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Job Performance Report

Project F-66-R-2



RIVER AND STREAM INVESTIGATIONS

Job No. IV Lochsa River Fisheries Investigations

Period Covered: 1 March 1976 to 28 February 1977

by

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JOB PERFORMANCE REPORT

State of Idaho Name: RIVER AND STREAM INVESTIGATIONS
Project No. F-66-R-2 Title: Lochsa River Fisheries Investi-
Job No. IV gations
Period Covered: 1 March 1976 to 28 February 1977

ABSTRACT

From 29 May through 10 September 1976, fisheries personnel conducted an intensive angler count-interview type creel census on the Lochsa River and the lower 8 miles of Crooked Fork Creek. Census techniques and stream sections were structured such that comparisons could be made with previous Lochsa River census studies conducted in 1966 and 1956.

Anglers fished an estimated 13,679 hours on the Lochsa during the 1976 general trout season. They caught an estimated 11,170 (73.0%) wild rainbow-steelhead, 2,557 (16.7%) hatchery catchable rainbow, 654 (4.3%) cutthroat, 195 (1.3%) Dolly Varden and 717 (4.7%) whitefish. Approximately 60.3% of the total angler effort was expended above Boulder Creek, and this effort yielded 75.6% of the wild rainbow-steelhead and 68.7% of the cutthroat trout. The Lochsa River above Boulder Creek and the lower 12.8 km (8 mi) of Crooked Fork Creek will be catch-and-release for trout in 1977. By comparison, anglers fished an estimated 32,117 hours in the Lochsa River between 4 June and 10 September, 1966 and caught 35,256 (66.0%) wild rainbow-steelhead, 14,472 (27.5%) catchable rainbow, 1,657 (3.1%) cutthroat, 260 (0.5%) Dolly Varden and 1,787 (3.3%) whitefish (Keating 1966).

In addition to standard biological creel census information we noted angler residency and angling methods and collected angler preference information. Of the 809 anglers interviewed on the Lochsa River during 1976, 77.8% were residents of Idaho. In 1966, 74% of the anglers interviewed were residents. Our 1976 interviews revealed that 46.0% of the anglers fishing the Lochsa used bait, 24.7% artificial lures and 29.3% artificial flies. When asked to rate fishing on the Lochsa 23.4% rated it "good", 40.8% "fair", and 35.8% "poor". Over 51% of the anglers interviewed preferred to catch a few large fish, while 48.8% would rather catch many small fish. Over 53% of the anglers were in favor of a restrictive regulation to restore cutthroat to the Lochsa, and 56% favored an 8-inch minimum size limit for trout in the Lochsa.

We snorkeled the established transects in the Lochsa River and Crooked Fork, Papoose and Squaw Creeks on 10 and 25 August 1976. We noted a decrease in numbers of juvenile steelhead in the Lochsa and an increase in

young-of-the-year (YOY) steelhead in the tributaries compared to 1975. No cutthroat were seen in Lochsa River transects in 1976 but increased numbers were noted in Papoose Creek.

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RECOMMENDATIONS

Impose catch-and-release regulations on the Lochsa River above Boulder Creek to protect wild juvenile steelhead and cutthroat trout.

Concentrate all releases of hatchery catchable rainbow in the Lochsa below Boulder Creek.

Continue the intensive angler count-interview type creel census on the Lochsa to evaluate the effects of the catch-and-release regulation on populations of wild juvenile steelhead and cutthroat trout.

Continue snorkeling in established transect areas to monitor distribution and abundance of wild juvenile steelhead and cutthroat trout in the Lochsa River and tributaries.

OBJECTIVES

To measure the angling pressure on the harvest of cutthroat trout, juvenile steelhead and hatchery catchable rainbow trout in the Lochsa River.

To monitor cutthroat trout distribution and abundance in the Lochsa River and selected tributaries.

To collect life history data on cutthroat trout populations in the Lochsa River and selected tributaries.

To collect angler opinions on the acceptability of catch-and-release or other restrictive regulations for the Lochsa River.

To evaluate the effects of catch-and-release or other restrictive regulations on the cutthroat trout and juvenile steelhead populations of the Lochsa River.

TECHNIQUES USED

Angler Creel Census

From 29 May through 10 September 1976, fisheries personnel conducted an intensive angler count-interview type creel census on the Lochsa River and the lower 8 miles of Crooked Fork Creek. In order to make our census comparable to previous Lochsa River census studies conducted by Corning (1956) and Keating (1966) we divided the 121-km (75.5-mi) census route into six sections. These sections were (Fig. 1):

Section 1 -- Mouth of Lochsa (Lowell) to Split Creek - 24 km (15 mi)

Section 2 -- Split Creek to Fish Creek - 13.6 km (8.5 mi)

Section 3 -- Fish Creek to Boulder Creek - 3.2 km (2.0 mi)

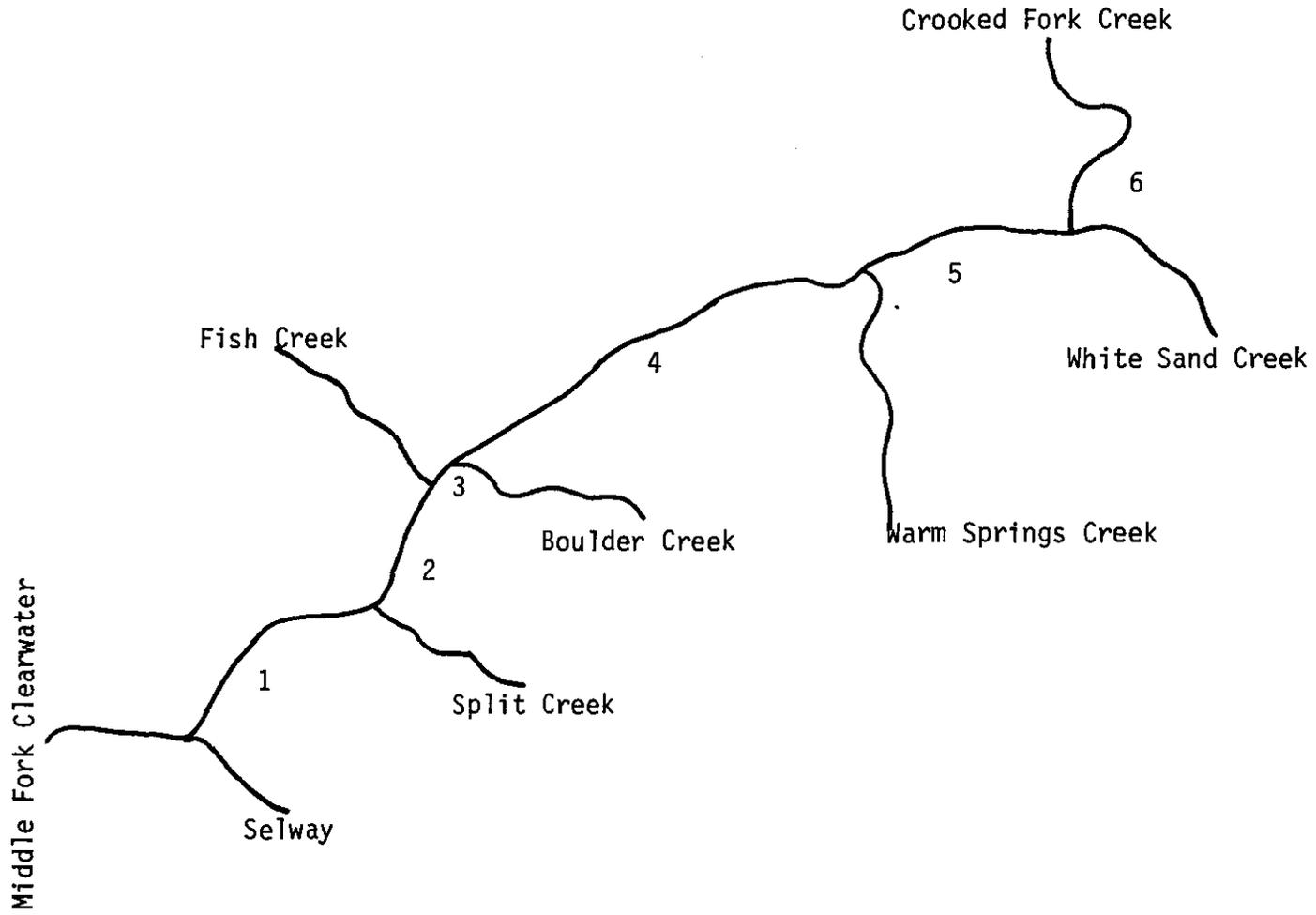


Figure 1. Stream sections used in conducting the creel census study on the Lochsa River, 1976.

