LOWER SNAKE RIVER COMPENSATION PLAN:
Summer Steelhead Creel Surveys on the Grande Ronde, Wallowa, and Imnaha Rivers for the 2001-02 Run Year

Oregon Department of Fish and Wildlife
Fish Research and Development, NE Region

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LOWER SNAKE RIVER
COMPENSATION PLAN

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PREFACE

The sampling period was from 1 September 2001 to 15 April 2002. The report summarizes statistical angler surveys conducted during the summer steelhead angling season in major fishing areas on the Grande Ronde, Wallowa, and Imnaha Rivers. Hatchery adult steelhead harvested during the 2001-2002 run year were primarily from the 1998 and 1999 brood years. Results of creel surveys conducted prior to fall 2001 are reported in previous Lower Snake River Compensation Plan evaluation annual reports (Carmichael et al. 1986, 1987, 1988, 1989, 1990; Flesher et al. 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1999, 2000, 2001, and 2004. The steelhead angling season surveyed in this report, during which only adipose fin-clipped fish could be kept, was open from 1 September 2001 to 15 April 2002 in the Grande Ronde and Imnaha River basins.

ACKNOWLEDGMENTS

We would like to thank Dan Herrig for his review of the report, Mary Buckman for the statistical design and analysis of the data and Tracy Albert and Courtney Sherwood for their dedication in conducting the surveys. We would also like to thank Joe Bumgarner (Washington Department of Fish and Wildlife) for coordination and John Johnston for conducting the Lower Grande Ronde survey during spring, 2002. This project was financed as a cooperative agreement between the Oregon Department of Fish and Wildlife and the U.S. Fish and Wildlife Service under the Lower Snake River Compensation Plan.

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SUMMARY

Angler effort during the 2001-02 run year was higher than the previous year on the lower Grande Ronde River and harvest was higher on both the lower Grande Ronde and Imnaha rivers than during the previous year. Catch rates in three of the five fisheries in the Grande Ronde and Imnaha basins were the highest observed since surveys began with the highest catch rates from December through April on the lower Grande Ronde River and in both March and April on the Imnaha River. Catch and release of wild steelhead during the 2001-02 run year was almost five times higher on the lower Grande Ronde River and almost twice as high on the Imnaha River compared to the average since the 1989-90 run year. Hatchery summer steelhead dominated the catch in 12 of the 20 months surveyed in the Grande Ronde and Imnaha River basin fisheries. Anglers harvested more one-ocean than two-ocean hatchery steelhead in the Wallowa and Imnaha fisheries but similar numbers in the lower Grande Ronde and Rondowa fisheries. Also, anglers harvested more females than males in the lower Grande Ronde fishery but similar numbers in the Wallowa, Rondowa, and Imnaha fisheries. Both the percentage of anglers from Oregon counties other than Union or Wallowa (local anglers) and out-of-state anglers was higher than average and accordingly, the percentage of local anglers was lower than average in summer steelhead fisheries during the 2001-02 run year. We sampled adipose fin-clipped and left ventral fin-clipped plus coded-wire-tagged (AdLV+CWT) summer steelhead in both the Grande Ronde and Imnaha basin fisheries, except on the upper Grande Ronde River. Expanded estimates for the Wallowa and Rondowa fisheries will not be determined until statewide annual harvest card (tag) summaries become available (usually a two-year delay).

INTRODUCTION

Summer steelhead (*Oncorhynchus mykiss*) fisheries in the Grande Ronde and Imnaha basins were closed in 1974. This closure was prompted by declining adult returns, as indicated by adult counts at Ice Harbor Dam on the Snake River (U.S. Army Corps of Engineers 1996) and low steelhead redd counts on index streams in the Grande Ronde and Imnaha basins (Oregon Department of Fish and Wildlife District Annual Reports 1949-1974). The Lower Snake River Compensation Plan (LSRCP), initiated by Congress in 1976, was developed to compensate for losses of anadromous salmonids in the Snake River basin from construction of the four lower Snake River Dams built between 1962 and 1976. Thus, the focus of the LSRCP is above Lower Granite Dam (Rkm 173), the uppermost of the four lowest dams on the Snake River. One of the primary objectives of the LSRCP in Oregon is to restore historic recreational and tribal fisheries for summer steelhead in the Grande Ronde and Imnaha basins (Carmichael 1989*).* Approximately 1.68 million steelhead smolts have been released in Oregon each year during April and May in the Grande Ronde and Imnaha basins until 2000, when we reduced releases to approximately 1.2 million smolts. This reduction was implemented due to a National Oceanic and Atmospheric Administration (NOAA) Fisheries' recommendation to help reduce straying of Wallowa hatchery stock steelhead, primarily into the Deschutes River (mid-Columbia tributary). These fish

