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PROJECT TITLE: Summer Steelhead Creel Surveys on the  
Grande Ronde, Willowa, and Imnaha  
Rivers for the 1990-91 Run Year

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## CONTENTS

	<u>Page</u>
SUMMARY.....	1
Objectives in FY 1991.....	1
Accomplishments and Findings in FY 1991.....	1
Management Implications and Recommendations.....	2
INTRODUCTION.....	3
STUDY AREA. ....	4
METHODS.....	5
RESULTS.....	5
DISCUSSION.....	12
REFERENCES.....	16



## SUMMARY

### Objectives in FY 1991

1. Estimate angler effort in hours and angler days for summer steelhead fisheries on the Grande Ronde, Wallowa, and Imnaha rivers.
2. Estimate total catch, catch rate, and number of fish harvested in summer steelhead fisheries on the Grande Ronde, Wallowa, and Imnaha rivers.
3. Estimate the proportion of hatchery fish in the total catch.
4. Determine length frequency, age composition, and sex composition of catch.
5. Estimate, by tag code, the number of adipose-left ventral clipped plus coded-wire-tagged steelhead harvested.

### Accomplishments and Findings in FY 1991

We estimated that on the lower Grande Ronde River during the periods 1 September through 20 December 1990 and 1 March through 15 April 1991, 772 anglers fished 3,814 hours. They caught and released 99 wild and 87 hatchery steelhead and kept 18 hatchery steelhead. Angler effort, catch, and harvest was the lowest since angler surveys began in 1986. This may have been due to low steelhead abundance, low catch rates, and the fishery changing to catch-and-release only beginning 15 November.

On the upper Grande Ronde River from 16 February through 15 April 1991, we estimated that 1,894 anglers fished for 6,193 hours. They caught and released 25 wild and 81 hatchery steelhead and kept 151 hatchery steelhead.

effort in this fishery has steadily increased since 1989 when it was opened for steelhead angling for the first time since 1974.

On the Wallowa River from 16 February through 15 April 1991, we estimated that 1,152 anglers fished for 6,571 hours. They caught and released 146 wild and 924 hatchery steelhead. The catch-and-release only regulation was also in effect on the Wallowa River.

From 1 March through 15 April 1991 we estimated that 300 anglers fished for 1,216 hours on the Imnaha River. They caught and released 50 wild and 35 hatchery steelhead and kept 15 hatchery steelhead. The daily bag limit on the Imnaha River was reduced from two to one adipose-marked steelhead.

Low angler effort during the 1990-91 run year in most fisheries in the Grande Ronde and Imnaha basins may have been due to poor steelhead returns during the 1990-91 run year to many Columbia and Snake basin tributaries including the Grande Ronde and Imnaha basins. Poor returns obligated managers to impose more restrictive in-basin regulations to ensure broodstock needs would be met at hatchery facilities. The catch rate goal of 10 hours per fish during the 1990-91 run year was met only on the Wallowa River.

#### **Management Implications and Recommendations**

1. We believe that more restrictive harvest regulations helped limit harvest. Restrictive harvest was a major factor ensuring sufficient summer steelhead broodstock returns to meet Lower Snake River Compensation Plan (LSRCP) hatchery needs in the Grande Ronde basin during the 1990-91 run year.

2. The high percentage (90.3%) of hatchery steelhead in the recreational catch on the upper Grande Ronde River is of considerable concern. The proportion of fish caught that were hatchery origin was 15% higher than in the previous year. If the ratio of hatchery:wild in the catch is representative of the natural spawning population, then the proportion of hatchery fish is well above levels specified in Oregon's Wild Fish Policy (OAR 635-07-525 through 529). Further investigation is needed to determine the percentage of natural spawners that are hatchery origin.
3. Catch rates were generally higher in areas regulated as catch and release only, however angler effort was lower in these areas. Conversely, in areas where steelhead harvest was permitted, we generally found low catch rate but high effort. It appears that anglers prefer areas where they can retain steelhead.
4. As in previous years, the low catch of hatchery fish during September and October on the lower Grande Ronde River is of concern since it indicates a difference in run timing of wild and hatchery fish and may limit contribution to Oregon fisheries.