Section 4 -- Boulder Creek to Warmspring Creek - 45.6 km (28.5 mi)

Section 5 -- Warmspring Creek to mouth of Crooked Fork Creek - 20 km (12.5 mi)

Section 6 -- Mouth of Crooked Fork Creek to Highway 12 Bridge - 12.8 km (8.0 mi)

To remove error due to seasonal and type-of-day variability, we divided the fishing season into 2-week intervals and further subdivided these intervals into Saturdays, Sundays, holidays and weekdays. We counted anglers four times a day on all holidays, one Saturday, one Sunday and two randomly selected weekdays per 2-week interval. The average of the counts for each type of day was expanded to obtain an estimate of angling pressure for that type of day during the interval. These totals were added to calculate total pressure for the interval. Counts were conducted by driving along Highway 12 which parallels the entire length of the Lochsa and the lower 12.8 km (8 mi) of Crooked Fork Creek. The estimate of angling pressure for a 2-week interval is the product of average angler count times average daylight hours in that interval times number of days of each class (weekend, holiday, week-day) in the interval.

We interviewed anglers to obtain information on hours fished, numbers of each species caught, angler residency, method of angling and angler opinions. In addition to the angler interviews obtained on count days, we interviewed anglers on all other weekend days as time permitted. Estimates of harvest for an interval are the product of the estimated angling pressure times the average catch per hour for each species as obtained from the angler inter-views.

To obtain length frequencies, we measured all wild rainbow and cutthroat checked in anglers' creels. The majority of hatchery rainbow, Dolly Varden and whitefish checked were also measured.

Angler Residency, Methods and Opinions

In addition to the catch rate information obtained from angler interviews, angler residency and method of angling (bait, lures, flies) were noted. Anglers were also asked the following opinion or preference questions:

1. Do you consider fishing on the Lochsa River good, fair or poor?
2. Do you prefer to catch a few large fish or many small fish?
3. Would you be in favor of restrictive regulations (i.e. catch-and-release or reduced bag limit) to restore cutthroat to the Lochsa River?
4. Would you be in favor of an 8-inch minimum size limit on trout? 5

Snorkeling

We snorkeled the established transects in Papoose and Squaw Creeks on 13 July and 25 August. Transects in the Lochsa River and Crooked Fork Creek were snorkeled on 10 and 25 August.

Releases of Hatchery Rainbow in Lochsa River

Between 29 June and 21 July 1976, a total of 12,640 hatchery rainbow were released into the Lochsa River between Boulder Creek and the mouth of Crooked Fork Creek. Table 1 summarizes these releases. No hatchery rainbow were released below Boulder Creek during 1976.

Cutthroat Tagging in Lochsa Tributaries

We caught, measured, tagged and released cutthroat trout in Crooked Fork Creek, Pack Creek, Brushy Fork Creek and White Sand Creek during 1976.

FINDINGS

Angler Effort and Harvest

From 29 May to 10 September 1976 (general trout season) anglers fished an estimated 13,679 hours on the Lochsa River and the lower 12.8 km (8 mi) of Crooked Fork Creek to catch an estimated 11,170 wild rainbow-steelhead, 2,557 hatchery rainbow trout, 654 cutthroat trout, 195 Dolly Varden and 717 whitefish. Seventy-three percent of the fish harvested in the census area during 1976 were wild rainbow-steelhead. Hatchery rainbow comprised 16.7% of the harvest, cutthroat 4.3%, Dolly Varden 1.3% and whitefish 4.7%. Anglers caught fish at an overall rate of 1.12 per hour, with wild rainbow-steelhead being caught at a rate of 0.82 per hour, hatchery rainbow 0.19, cutthroat 0.05, Dolly Varden 0.01 and whitefish 0.05 (Table 2).

Comparing our 1976 estimates with those made by Keating (1966) reveals some significant changes. From 4 June through 10 September 1966, Keating estimated that anglers fished 32,117 hours on the Lochsa River and the lower 12.8 km (8 mi) of Crooked Fork to catch 35,256 (66.0%) wild rainbow-steelhead, 14,472 (27.1%) hatchery rainbow, 1,657 (3.1%) cutthroat, 260 (0.5%) Dolly Varden and 1,787 (3.3%) whitefish (Table 3). In 1966, anglers caught fish at an overall rate of 1.66 per hour, with wild rainbow-steelhead being caught at a rate of 1.10 per hour, hatchery rainbow 0.45, cutthroat 0.05, Dolly Varden 0.01, and whitefish 0.06 (Fig. 2). Angler effort in 1976 was 42.6% of that in 1966 and total fish harvested only 28.6% of the 1966 total. When making comparisons between 1976 and 1966 harvest and catch rate figures, it should be pointed out that only 12,640 hatchery rainbow were released in the Lochsa in 1976, while 34,305 (2.7 times as many) were released in 1966.

From the mouth of the Lochsa to Split Creek (Section 1), anglers fished an estimated 2,779 hours in 1976 to catch 657 (49%) wild rainbow-steelhead, 382 (28.5%) hatchery rainbow, 117 (8.7%) cutthroat, 12 (0.9%) Dolly Varden and 174 (12.9%) whitefish. Anglers caught an average of 0.48 fish per hour

Table 1. Releases of hatchery catchable rainbow and release sites on the Lochsa River, 1976

Date of Release	Number of fish	Number per pound	Pounds
6/29	2,280	3.8	600
6/30	2,280	3.8	600
7/8	2,960	3.7	800
7/20	2,560	3.2	800
7/21	2,560	3.2	800
Total	12,640		3,600

Release Sites	Number of times planted
Boulder Creek	4
Mile Post 126	4
Mile Post 128	1
Green Flat	4
Mile Post 131	1
Mile Post 132	4
Eagle Mt Bridge	3
Mile Post 141	4
Mile Post 143	5
Mile Post 150	4
Mile Post 157	4
Twin Bridges-Elk Summit	3
Castle Lookout	1
Colgate Licks	3
Warm Springs	3
Powell Ranger Station	1

Table 2. Total estimated hours fished and harvest by anglers on the Lochsa River and Crooked Fork (mouth to Highway 12 Bridge) by 2-week intervals, 29 May - 10 September, 1976.

Interval starting date	Estimated hours fished	Species caught					Total
		WRB	HRB	CT	DV	WF	
29 May	466	75	19	15	19	38	166
12 June	487	158	18	0	34	110	320
26 June	1,536	361	53	10	13	106	543
10 July	1,895	1,408	450	168	49	213	2,288
24 July	2,570	3,096	365	121	30	71	3,683
7 August	2,220	2,127	369	132	11	37	2,676
21 August	2,815	2,245	761	106	32	8	3,152
4 September	1,690	1,700	522	102	7	134	2,465
Totals	13,679	11,170	2,557	654	195	717	15,293
Percent of total		73.0	16.7	4.3	1.3	4.7	
Fish/hour		.816	.187	.048	.014	.052	1.12

Table 3. Comparison of angling pressure and harvest of game fish in the Lochsa River and lower 12.8 km (8 mi) of Crooked Fork Creek for 1956, 1966 and 1976

Section	Year	Estimated Hours fished	Number of fish caught					Total
			WRB	HRB	CT	DV	WF	
Mouth to Fish Creek	1966**	9,526	3,827	5,019	197	25	868	9,936
	1976***	4,766	2,077	490	171	48	496	3,282
Mouth to Boulder Creek	1956*	23,498	17,977	6,795	2,888	651	1,556	29,867
	1976	5,430	2,726	755	205	101	496	4,283
Fish Creek to Warmspring Creek	1966	12,854	19,841	3,998	960	80	653	25,532
	1976	6,069	5,488	1,337	339	99	168	7,429
Warmspring Creek to Hwy 12 Bridge on Crooked Fork	1956	3,253	2,474	None Planted	2,337	49	632	5,492
	1966	9,737	11,588	5,455	500	155	266	17,964
	1976	2,844	3,605	730	146	48	53	4,582
Mouth of Lochsa to Highway 12 Bridge on Crooked Fork	1966	32,117	35,256	14,472	1,657	260	1,787	53,432
	1976	13,679	11,170	2,557	654	195	717	15,293

