.4%

St. Joe River

In 1974, the average angler interviewed while fishing the upper St. Joe River used flies, was from Washington or Idaho, and stated a preference to catch a few large fish rather than many small fish. The trophy-fish regulation was acceptable to all (100%) of the anglers interviewed. The species composition of the angler catch above Prospector Creek was 97.7% cutthroat trout and 2.3% rainbow trout. The catch rate of 19 anglers interviewed was 0.9 cutthroat trout per hour and 0.04 "keepers" per hour (Table 13). Because of the small sample size, the catch rates in Table 13 probably are not representative of anglers fishing the upper St. Joe River in 1974.

Table 13. Results of creel census on the upper St. Joe River in 1974.

Total anglers interviewed	19
Average size of party	3.1
Used flies	58%
Used lures	42%
Preferred few large fish	79%
Preferred few small fish	0%
No Preference	21%
Total hours fished	50.5
Total fish caught	44
Total cutthroat caught	43
Total cutthroat kept	2
Catch per hour	0.9
Cutthroat per hour	0.9
Cutthroat kept per hour	0.04
Hours per angler	2.7
<u>Species Composition of catch</u>	
Cutthroat trout	97.7%
Rainbow trout	2.3%
<u>Opinion of Trophy-Fish Regulation</u>	
Acceptable	100%
Not Acceptable	0%
<u>Residence</u>	
Washington	31.6%
Idaho	26.3%
California	21.1%
Illinois	10.5%
Other	10.5%

ACKNOWLEDGEMENTS

Funds and materials from the Idaho Fish and Game Department, U. S. Fish and Wildlife Service and the University of Idaho supported this research through the Idaho Cooperative Fishery Unit.

The U. S. Forest Service - Clearwater National Forest, Kelly Forks Ranger Station - provided the use of a residential building and provided gasoline at cost. Red Ives Ranger Station - St. Joe National Forest - also provided gasoline at cost. We are grateful for the assistance and cooperation of the personnel at Kelly Forks and Red Ives Ranger Stations.

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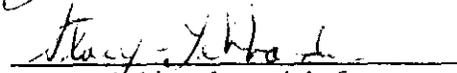
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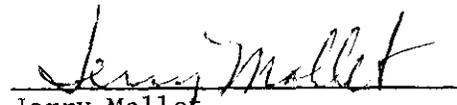
T. H. Johnson
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