## INTRODUCTION

One of the primary objectives of the Lower Snake River Compensation Plan (LSRCP) in Oregon is to restore historic recreational and tribal fisheries for summer steelhead *Oncorhynchus mykiss* in the Grande Ronde and Imnaha river basins. The goal of the creel surveys is to provide annual harvest information needed to assess LSRCP objectives and mitigation goals (Carmichael and Wagner 1983). This report summarizes results of creel surveys conducted

during fall 1990 and spring 1991 on the Grande Ronde, Wallowa, and Imnaha rivers. Results of creel surveys conducted prior to fall 1990 are reported in previous LSRCP evaluation annual reports (Carmichael et al. 1986, 1987, 1988, 1989, 1990a). The steelhead angling season was open from 1 September 1990 to 15 April 1991 during which only adipose-clipped fish could be kept. On 15 November 1990, an emergency regulation change became effective which required anglers to catch and release all steelhead on the lower Grande Ronde River from the Oregon-Washington border upstream to Rondowa (mouth of the Wallowa River), and on the Wallowa River from the mouth upstream to the Lostine River. There was no regulation change on the Grande Ronde River upstream of Rondowa. On the Imnaha River, the daily angler bag limit was reduced from two to one hatchery fish. These regulation changes were in response to extremely low projected steelhead returns during the 1990-91 run year into the Grande Ronde and Imnaha rivers, and concern that broodstock needs would not be met at LSRCP hatchery facilities in Oregon.

#### STUDY AREA

Creel surveys on the lower Grande Ronde River were conducted on a 14.6 mile section from the Oregon-Washington state line (RM 38.7) to Wildcat Creek (RM 53.3) and on a 24.4 mile section of the upper Grande Ronde River from Highway 82 bridge at Island City (RM 158.8) to Meadow Creek (RM 183.2). The survey on the Wallowa River was conducted on a 17.8 mile section from Minam State Park (RM 8.2) to the Lostine River (RM 26.0). Anglers who parked their vehicles at Minam State Park and hiked downstream to fish were included in this survey. No survey was conducted on the lower Wallowa River at Rondowa. The survey on the Imnaha River was conducted on the lower 23.0 miles from its

confluence with the Snake River (RM 0) to the town of Imnaha (RM 23.0). The study area is shown in Figure 1.

## METHODS

Generally, we followed the methods described by Carmichael et al. (1988). We randomly sampled 50% of the weekends and 30% of the weekdays each month for all surveys. The survey on the lower Grande Ronde River was from 1 September to 20 December 1990 and 1 March to 15 April 1991. Surveys on the upper Grande Ronde and Wallowa rivers were from 16 February to 15 April 1991. The survey on the Imnaha River was from 1 March to 15 April 1991.

## RESULTS

We estimated that 772 anglers fished for 3,814 hours on the lower Grande Ronde River. They caught and released 99 wild and 87 hatchery steelhead and kept 18 hatchery steelhead (Table 1). On the upper Grande Ronde River, we estimated that 1,894 anglers fished for 6,193 hours. They caught and released 25 wild and 81 hatchery steelhead and kept 151 hatchery steelhead (Table 2). On the Wallowa River, we estimated that 1,152 anglers fished for 6,571 hours and they caught and released 146 wild and 924 hatchery steelhead (Table 3). On the Imnaha River, we estimated that 300 anglers fished for 1,216 hours. They caught and released 50 wild and 35 hatchery steelhead and kept 15 hatchery steelhead (Table 4). The percent of the total fish caught that were hatchery fish was highest in the upper Grande Ronde River and lowest in the Imnaha River (Table 5). Anglers harvested 1-salt fish which averaged less than 650 mm fork length and 2-salt fish which averaged greater than 650mm fork length (Table 6).