*1956 estimates are for entire season from June 4 to October 31

**1966 estimates are for that portion of season from June 4 to September 10

***1976 estimates are for entire season from May 29 to September 10

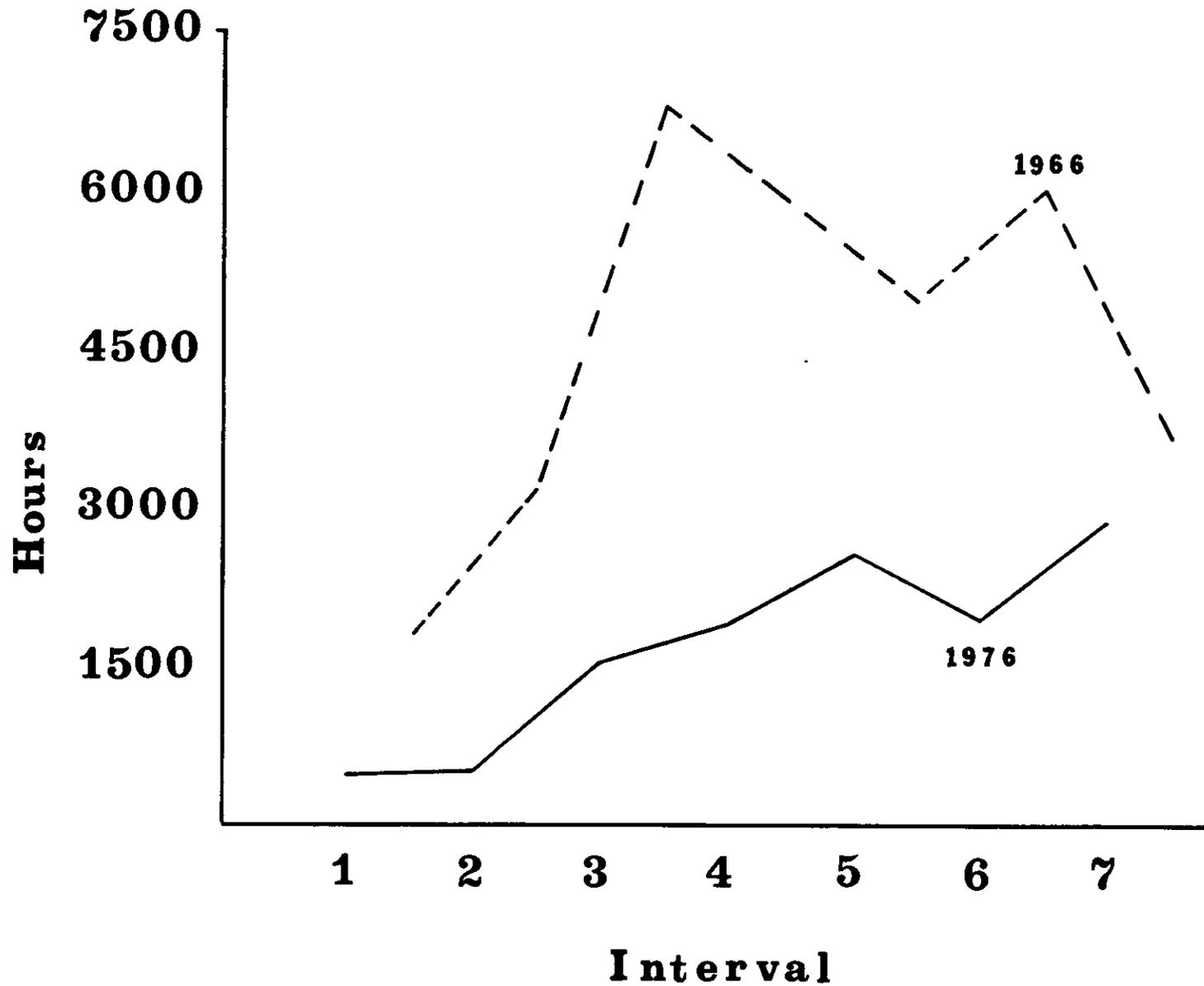


Figure 2. Comparison of estimated angler effort on the Lochsa River and the lower 12.8 km (8 mi) of Crooked Fork Creek by 2-week census interval, 1966 and 1976.

Section 1 during 1976 (Table 4). No estimate is available for angler effort in this river section during 1956, however Corning (1956) estimated that anglers caught 7,445 (52.5%) wild rainbow-steelhead, 4,846 (34.2%) hatchery rainbow, 1,350 (9.5%) cutthroat, 127 (0.9%) Dolly Varden and 402 (2.9%) whitefish from 4 June to 31 October 1956.

From Split Creek to Fish Creek (Section 2), anglers fished an estimated 1,987 hours in 1976 to catch 1,420 (73.2%) wild rainbow-steelhead, 108 (5.6%) hatchery rainbow, 54 (2.8%) cutthroat, 36 (1.9%) Dolly Varden and 322 (16.5%) whitefish. Anglers caught an average of 0.98 fish per hour in Section 2 during 1976 (Table 5).

Combining 1976 Sections 1 and 2, we can compare our findings with Keating's 1966 Section A (mouth of the Lochsa to Fish Creek). In 1976 anglers fished an estimated 4,766 hours in this section to catch 2,077 (63.3%) wild rainbow-steelhead, 490 (14.9%) hatchery rainbow, 171 (5.2%) cutthroat, 48 (1.5%) Dolly Varden and 496 (15.1%) whitefish. The overall catch rate was 0.69 fish per hour in 1976. From 4 June to 10 September 1966, anglers fished an estimated 9,526 hours to catch 3,827 (38.5%) wild rainbow-steelhead, 5,019 (50.5%) hatchery rainbow, 197 (2.0%) cutthroat, 25 (0.3%) Dolly Varden and 868 (8.7%) whitefish. The overall catch rate was 1.04 fish per hour in 1966 (Table 3). Angler effort in 1976 was 50.0% of that in 1966, and total fish harvested only 33.0% of the 1966 total.

From Fish Creek to Boulder Creek (Section 3), anglers fished an estimated 841 hours in 1976 to catch 649 (64.8%) wild rainbow-steelhead, 265 (26.5%) hatchery rainbow, 34 (3.4%) cutthroat, and 53 (5.3%) Dolly Varden. No whitefish were checked in this section in 1976. Anglers caught an average of 1.19 fish per hour in Section 3 during 1976 (Table 6).

Combining 1976 Sections 1, 2 and 3, we can compare our findings with Corning's 1956 Section G (mouth of the Lochsa to Boulder Creek). In 1976, anglers fished an estimated 5,430 hours to catch 2,726 (63.6%) wild rainbow-steelhead, 755 (17.6%) hatchery rainbow, 205 (4.8%) cutthroat, 101 (2.4%) Dolly Varden and 496 (11.6%) whitefish. The overall catch rate below Boulder Creek was 0.76 fish per hour in 1976 (Table 7). From 4 June to 31 October 1956, anglers fished an estimated 23,498 hours to catch 17,979 (60.2%) wild rainbow-steelhead, 6,795 (22.8%) hatchery rainbow, 2,888 (9.7%) cutthroat, 651 (2.2%) Dolly Varden, and 1,556 (5.1%) whitefish. The overall catch rate was 1.27 fish per hour in 1956 (Table 3). Angler effort in 1976 was only 23.1% of that in 1956, and total fish harvested only 14.3% of the 1956 total.

From Boulder Creek to Warmspring Creek (Section 4), anglers fished an estimated 5,228 hours to catch 4,839 (75.3%) wild rainbow-steelhead, 1,072 (16.6%) hatchery rainbow, 303 (4.7%) cutthroat, 46 (0.7%) Dolly Varden and 168 (2.6%) whitefish. Anglers caught an average of 1.23 fish per hour in Section 4 during 1976 (Table 8).

Combining Sections 3 and 4, we can compare our findings with Keating's 1966 Section B (Fish Creek to Warmspring Creek). In 1976 anglers fished an estimated 6,069 hours in this section to catch 5,488 (73.9%) wild rainbow-

Table 4. Estimated hours fished and harvest by anglers on the Lochsa River (Section 1 - mouth to Split Creek) by 2-week intervals, 29 May - 10 September, 1976.

Interval starting date	Estimated hours fished	Species caught					Total
		WRB	HRB	CT	DV	WF	
29 May	178	55	0	0	0	7	62
12 June	139	24	18	0	12	36	90
26 June	536	0	0	0	0	0	0
10 July	413	49	0	49	0	49	147
24 July	398	399	0	0	0	51	450
7 August	376	68	23	68	0	0	159
21 August	475	0	279	0	0	0	279
4 September	264	62	62	0	0	31	155
Totals	2,779	657	382	117	12	174	1,342
Percent of total		49.0	28.5	8.7	0.9	12.9	
Fish/hour		.236	.137	.042	.004	.063	.483

Table 5. Estimated hours fished and harvest by anglers on the Lochsa River (Section 2 - Split Creek to Fish Creek) by 2-week intervals, 29 May - 10 September, 1976.