provide hatchery adult returns that contribute to recreational fisheries and may supplement natural spawning populations in northeast Oregon. Consumptive recreational fisheries for summer steelhead re-opened in 1986, in part as a result of increases in hatchery adult returns.

We began creel surveys for summer steelhead during the fall of 1985 in both the Grande Ronde and Imnaha basins. The goal of these surveys is to provide annual harvest information needed to assess LSRCP compensation goals (Carmichael and Wagner 1983). In general, the number of summer steelhead in the recreational fishery has been restored to historic values, but the fishery is concentrated at different times and places (Flesher et al. 1994). This report summarizes results of creel surveys conducted during the fall of 2001 and the spring of 2002 in the Grande Ronde and Imnaha basins. In addition, this report contains estimates of total effort, catch, and harvest for all fisheries in the Grande Ronde and Imnaha basins not reported in the previous annual report for the 2000-01 run year. The Grande Ronde and Imnaha basins encompass the major steelhead fisheries in Oregon streams that drain into the Snake River upstream of Lower Granite Dam.

STUDY AREA

Creel surveys on the Grande Ronde River were conducted on a lower 24 km section from the Oregon-Washington state line (Rkm 62) upstream to Wildcat Creek (Rkm 86) and an upper 39 km section from the Highway 82 bridge at Island City (Rkm 256) upstream to Meadow Creek (Rkm 295; Figure 1). Surveys on the Wallowa River were conducted on a 6 km section from its confluence with the Grande Ronde River at Rondowa (mouth of the Wallowa River) upstream to Howard Creek (Rkm 6) and a 50 km section from Minam State Park (Rkm 13) upstream to the mouth of Trout Creek (Rkm 63) near Enterprise. Anglers who parked their vehicles at Minam State Park to fish just below the park were included in the survey. Because vehicle access into Rondowa was limited, most anglers parked their vehicles at Palmer Junction, located 5.6 km upstream of Rondowa on the Grande Ronde River. Thus, for the Rondowa survey, we interviewed anglers leaving the parking area at Palmer Junction. The survey on the Imnaha River was conducted on the lower 32 km from its confluence with the Snake River (Rkm 0) upstream to the mouth of Big Sheep Creek (Rkm 32) near the town of Imnaha (Figure 1).

METHODS

For the lower Grande Ronde River survey, we used the methodology described by Carmichael et al. (1988). We sampled 50% of the weekend days (Saturday and Sunday) and holidays (41 total days sampled) and 30% of the weekdays (Monday through Friday, 46 total days sampled) during each month of each survey. Initially, sample days were chosen randomly in two-day blocks. They were then adjusted to equally represent days within two time periods (weekend days and holidays, and weekdays). Each sample day, beginning at a randomly selected start time, the creel