We recovered two adipose-left ventral clipped plus coded-wire-tagged (AdLV+CWT) fish during creel surveys in the Grande Ronde and Imnaha basins. One recovery was a 2-salt fish released in the Tucannon River (Washington) at Curl Lake that was harvested on the lower Grande Ronde River. The other recovery was a 1-salt Imnaha fish harvested on the Imnaha River (Table 7). No Ad+CWT fish were recovered on the upper Grande Ronde or Wallowa rivers.

The majority of anglers participating in summer steelhead fisheries in the Grande Ronde and Imnaha basins were either Union or Wallowa county residents (Table 8). The fishery on the Imnaha River had the highest percent of out-of-state anglers.

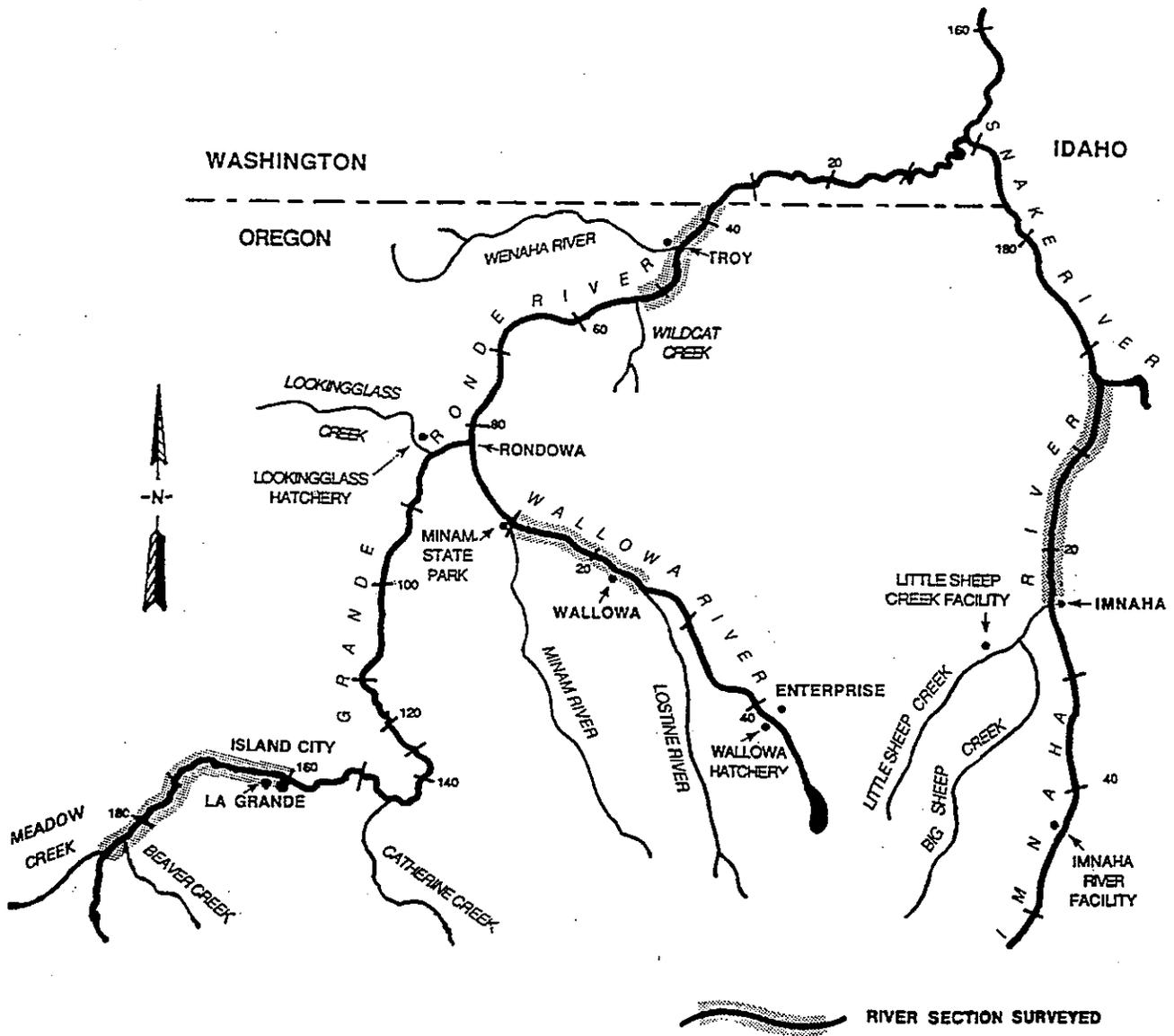


Figure 1. Map of northeastern Oregon showing where summer steelhead creel surveys were conducted in the Grande Ronde and Imnaha basins during the 1990-91 run year.

Table 1. Catch statistics for summer steelhead on the lower Grande Ronde River. Number caught and number harvested includes  $\pm 95\%$  confidence interval. Only adipose-marked fish were harvested. All angling was catch-and-release only from 15 November 1990 to 15 April 1991.

Month, day type	Number sampled		Hours fished	Number caught	Number harvested	Catch rate (hr/fish)	Angler days
	days	anglers					
September:							
Weekday	6	4	137	0	0	--	25
Weekend	4	53	832	$3 \pm 6$	0	277.3	140
Total	10	57	969	$3 \pm 6$	0	323.0	165
October:							
Weekday	6	37	1,020	0	0	--	190
Weekend	4	42	501	$20 \pm 14$	$2 \pm 4$	25.1	93
Total	10	79	1,521	$20 \pm 14$	$2 \pm 4$	76.0	283
November:							