Interval starting date	Estimated hours fished	Species caught					Total
		WRB	HRB	CT	DV	WF	
29 May	93	12	4	4	12	27	59
12 June	170	15	0	0	15	74	104
26 June	196	9	0	0	9	87	105
10 July	322	428	0	0	0	134	562
24 July	321	300	27	27	0	0	354
7 August	230	311	43	11	0	0	365
21 August	459	184	0	0	0	0	184
4 September	196	161	34	12	0	0	207
Totals	1,987	1,420	108	54	36	322	1,940
Percent of total		73.2	5.6	2.8	1.9	16.5	
Fish/hour		.715	.054	.027	.018	.162	.976

Table 6. Estimated hours fished and harvest by anglers on the Lochsa River (Section 3 - Fish Creek to Boulder Creek) by 2-week intervals, 29 May - 10 September, 1976.

Interval starting date	Estimated hours fished	Species caught					Total
		WRB	HRB	CT	DV	WF	
29 May	54	0	0	0	7	0	7
12 June	93	12	0	0	7	0	19
26 June	89	53	12	6	0	0	71
10 July	116	232	154	0	39	0	425
24 July	184	121	0	0	0	0	121
7 August	73	137	0	0	0	0	137
21 August	175	18	52	18	0	0	88
4 September	57	76	47	10	0	0	133
Totals	841	649	265	34	53	0	1,001
Percent of total		64.8	26.5	3.4	5.3	0.0	
Fish/hour		.772	.315	.040	.063	.000	1.19

Table 7. Estimated hours fished and harvest by anglers on the Lochsa River below Boulder Creek by 2-week intervals, 29 May - 10 September, 1976.

Interval starting date	Estimated hours fished	Species caught					Total
		WRB	HRB	CT	DV	WF	
29 May	325	67	4	4	19	34	128
12 June	402	51	18	0	34	110	213
26 June	821	62	12	6	9	87	176
10 July	851	709	154	49	39	183	1,134
24 July	903	820	27	27	0	51	925
7 August	679	516	66	79	0	0	661
21 August	1,109	202	331	18	0	0	551
4 September	340	299	143	22	0	31	495
Totals	5,430	2,726	755	205	101	496	4,283
Percent of total		63.6	17.6	4.8	2.4	11.6	
Fish/hour		.486	.135	.037	.018	.088	.764

Table 8. Estimated hours fished and harvest by anglers on the Lochsa River (Section 4 - Boulder Creek to Warm Spring Creek) by 2-week intervals, 29 May - 10 September, 1976.

Interval starting date	Estimated hours fished	Species caught					Total
		WRB	HRB	CT	DV	WF	
29 May	124	8	15	11	0	4	38
12 June	62	62	0	0	0	0	62
26 June	438	233	19	0	0	19	271
10 July	683	425	111	71	10	30	647
24 July	1,132	1,177	238	59	10	20	1,504
7 August	910	790	272	32	11	16	1,121
21 August	1,151	1,358	260	59	8	8	1,693
4 September	728	786	157	71	7	71	1,092
Totals	5,228	4,839	1,072	303	46	168	6,428
Percent of total		75.3	16.6	4.7	0.7	2.6	
Fish/hour		.926	.205	.058	.009	.032	1.23

steelhead, 1,337 (18.0%) hatchery rainbow, 337 (4.5%) cutthroat, 99 (1.3%) Dolly Varden and 168 (2.3%) whitefish. The overall catch rate in this section was 1.22 fish per hour in 1976. From 4 June to 10 September 1966, anglers fished an estimated 12,854 hours to catch 19,841 (77.7%) wild rainbow-steelhead, 3,998 (15.7%) hatchery rainbow, 960 (3.8%) cutthroat, 80 (0.3%) Dolly Varden, and 653 (2.6%) whitefish. The overall catch rate was 1.99 fish per hour in 1966 (Table 3). Angler effort in 1976 was 47.2% of that in 1966, and total fish harvested only 29.1% of the 1966 total.

From Warmspring Creek to the mouth of Crooked Fork Creek (Section 5) anglers fished an estimated 1,690 hours in 1976 to catch 2,635 (84.9%) wild rainbow-steelhead, 292 (9.4%) hatchery rainbow, 110 (3.5%) cutthroat, 13 (0.4%) Dolly Varden and 53 (1.8%) whitefish. Anglers caught an average of 1.84 fish per hour in Section 5 during 1976 (Table 9). Section 5 was the same as Keating's 1966 Section C. From 4 June to 10 September 1966, anglers fished an estimated 6,992 hours to catch 7,920 (64.4%) wild rainbow-steelhead, 3,702 (30.1%) hatchery rainbow, 351 (2.9%) cutthroat, 91 (0.7%) Dolly Varden, and 239 (1.9%) whitefish. The overall catch rate was 1.76 fish per hour in 1966. Angler effort in 1976 was only 24.2% of that in 1966, and total fish harvested only 25.2% of the 1966 total.

From the mouth of Crooked Fork Creek to the Highway 12 Bridge across Crooked Fork (Section 6), anglers fished an estimated 1,154 hours in 1976 to catch 970 (65.5%) wild rainbow-steelhead, 438 (29.6%) hatchery rainbow, 36 (2.4%) cutthroat and 35 (2.4%) Dolly Varden. No whitefish were checked in this section in 1976. Anglers caught an average of 1.28 fish per hour in Section 6 during 1976 (Table 10). Section 6 was the same as Keating's 1966 Section D. From 4 June to 10 September 1966, anglers fished an estimated 2,745 hours to catch 3,668 (64.8%) wild rainbow-steelhead, 1,753 (31.0%) hatchery rainbow, 149 (2.6%) cutthroat, 64 (1.1%) Dolly Varden and 27 (0.5%) whitefish. The overall catch rate was 2.06 fish per hour in 1966. Angler effort in 1976 was 42.0% of that in 1966 and total fish harvested only 26.1% of the 1966 total.

Combining 1976 Sections 5 and 6, we can compare our findings with Corning's 1956 Section H (Warmspring Creek to present Highway 12 Bridge on Crooked Fork) and Keating's 1966 Sections C and D. In 1976, anglers fished an estimated 2,844 hours to catch 3,605 (78.7%) wild rainbow-steelhead, 730 (15.9%) hatchery rainbow, 146 (3.2%) cutthroat, 48 (1.0%) Dolly Varden and 53 (1.2%) whitefish. The overall catch rate in these sections was 1.61 fish per hour in 1976. Corning (1956) estimated that anglers fished 3,253 hours between 4 June and 31 October to catch 2,474 (45.0%) wild rainbow-steelhead, 2,337 (42.6%) cutthroat, 49 (0.9%) Dolly Varden and 632 (11.5%) whitefish. No hatchery rainbow were released in this area in 1956. The overall catch rate was 1.69 fish per hour in this section in 1956. Angler effort in 1976 was 87.4% of that in 1956 and total fish harvested was 83.4% of the 1956 total. Keating (1966) estimated that anglers fished 9,737 hours between 4 June and 10 September to catch 11,588 (64.5%) wild rainbow-steelhead, 5,455 (30.4%) hatchery rainbow, 500 (2.8%) cutthroat, 155 (0.9%) Dolly Varden and 266 (1.5%) whitefish (Table 3). The overall catch rate was 1.84 fish per hour in this section in 1966. Angler effort in 1976 was 29.2% of that in 1966 and total fish harvested was 25.5% of the 1966 total.

Table 9. Estimated hours fished and harvest by anglers on the Lochsa River
 (Section 5 - Warm Spring Creek to Crooked Fork) by 2-week intervals,
 29 May - 10 September, 1976.

Interval starting date	Estimated hours fished	Species caught					Total
		WRB	HRB	CT	DV	WF	
29 May	17	0	0	0	0	0	0
12 June	8	0	0	0	0	0	0
26 June	125	14	0	0	0	0	14
10 July	168	240	0	48	0	0	288
24 July	337	967	29	15	0	0	1,011
7 August	352	598	11	21	0	21	651
21 August	473	558	91	26	13	0	688
4 September	210	258	161	0	0	32	451
Totals	1,690	2,635	292	110	13	53	3,103
Percent of total		84.9	9.4	3.5	0.4	1.8	
Fish/hour		1.56	.173	.065	.008	.031	1.84

Table 10. Estimated hours fished and harvest by anglers on Crooked Fork Creek (Section 6 - mouth to Highway 12 Bridge) by 2-week intervals, 29 May - 10 September, 1976.