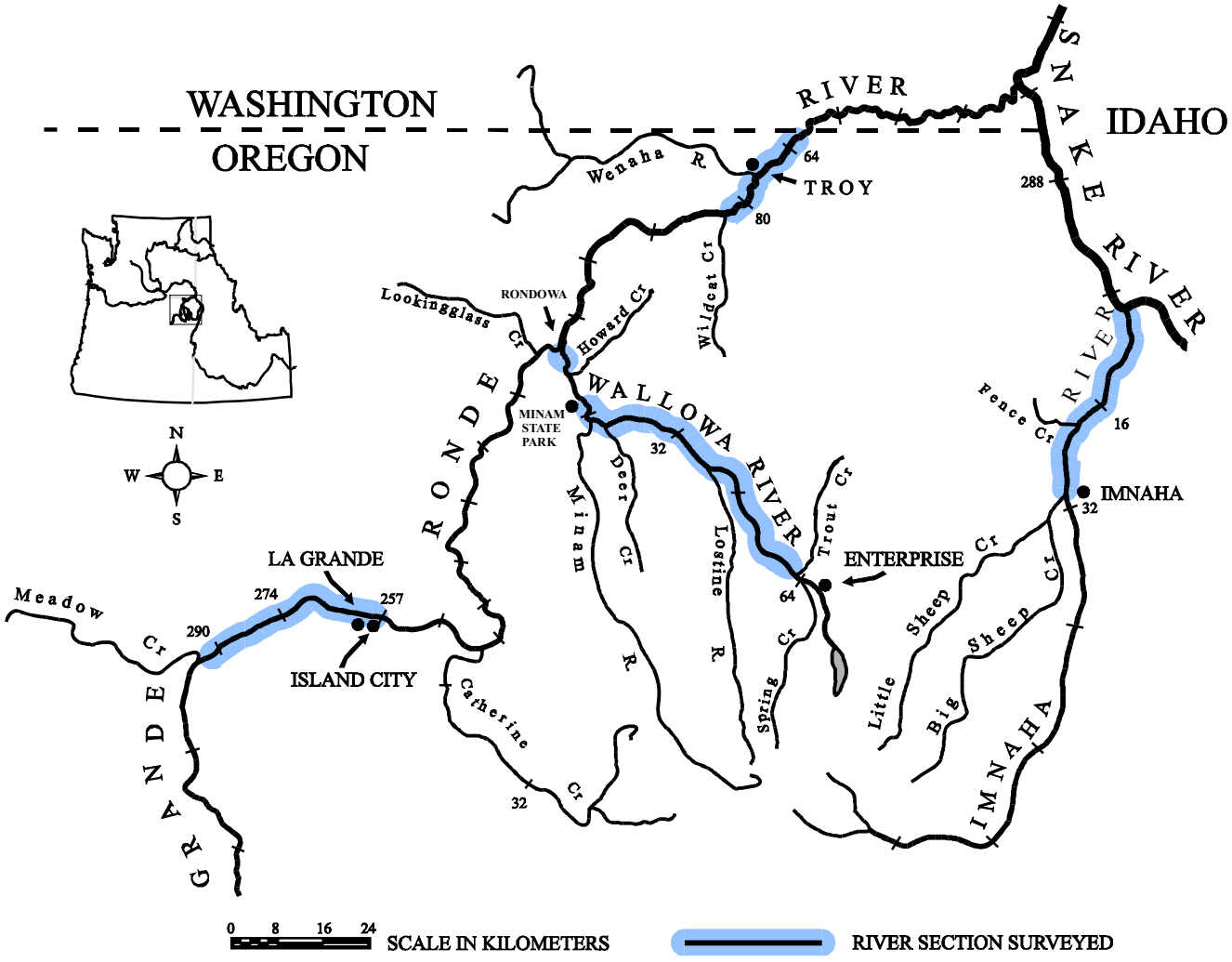

Figure 1. Map of northeastern Oregon showing where summer steelhead creel surveys were conducted in the Grande Ronde and Imnaha basins during the 2001-02 run year.

surveyor conducted a pressure count by tallying all anglers and vehicles every three hours while driving a vehicle along the entire survey route. Between pressure counts, the surveyor interviewed anglers by recording a description of each angler, their residence, the number of hours fished, and the number and species caught. The surveyor also sampled all harvested fish by recording fork length (mm), sex, fin clip, and any external tags. If the fish was coded-wire-tagged (CWT), as indicated by an adipose fin-clip and left ventral fin-clip (AdLV), the surveyor asked permission from the angler, then excised the snout behind the eye and placed it with an identification number in a plastic bag for later processing. For the Imnaha River survey, we used a check station for the area below Fence Creek (Rkm 23) and a roving survey in the area above Fence Creek. We selected sample days using the same methodology described for the lower Grande Ronde River survey. We sampled 50% of the weekends (13 total days sampled) and 30% of the weekdays (16 total days sampled) during each month of each survey. For the check station, we used the methodology described by Carmichael et al. (1988). The check station was designed so that anglers leaving the lower river area during a sample day would stop voluntarily and the surveyor would interview each angler and sample all harvested fish. At the end of the second sample day, the surveyor would drive to Cow Creek (Rkm 7) and interview all anglers encountered that fished that day and those that fished the previous sample day. For the roving survey we followed the same procedures as on the lower Grande Ronde River survey except that the surveyor interviewed anglers during pressure counts. For each pressure count the surveyor closed the check station, interviewed and enumerated all anglers from Fence Creek to the town of Imnaha, and returned. Time spent away from the check station was recorded and later expanded.