Weekday	8	15	199	$5 \pm 8$	0	39.8	37
Weekend	4	45	736	$57 \pm 51$	$16 \pm 19$	12.9	194
Total	12	60	935	$62 \pm 60$	$16 \pm 19$	15.1	231
December:							
Weekday	4	3	73	$58 \pm 44$	0	1.3	14
Weekend	4	14	92	$19 \pm 22$	0	4.8	17
Total	8	17	165	$77 \pm 49$	0	2.1	31
March:							
Weekday	6	6	85	$17 \pm 33$	0	5.0	16
Weekend	5	10	76	$25 \pm 42$	0	3.0	34
Total	11	16	161	$42 \pm 53$	0	3.8	50
April:							
Weekday	4	0	--	--	--	--	--
Weekend	2	3	63	0	0	--	12
Total	6	3	63	0	0	--	12
Grand total	57	232	3,814	$204 \pm 90$	$18 \pm 20$	18.7	772

Table 2. Catch statistics for summer steelhead on the upper Grande Ronde River. Number caught and number harvested includes  $\pm 95\%$  confidence interval. Only adipose-marked fish were harvested.

Month, day type	Number sampled		Hours fished	Number caught	Number harvested	Catch rate (hr/fish)	Angler days
	days	anglers					
February:							
Weekday	2	10	82	0	0	--	82
Weekend	2	21	128	4 $\pm$ 6	0	32.0	35
Total	4	31	210	4 $\pm$ 6	0	52.5	117
March:							
Weekday	6	101	1,782	68 $\pm$ 48	42 $\pm$ 38	26.2	683
Weekend	5	144	1,700	58 $\pm$ 22	41 $\pm$ 21	29.3	487
Total	11	245	3,482	126 $\pm$ 53	83 $\pm$ 43	27.6	1,170
April:							
Weekday	3	77	1,684	111 $\pm$ 98	52 $\pm$ 53	15.2	403
Weekend	2	55	817	16 $\pm$ 37	16 $\pm$ 37	51.1	204
Total	5	132	2,501	127 $\pm$ 105	68 $\pm$ 64	19.7	607
Grand total	20	408	6,193	257 $\pm$ 117	151 $\pm$ 77	24.1	1,894

Table 3 Catch statistics for summer steelhead on the Wallowa River. Number caught and number harvested includes  $\pm 95\%$  confidence interval. All angling was catch-and-release only from 15 November 1990 to 15 April 1991.