Interval starting date	Estimated hours fished	Species caught					Total
		WRB	HRB	CT	DV	WF	
29 May	0	0	0	0	0	0	0
12 June	15	45	0	0	0	0	45
26 June	152	52	22	4	4	0	82
10 July	193	34	185	0	0	0	219
24 July	198	132	71	20	20	0	243
7 August	279	223	20	0	0	0	243
21 August	82	127	79	3	11	0	220
4 September	235	357	61	9	0	0	427
Totals	1,154	970	438	36	35	0	1,479
Percent of total		65.6	29.6	2.4	2.4	0.0	
Fish/hour		.841	.380	.031	.030	.000	1.28

In 1977, the Lochsa River above Boulder Creek and the lower 12.8 km (8 mi) of Crooked Fork will be catch-and-release for trout. During the 1976 season, we estimated that anglers fished 8,249 hours in this area to catch 8,444 (76.7%) wild rainbow-steelhead, 1,802 (16.4%) hatchery rainbow, 449 (4.1%) cutthroat, 94 (0.8%) Dolly Varden and 221 (2.0%) whitefish. Anglers averaged 1.36 fish per hour above Boulder Creek in 1976 (Table 11). Our estimates indicate that 60.3% of the total angler effort on the Lochsa River took place above Boulder Creek and that this effort yielded 75.6% of the wild rainbow-steelhead, 70.5% of the hatchery catchable rainbow, 68.7% of the cutthroat, 48.2% of the Dolly Varden and 30.8% of the whitefish.

Species Composition

Wild rainbow-steelhead have comprised a higher percent of the total harvest from the Lochsa River each year, increasing from 57.8% in 1956 to 66.0% in 1966 to 73.0% in 1976 (Table 12 & Fig. 3). Cutthroat have decreased from 14.8% of the total catch in 1956 to 4.3% in 1976. The large number of hatchery catchable rainbow released into the Lochsa in 1966 (34,305 compared to 12,640 in 1976) may have acted as a "buffer" species for the wild rainbow and cutthroat. Over 50% of the catch from the mouth of the Lochsa to Fish Creek was hatchery rainbow in 1966.

Catch Rates

Anglers caught fish from the Lochsa River at an overall rate of 1.12 per hour in 1976, compared to 1.32 in 1956 and 1.66 in 1966. Catch rates were much better for all species in June and early July of 1966 than in 1976, but during late July and August catch rates were about equal for both years (Table 13). Peak rates for wild rainbow-steelhead and cutthroat occurred during mid-July of both years. Hatchery rainbow were caught at a rate 2.4 times greater in 1966 than in 1976.

Length Frequencies

We measured a total of 887 wild rainbow-steelhead from the Lochsa River during 1976. They ranged from 102 to 356 mm (4.0-14.0 in) and averaged 198 mm (7.8 in) total length. We found that 28.7% of these fish were over 203 mm (8 in) in length (Fig. 4). Keating (1966) measured 1,464 wild rainbow-steelhead and found that only 85.% were over 203 mm (8 in).

A total of 61 cutthroat trout from the Lochsa were measured in 1976. They ranged from 159 to 356 mm (6.3-14.0 in) and averaged 254 mm (10 in) total length. We also measured four rainbow-cutthroat hybrids ranging from 152 to 227 mm (6.0-8.9 in). Keating (1966) measured 144 cutthroat and 30% were over 254 mm (10 in) total length. Of the 61 cutthroat measured in 1976, 23 (37.7%) were over 254 mm (10 in) long.

We measured 27 Dolly Varden from the Lochsa in 1976. They ranged from 178 to 570 mm (7.0-22.4 in) total length and averaged 320 mm (12.6 in).

We measured 73 whitefish from the Lochsa in 1976. They ranged from 220 to 20

Table 11. Estimated hours fished and harvest by anglers on the Lochsa River above Boulder Creek and Crooked Fork (mouth to Highway 12 Bridge) by 2-week intervals, 29 May - 10 September, 1976.

Interval starting date	Estimated hours fished	Species caught					Total
		WRB	HRB	CT	DV	WF	
29 May	141	8	15	11	0	4	38
12 June	85	107	0	0	0	0	107
26 June	715	299	41	4	4	19	367
10 July	1,044	699	296	119	10	30	1,154
24 July	1,667	2,276	338	94	30	20	2,758
7 August	1,541	1,611	303	53	11	37	2,015
21 August	1,706	2,043	430	88	32	8	2,601
4 September	1,350	1,401	379	80	7	103	1,970
Totals	8,249	8,444	1,802	449	94	221	11,010
Percent of total		76.7	16.4	4.1	0.8	2.0	
Fish/hour		1.05	.223	.056	.012	.027	1.36

Table 12. Comparison of percent composition of catch by stream section in the Lochsa River for 1956, 1966 and 1976

Stream and section	Percent of catch by species and year														
	WRB			HRB			CT			DV			WF		
	1956	1966	1976	1956	1966	1976	1956	1966	1976	1956	1966	1976	1956	1966	1976
Mouth of Lochsa to Split Creek	52.5	-	49.0	34.2	-	28.5	9.5	-	8.7	0.9	-	0.9	2.9	-	12.9
Mouth of Lochsa to Fish Creek	-	38.5	63.3	-	50.5	14.9	-	2.0	5.2	-	0.3	1.5	-	8.7	15.1
Mouth of Lochsa to Boulder Creek	60.2	-	63.6	22.8	-	17.6	9.7	-	4.8	2.2	-	2.4	5.1	-	11.6
Fish Creek to Warmspring Creek	-	77.7	73.9	-	15.7	18.0	-	3.8	4.5	-	0.3	1.3	-	2.6	2.3
Warmspring Creek to mouth of Crooked Fork Creek	-	64.4	84.9	-	30.1	9.4	-	2.9	3.5	-	0.7	0.4	-	1.9	1.8
Mouth of Crooked Fork to Highway 12 Bridge	-	64.8	65.6	-	31.0	29.6	-	2.6	.24	-	1.1	2.4	-	0.5	0.0
Warmspring Creek to Highway 12 Bridge on Crooked Fork	45.0	64.5	78.7	0.0*	30.4	15.9	42.6	2.8	3.2	0.9	0.9	1.0	11.5	1.5	1.2
Mouth of Lochsa to Highway 12 Bridge on Crooked Fork	57.8	66.0	73.0	19.2	27.1	16.7	14.8	3.1	4.3	2.0	0.5	1.3	6.2	3.3	4.7

*No hatchery rainbow released in this section in 1956

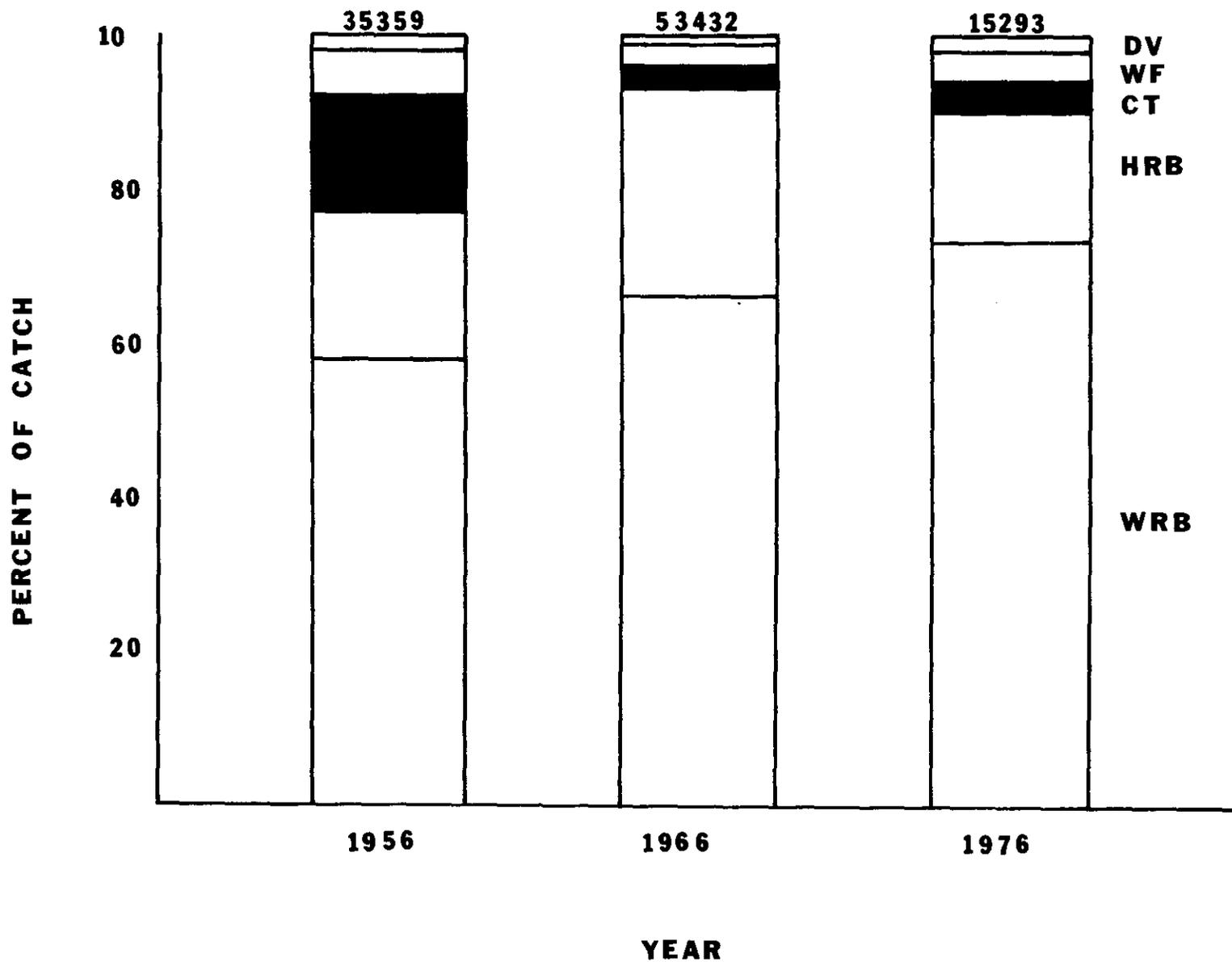


Figure 3. Comparison of species composition of the angler catch and total estimated catch from the Lochsa River, 1956, 1966 and 1976.

Table 13. Comparison of catch rates by anglers on the Lochsa River and Crooked Fork Creek (mouth to Highway 12 Bridge) by 2-week intervals, 4 June - 10 September 1966 and 29 May - 10 September 1976.

Interval starting date	Catch per hour by species											
	WRB		HRB		CT		DV		WF		Total	
	1966	1976	1966	1976	1966	1976	1966	1976	1966	1976	1966	1976
29 May 76		.155		.052		.041		.041		.124		.414
4 June 66	.307		.248		.078		.015		.220		.867	
12 June 76		.268		.062		.000		.082		.227		.680
18 June 66	.985		.277		.033		.015		.243		1.55	
26 June 76		.232		.043		.009		.017		.133		.433
2 July 66	1.06		.316		.066		.014		.022		1.48	
10 July 76		.679		.245		.085		.019		.085		1.11
16 July 66	1.52		.570		.066		.003		.004		2.16	
24 July 76		1.18		.178		.056		.015		.020		1.47
30 July 66	1.29		.365		.045		.000		.002		1.71	
7 Aug 76		.982		.216		.047		.007		.018		1.27
13 Aug 66	.924		.594		.036		.004		.054		1.61	
21 Aug 76		1.02		.305		.050		.027		.004		1.41
27 Aug 66	.979		.514		.040		.005		.039		1.58	
4 Sept 76		1.02		.261		.071		.005		.076		1.43
Totals	1.10	.817	.451	.187	.052	.048	.008	.014	.056	.052	1.66	1.12

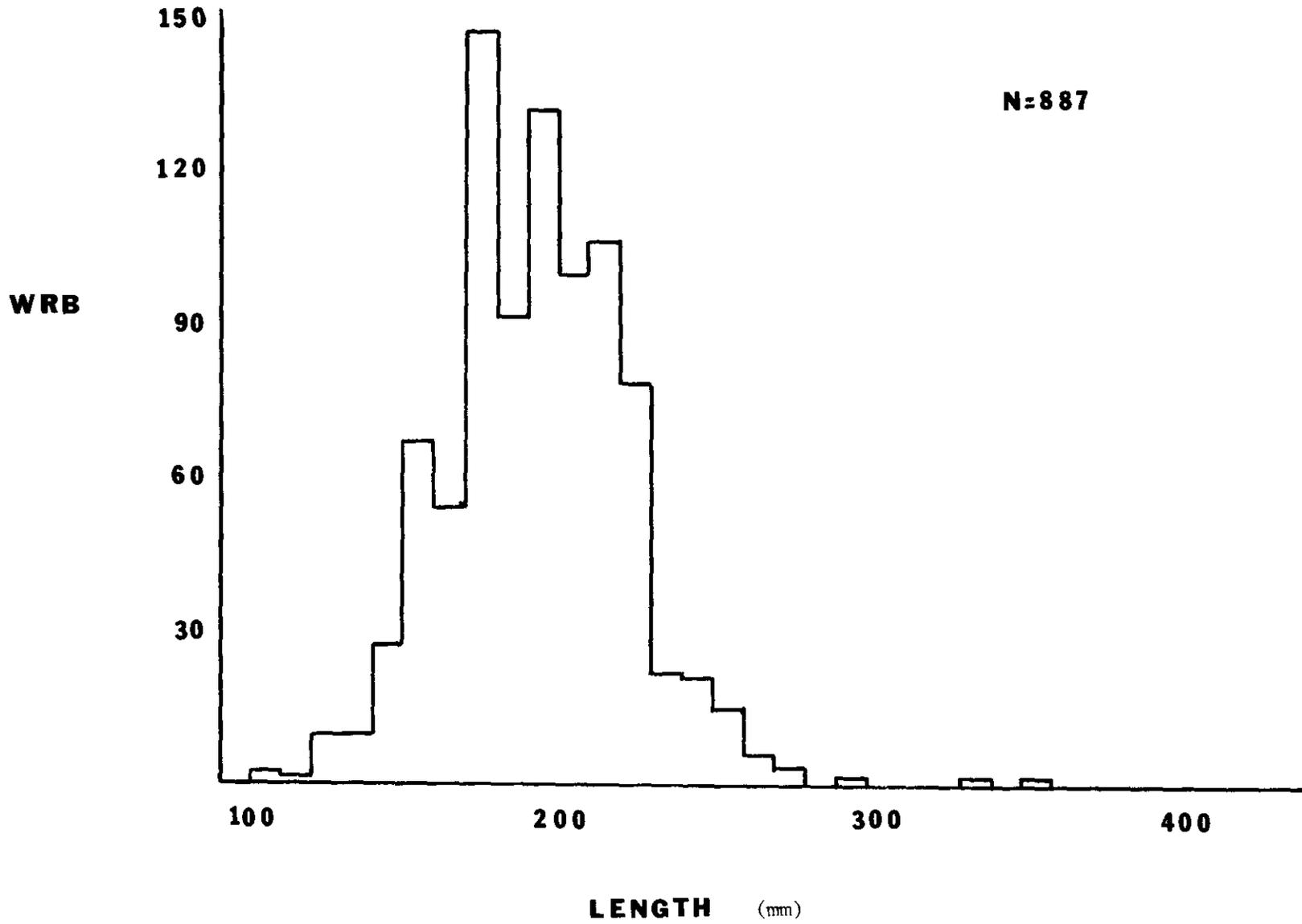


Figure 4. Length frequency of 887 wild rainbow-steelhead measured from the Lochsa River, 1976.

to 390 mm (8.7-15.4 in) total length and averaged 302 mm (11.9 in).

Angler Residency

We interviewed a total of 809 anglers on the Lochsa River during 1976. Of these, 77.8% were residents of Idaho. This ratio did not vary significantly above or below Boulder Creek, with 79.6% Idaho residents below and 76.8% above. We encountered the most nonresidents during Interval 6 (7-20 August) when 33.3% of the people interviewed were nonresidents (Table 14). Very few nonresidents were seen early in the season, with 89.8% and 94.4% residents during Intervals 1 and 2 (29 May - 25 June) (Fig. 5). Of the 2,783 anglers interviewed in 1966, 74% were residents.

Angler Methods and Opinions

Forty-six percent of the anglers interviewed on the Lochsa River during 1976 were fishing with bait, while 24.7% used artificial lures and 29.5% used artificial flies. Use of bait varied from 59.1% in May to 42.0% in July. In May, 40.9% of anglers interviewed used artificial lures while only 17.2% used artificial lures in August. August was the top month for fly fishermen with 38.0% of the anglers interviewed using flies while none used flies in May (Table 15).

When asked to rate fishing on the Lochsa River in 1976, 23.4% of the anglers interviewed rated it "good", 40.8% "fair" and 35.8% "poor". Because of high water and rainy weather in June, only 6.1% of the anglers rated fishing as "good", while 73.5% rated it "poor". In August, 28.0% rated fishing as "good", 44.7% "fair" and 31.6% "poor", (Table 15).