Month, day type	Number sampled		Hours fished	Number caught	Number harvested	Catch rate (hr/fish)	Angler days
	days	anglers					
February:							
Weekday	2	9	122	-5 $\pm$ 10	0	24.4	46
Weekend	2	21	208	18 $\pm$ 26	0	11.6	44
Total	4	30	330	23 $\pm$ 28	0	14.3	90
March:							
Weekday	6	99	2,189	325 $\pm$ 144	0	6.7	364
Weekend	5	142	2,201	316 $\pm$ 93	0	7.0	358
Total	11	241	4,390	641 $\pm$ 171	0	6.8	722
April:							
Weekday	3	37	667	179 $\pm$ 166	0	3.7	132
Weekend	2	80	1,184	227 $\pm$ 110	0	5.2	208
Total	5	117	1,851	406 $\pm$ 199	0	4.6	340
Grand total	20	388	6,571	1,070 $\pm$ 264	0	6.1	1,152

Table 4. Catch statistics for summer steelhead on the Imnaha River. Number caught and number harvested includes  $\pm 95\%$  confidence interval. Only adipose-marked fish were harvested. Daily angler bag limit was reduced from two to one adipose-marked fish from 15 November 1990 to 15 April 1991.

Month, day type	Number sampled		Hours fished	Number caught	Number harvested	Catch rate (hr/fish)	Angler days
	days	anglers					
March:							
Weekday	6	29	420	42 $\pm$ 45	7 $\pm$ 11	10.0	98
Weekend	6	71	479	31 $\pm$ 14	5 $\pm$ 6	15.5	115
Total	12	100	899	73 $\pm$ 47	12 $\pm$ 12	12.3	213
April:							
Weekday	4	24	201	25 $\pm$ 11	3 $\pm$ 5	8.0	63
Weekend	2	13	116	2 $\pm$ 3	0	58.0	24
Total	6	37	317	27 $\pm$ 11	3 $\pm$ 5	11.7	87
Grand total	18	137	1,216	100 $\pm$ 48	15 $\pm$ 13	12.6	300

Table 5. Percent of the total number of summer steelhead caught that were hatchery fish by month in the Grande Ronde and Imnaha basins during the 1990-91 run year. Sample size is shown in parentheses.

Creeel survey area	Sept	Oct	Nov	Dec	Feb	Mar	Apr
Lower Grande Ronde	0(3)	10(20)	42(62)	78(77)	--	40(42)	0(0)
Upper Grande Ronde	--	--	--	--	100(4)	86(126)	94(127)
Wallowa	--	--	--	--	65(23)	86(641)	88(406)
Imnaha	--	--	--	--	--	58(73)	30(27)

Table 6. Percent age composition and mean fork length of summer steelhead sampled in creel surveys in the Grande Ronde and Imnaha basins during the 1990-91 run year. Standard deviation is shown in parentheses. Age is expressed as years spent in freshwater prior to ocean migration:years spent in the ocean prior to spawning migration.

Creel survey area, age	Age composition			Fork length (mm)			
	N	Males	Females	N	Males	N	Females
Lower Grande Ronde:							
1:1	2	25.0	25.0	1	580	1	610
1:2	2	25.0	25.0	1	670	1	740
Upper Grande Ronde:							
1:1	10	25.0	37.5	4	581(23)	6	582(24)
1:2	6	18.7	18.7	3	782(39)	3	708(18)
Imnaha:							
1:1	4	16.7	50.0	1	620	2	542(32)
1:2	2	--	33.3	0	--	2	695(50)

Table 7. Observed and expanded number of AdLV+CWT summer steelhead recoveries in the Grande Ronde and Imnaha basins during the 1990-91 run year. Tag recoveries were expanded for the entire fishery.

Creel survey area	Tag code	Number recovered	
		Observed	Expanded
Lower Grande Ronde	63 49 44	1	5
Imnaha	07 40 33	1	2

Table 8. Residence of summer steelhead anglers interviewed during creel surveys in the Grande Ronde and Imnaha basins during the 1990-91 run year.