A slight majority (51.2%) of anglers on the Lochsa River preferred to catch a few large fish, while 48.8% preferred to catch many small fish (Table 15).

When asked if they would be in favor of some type of restrictive regulation on the Lochsa to restore the cutthroat trout population, 53.3% replied "yes", 26.4% "no" and 20.3% had no opinion (Table 15).

When asked if they would be in favor of an 8-inch minimum size limit on trout, 56.0% replied "yes", 32.9% "no", and 11.1% had no opinion (Table 15).

Snorkel Transects

We snorkeled established transects in the Lochsa River on 10 August and 30 August 1976. On 10 August we snorkeled six transects and counted 8 juvenile, 76 to 203 mm (3-8 in), steelhead (1.3 per transect), 8 hatchery catchable rainbow (1.3) and 52 whitefish (8.7). On 30 August, we snorkeled two transects and counted 12 juvenile steelhead (6.0 per transect), 28 hatchery catchable rainbow (14.0) and 99 whitefish (49.5). We saw no young-of-the-year (YOY) steelhead, juvenile chinook, cutthroat trout or Dolly Varden on either date (Table 16). In 1975, we snorkeled a total of 44 transects in the Lochsa River and counted 114 juvenile steelhead (2.6 per

Table 14. Percent of nonresident anglers fishing the Lochsa River above and below Boulder Creek by 2-week interval, 29 May - 10 September, 1976

Interval starting date	Lochsa below Boulder Creek	Lochsa above Boulder Creek	Total
29 May	15.6	0.0	10.2
12 June	5.9	0.0	5.6
26 June	13.6	29.3	21.4
10 July	11.1	25.0	19.7
24 July	30.0	13.9	17.0
7 August	36.4	32.7	33.3
21 August	25.0	21.5	22.2
4 September	30.3	18.0	22.9
Totals	20.4	23.2	22.2

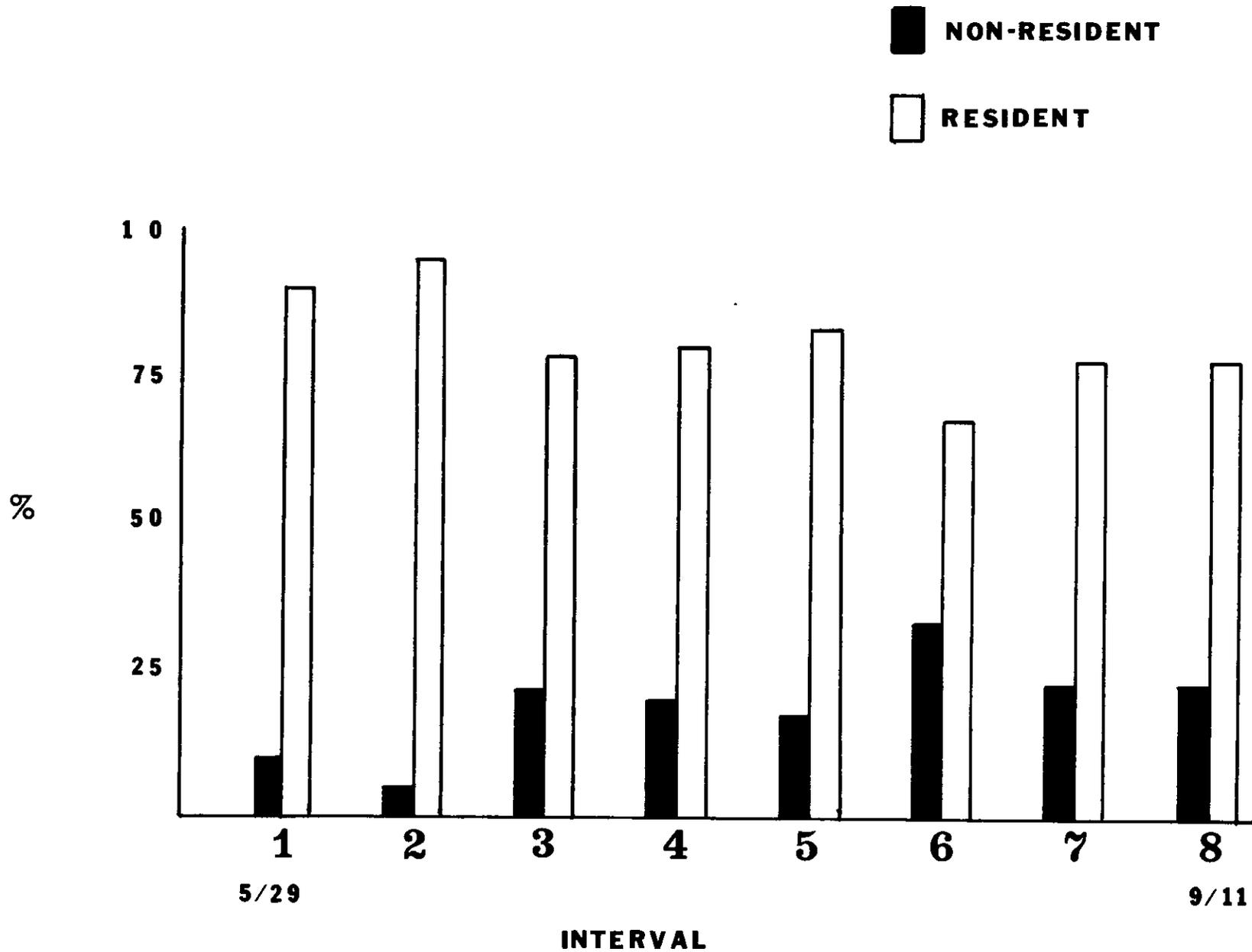


Figure 5. Residency of anglers interviewed on the Lochsa River by 2-week census interval, 29 May - 10 September 1976.

Table 15. Angling methods and angler opinion information collected on the Lochsa River, 29 May - 10 September 1976

Interval	Method			Rate fishing			Size-number preference		Restrictive limit to restore cutthroat			8-inch Minimum size limit		
	Bait	Lure	Flies	Good	Fair	Poor	Few Large	Many small	Yes	No	No Op.	Yes	No	No op.
29-31 May	59.1	40.9	0.0	31.8	54.4	13.7	63.6	36.4	50.0	27.2	22.8	59.1	40.9	0.0
1-30 June	51.8	32.1	16.1	6.1	20.4	73.5	52.0	48.0	70.6	13.7	15.7	62.0	22.0	16.0
1-31 July	42.0	26.2	31.4	22.9	35.9	41.2	46.4	53.6	57.0	17.6	25.4	59.9	31.7	8.4
1-31 August	44.8	17.2	38.0	28.0	48.4	23.6	54.2	45.8	46.8	35.7	17.5	56.1	34.5	9.4
1-10 September	50.0	31.6	18.4	23.7	44.7	31.6	47.4	52.6	47.4	34.2	18.4	31.6	39.5	28.9
Total	46.0	24.7	29.3	23.4	40.8	35.8	51.2	48.8	53.3	26.4	20.3	56.0	32.9	11.1

Table 16. Numbers of fish counted by snorkeling in the Lochsa River, Crooked Fork, Papoose and Squaw Creeks in 1976

Stream	Dates	Species counted							Number of transects
		Steelhead rainbow		Hatchery rainbow	Chinook	Cutthroat	Dolly Varden	Whitefish	
		YOY	Juv						
Lochsa River	8/10	0	8	8	0	0	0	52	6
	8/30	0	12	28	0	0	0	99	2
Crooked Fork Creek	8/10	15	4	5	0	3	2	3	1
	8/25	47	33	6	0	0	1	3	2
Papoose Creek	7/13	0	24	0	0	7	0	0	3
	8/25	13	21	0	0	31	0	0	4
Squaw Creek	7/13	0	39	1	0	2	1	0	2
	8/25	39	5	0	0	0	0	0	3

transect), 40 hatchery catchable rainbow (0.9), 62 juvenile chinook (1.4), 2 cutthroat (.05) and 607 whitefish (13.8) (Lindland 1976).

In Crooked Fork Creek, we snorkeled one transect on 10 August and two on 25 August 1976. On 10 August we counted 15 YOY steelhead, 4 juvenile steelhead, 5 hatchery rainbow, 3 cutthroat, 2 Dolly Varden and 3 whitefish; on 25 August, 47 YOY steelhead (23.5 per transect), 33 juvenile steelhead (16.5), 6 hatchery catchable rainbow (3.0), 1 Dolly Varden (0.5) and 3 whitefish (1.5) (Table 16). We saw no juvenile chinook in 1976. In 1975, we snorkeled a total of 10 transects in Crooked Fork Creek and counted 18 YOY steelhead (1.8), 141 juvenile steelhead (14.1), 16 hatchery catchable rainbow (1.6), 157 juvenile chinook (15.7), 1 cutthroat (0.1), 4 Dolly Varden (0.4) and 64 whitefish.