Creel survey area	Number of anglers	Wallowa and Union counties	Other Oregon residents	Out-of-state
Lower Grande Ronde	232	70%	17%	13%
Upper Grande Ronde	408	88%	11%	1%
Wallowa	388	70%	25%	5%
Imnaha	137	80%	2%	18%

## DISCUSSION

Angler effort for all summer steelhead fisheries in the Grande Ronde and Imnaha basins from fall 1990 through spring 1991 was the lowest since consumptive sport fisheries reopened in 1986 (Figure 2). Low effort appeared to be due in part to poor adult steelhead returns to the Grande Ronde and Imnaha basins. Managers imposed more restrictive harvest regulations because of concerns that broodstock needs at LSRCP facilities in Oregon would not be reached. These concerns were based on low projected 1990-91 returns and high exploitation rates in previous years in recreational sport fisheries (Figure 3). Emergency regulation changes during the 1990-91 run-year included catch-and-release only on the lower Grande Ronde and Wallowa rivers and a reduced daily angler bag limit on the Imnaha River.

Angler effort on the lower Grande Ronde River dropped 75%, catch dropped 82%, and harvest dropped 97% from the previous year. The proportion of anglers that fished after 15 November 1990, when the catch-and-release only regulation was implemented, was lower than in previous years. Both catch and

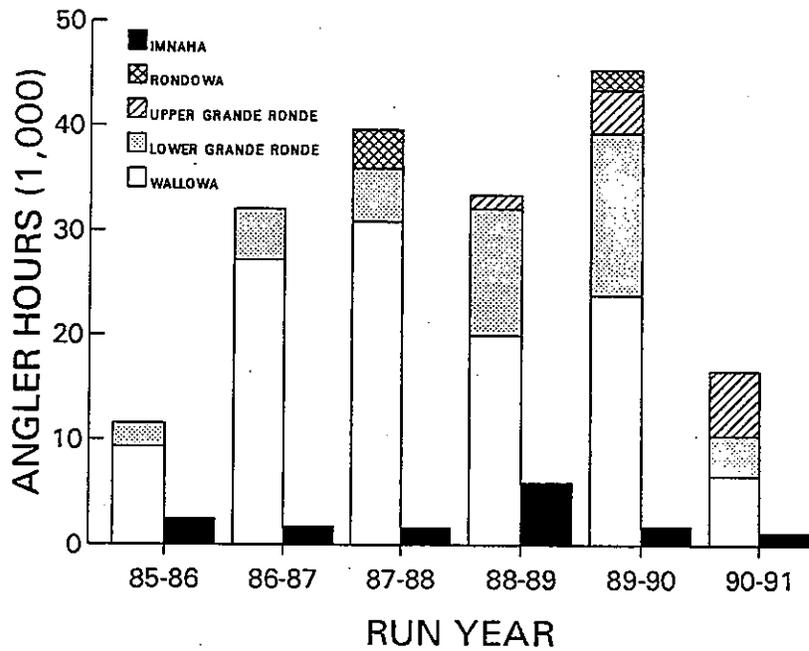


Figure 2. Angler effort for summer steelhead in the Grande Ronde and Imnaha basins from 1986-91.