In Papoose Creek we snorkeled three transects on 13 July and four on 25 August. On 13 July, we counted 24 juvenile steelhead (8.0 per transect) and 7 cutthroat (2.3); on 25 August, 13 YOY steelhead (3.3), 21 juvenile steelhead (5.3) and 31 cutthroat (7.8) (Table 16). In 1975 we snorkeled a total of 23 transects in Papoose Creek and counted 105 YOY steelhead (4.6), 279 juvenile steelhead (12.1), 3 juvenile chinook (0.1), 58 cutthroat (2.5) and 1 Dolly Varden (.04).

In Squaw Creek, we snorkeled two transects on 13 July and three on 25 August. On 13 July, we counted 39 juvenile steelhead (19.5 per transect), 1 hatchery catchable rainbow (0.5), 2 cutthroat (1.0) and 1 Dolly Varden (0.5); on 25 August, 39 YOY steelhead (13.0) and 5 juvenile steelhead (1.7) (Table 16). In 1975, we snorkeled a total of 20 transects in Squaw Creek and counted 32 YOY steelhead (1.6), 187 juvenile steelhead (9.4), 26 catchable rainbow (1.3), 7 juvenile chinook (0.4), 10 cutthroat (0.5), and 6 Dolly Varden (0.3).

Cutthroat Tagging in Lochsa Tributaries

During 1976, we tagged a total of 49 cutthroat in four Lochsa River tributaries. We tagged 32 cutthroat in Pack Creek ranging from 120 to 180 mm (4.7-7.1 in) and averaging 146 mm (5.7 in) in length. We tagged 12 cutthroat in Brushy Fork Creek ranging from 120 to 160 mm (4.7-6.3 in) and averaging 152 mm (6.0 in). We tagged 3 cutthroat in White Sand Creek and 2 in Crooked Fork Creek. To date, none of these tagged cutthroat have been reported as recaptured.

DISCUSSION

One of the least expected findings revealed by the 1976 Lochsa River creel census study was the substantial decrease in estimated angler effort from 32,117 hours in 1966 to only 13,679 hours in 1976. Census techniques for the 2 years were as close to identical as possible with the season being divided into 2-week intervals and angler counts conducted on all holidays, two randomly selected weekend days and two weekdays per interval. We interviewed anglers on all other weekend days and at least three other week-days per interval. Counts were conducted by driving along Highway 12. One

difference was that Keating (1966) divided a count day into five time periods from 0500 to 2000 hours, while we had only four count periods per day, but alternated early and late count days. Keating (1966) interviewed a total of 2,783 anglers who had fished 3,428 hours (9.8% of his total estimated effort), while we interviewed 809 anglers who fished 1,402 hours (10.2% of total estimated effort).

Differences in environmental conditions between 1966 and 1976 and their effect on catch rates could have been a major cause of the reduction in angling pressure. The Lochsa was high and turbid during most of June, 1976, and fishing conditions were not good until after the 4 July weekend. Catch rates during June and early July were two or three times higher in 1966 as compared to 1976 (Table 13). August of 1976 was one of the wettest on record. The cool, wet August probably improved catch rates over a normal hot August, but the rainy weather kept angler participation lower than normal.

The reduction in hatchery catchable rainbow released in the Lochsa River from 34,305 in 1966 to 12,640 in 1976 could also have been a factor in reducing the angling pressure. An angler fishing the Lochsa in 1976 was more likely to catch only 152 to 203 mm (6-8 in) wild rainbow-steelhead (73.0% of the catch), whereas in 1966 he would have had a better chance to catch a larger 229 to 305 mm (9-12 in) hatchery rainbow (27.1% of the 1966 catch compared to 16.7% in 1976). This decrease in the per-cent of hatchery catchables in the catch was the most significant change in species composition from 1966 to 1976. Anglers may have chosen to fish other areas in 1976 such as Dworshak Reservoir where their chances of catching larger trout were better. Keating estimated that 46% of the catchables planted in 1966 were returned to the creel, while the 1976 return was only 20.2%. This percent return can also be greatly influenced by flows and environmental conditions.

Keating (1966) stated that there was a feeling among residents that nonresident anglers had "taken over the Lochsa River". Yet, he found that only 26% of the anglers fishing the Lochsa were nonresidents. The same feeling is still prevalent among residents, and still, only 22.2% of the anglers checked on the Lochsa in 1976 were nonresidents.

Escapement of wild adult steelhead above the North Fork of the Clear-water River and thus into the Lochsa and Selway has declined from 5,114 in 1973 to 900 in 1975 and rebounded to an estimated 3,600 in 1976 (Pettit 1977). Numbers of progeny of this declining run of wild steelhead must also be declining; yet, 73.0% of the catch in the Lochsa River during 1976 was composed of wild juvenile steelhead. What effect this harvest of juvenile steelhead has on the potential return of adults is difficult to predict, but it must be much more significant than in 1966 when returns of wild adult steelhead to the Lochsa were much more numerous. Pollard (1969) found that "the normal sport fishery may take as many as half of the catchable size (Age II-plus) juvenile steelhead from a stream such as Crooked Fork each year, and thus may reduce the number of smolts produced." The percent of II+ juvenile steelhead harvested from a larger stream such as the Lochsa River would probably be less, but may still be quite -cant.

During 1976, we measured a total of 887 wild rainbow-steelhead from the Lochsa River. We found that 28.7% of these were greater than 203 mm (8 in) long. Keating (1966) measured 1,464 wild rainbow and found that only 8.5% were over 203 mm (8 in). There are several possible explanations:

1. Fewer wild rainbow-steelhead in the system reduces competition for food and space and this results in production of a larger smolt.
2. Anglers were more selective towards larger fish in 1976 than in 1966.
3. Decreased numbers of juvenile steelhead with constant production of wild resident rainbow; thus, increased percentage of wild rainbow over 203 mm (8 in) long.
4. Inability of the census clerk to distinguish between wild rainbow and small catchable hatchery rainbow (I have no reason to believe that this occurred.)

The cutthroat trout population in the Lochsa River has apparently not changed significantly since 1966 when it had already been reduced drastically due to opening of Highway 12 up the Lochsa in 1962. Catch rates for cutthroat are almost identical in 1976 to those of 1966 (0.048 to 0.052 per hour), where-as, the 1956 cutthroat catch rate was 0.718 in the upper roaded section of the Lochsa and 0.123 in the lower roaded section. Length frequencies are also similar with 30% of the cutthroat measured in 1966 being over 254 mm (10 in) while 37.7% were over 254 mm (10 in) in 1976. In 1960, 53% of the cutthroat measured from the Lochsa were over 254 mm (10 in) (Keating 1966).

In its present state, the cutthroat population of the Lochsa is considerably more depressed than were the populations in Kelly Creek, St. Joe River, Middle Fork of the Salmon River or Selway River when restrictive regulations were first imposed on these streams. Catch rates of cutthroat trout were 0.21 per hour in Kelly Creek in 1969 and 0.22 in the St. Joe River in 1968 (before special regulations) compared to 0.048 cutthroat per hour in the Lochsa River in 1976. Divers counted an average of 0.8 cutthroat per transect in Kelly Creek in 1970, 4.0 per transect in the St. Joe River from Prospector Creek to Spruce Tree Campground in 1969, and 5.5 per transect in the Selway River (unroaded portion) in 1974. We saw only two cutthroat in the Lochsa River in 44 transects snorkeled in 1975 (Johnson and Bjornn 1975 and Lindland 1976).

The Lochsa River is also much more accessible than other catch-and-release streams in Idaho, with Highway 12 paralleling its entire length. Access to Kelly Creek and the St. Joe River is by gravel road and trail, while access to most of the Selway River and Middle Fork of the Salmon River is by trail or float boat. It will indeed be interesting to see whether or not the remnant cutthroat population which now exists in the Lochsa River will respond to catch-and-release regulations as have those in the above-mentioned streams.

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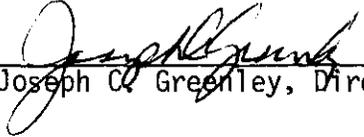
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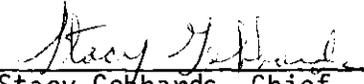
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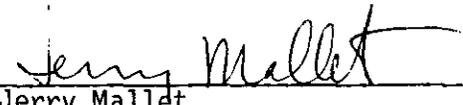
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