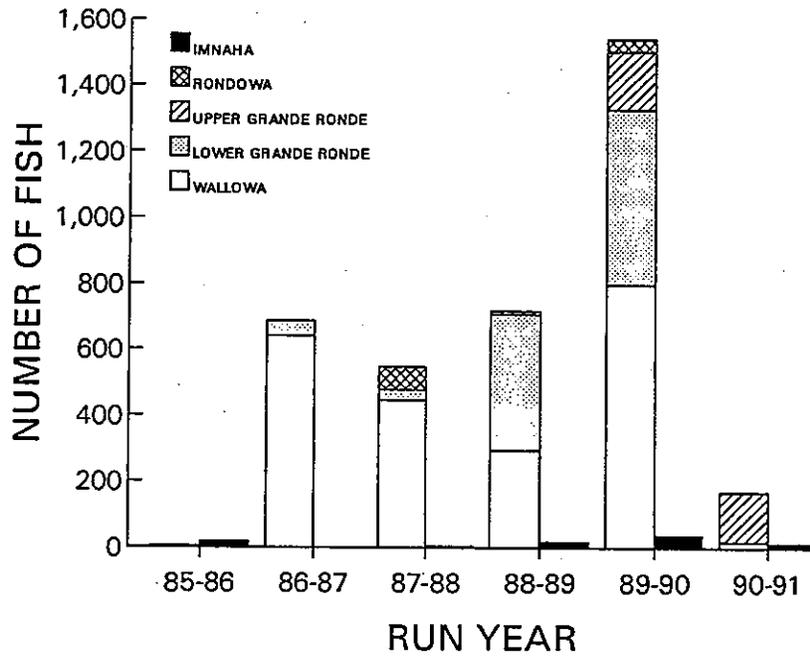


Figure 3. Number of hatchery summer steelhead harvested by recreational anglers in the Grande Ronde and Imnaha basins from 1986-91.

catch rates in September and October were the lowest since the fishery began in 1986, which reflected the low abundance of steelhead. Angler effort during the spring fishery was also the lowest since surveys began in 1989, even though catch rates were much higher than in previous years. This indicates that angler effort may be more affected by harvest regulations than by catch rate. In contrast, angler effort on the upper Grande Ronde River increased 52% from the previous year, which continues the trend of higher angler effort each year since this fishery re-opened in 1989. Catch and catch rate were lower than the previous year, which was probably due to the low abundance of steelhead. Concern is developing for the need to survey additional areas in the Grande Ronde basin, specifically Catherine Creek, to more accurately estimate total angler effort, catch, and harvest. We plan to initiate a creel survey on Catherine Creek in 1992.

Angler effort on the Wallowa River was the lowest since consumptive sport fisheries re-opened in 1986. The low abundance of steelhead coupled with the catch-and-release regulation probably contributed to low angler effort, however catch rate was higher than in previous years. With the fishery being catch-and-release only, we expected many adult steelhead to be caught, released, and later return to Wallowa Hatchery. Although no comparison is available for previous years, we found hook marks on 14% of the steelhead spawned at Wallowa Hatchery (Messmer et al. in preparation). Hook marks observed were probably from anglers catching and releasing fish in both the Snake and Grande Ronde rivers.

Since 1987, the proportion of 1-ocean steelhead harvested was higher than the proportion that returned to Wallowa Hatchery. This suggests that 1-ocean fish are more susceptible to harvest than 2-ocean fish. We found no

difference in the proportion of males and females harvested compared to proportions that returned to Wallowa Hatchery.

Angler effort and harvest on the Imnaha River was 31% and 59% lower than the previous year, respectively. This may have been due primarily to the reduced angler bag limit and low abundance of steelhead. Conversely, total catch was 12% and catch rate was 36% higher than the previous year.

The percentage of hatchery steelhead in the catch was higher during the 1990-91 run year than the previous year for all sport fisheries in the Grande Ronde and Imnaha basins except during the fall fishery on the lower Grande Ronde River. As in previous years, the low percentage of hatchery fish in the catch during September and October on the lower Grande Ronde River is of great concern, since it indicates a difference in run timing of wild and hatchery steelhead and limits contribution to Oregon recreational fisheries (also see Carmichael et al. 1990b). The reason for this discrepancy may be inherent differences in migration timing between Wallowa stock and the locally adapted native stocks and the early returning segment of the run being exploited by the recreational fishery at a higher rate than later segments of the run. Further investigation is needed to determine if the early segment of the run is being incorporated proportionally into Wallowa Hatchery broodstock each year. This may limit our ability to reach our long term objectives which include restoring and maintaining natural spawning populations of summer steelhead in the Grande Ronde and Imnaha systems and maintaining native stocks of summer steelhead in Joseph Creek, Minam, and Wenaha rivers (see Carmichael 1989).

Angler effort and catch must increase in the future if we are going to meet our specific objectives for harvest, effort, and catch rates.

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