For the upper Grande Ronde River, Rondowa, and Wallowa River survey areas, one surveyor conducted angler interviews from 1 February to 15 April 2002. We randomly selected survey areas and a minimum of two areas were surveyed each sample day. Each sample day, the surveyor drove the survey route, stopped to interview anglers, then drove to the next area and repeated this sequence. If sufficient time was available, the surveyor included and interviewed anglers in a third area. All harvested fish observed were sampled. We sampled 83% of the weekends and holidays and 46% of the weekdays. From 1 February to 2 March, we surveyed five days each week from 0800-1700. From 3 March to 15 April, we surveyed four days each week from 0700-1800.

During the lower Grande Ronde and Imnaha river creel surveys, we estimated angler effort in hours and days, total catch, harvest, catch rate, percent hatchery fish in the catch, and the number of AdLV+CWT marked fish harvested (see Carmichael et al. 1988). In all other areas, we estimated catch rate and percent hatchery fish in the catch. In addition, we determined age and sex composition and mean fork length of harvested fish in all survey areas. Catch rate was expressed as an index, hours per fish, in which lower values indicate better angling success and higher values indicate poorer angling success. The survey on the lower Grande Ronde River was from 1 September 2001 to 15 April 2002. Surveys on the upper Grande Ronde, Wallowa, and Imnaha Rivers, and Rondowa were from 1 February to 15 April 2001.

We estimated total harvest by month for previous spring fisheries in the Grande Ronde and Imnaha basins (2000-01 run year) using the relationship between angler harvest tag (punch card) harvest and creel survey harvest for specific reaches within each basin (see Flesher et al. 1996). For estimating total catch, we used total harvest multiplied by the ratio of sampled catch to sampled harvest. To estimate total angler effort in hours, we used total catch divided by the sample catch rate (fish per hour) reported in Flesher et al. 2002.

ACCOMPLISHMENTS AND FINDINGS

On the lower Grande Ronde River, we sampled an average of 56.2% of the weekends and holidays and 29.9% of the weekdays each month for a total of 87 sample days. On the upper Grande Ronde River, we sampled an average of 47.8% of the weekends and holidays and 33.3% of the weekdays each month for a total of 28 sample days. On the Wallowa River, we sampled an average of 69.6% of the weekends and holidays and 35.3% of the weekdays each month for a total of 34 sample days. On the Imnaha River, we sampled an average of 56.5% of the weekends and holidays and 31.4% of the weekdays each month for a total of 29 sample days.

We estimated that 4,316 anglers fished for 26,397 hours on the lower Grande Ronde River. They caught and released 1,968 wild and 1,059 hatchery steelhead and kept 2,132 hatchery steelhead for a catch rate index of 5 hours per fish (Figures 2-6, Appendix A-1). The percent of steelhead caught that were hatchery origin ranged from 0% in April 2002 to 100% in September 2001 (Figure 7, Appendix B). Age composition of harvested hatchery steelhead was 48% 1:1's (one year spent in freshwater: one year spent in saltwater), 51% 1:2's (one year spent in freshwater: two years spent in saltwater), and 1% 1:3's (one year spent in freshwater: three years spent in saltwater). Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 616 (±4) mm for 1:1's, 721 (±7) mm for 1:2's, and 700 mm for 1:3's (Table 1). Sex composition was 38% male and 62% female (Table 1). Seventy-one percent of the anglers were from Union or Wallowa counties, 16% were from other Oregon counties, 4% were Washington State residents and 9% resided outside the states of Oregon and Washington (Table 2). On the lower Grande Ronde River, anglers harvested an estimated 233 AdLV+CWT marked steelhead from our hatchery releases and an estimated 53 AdLV+CWT marked steelhead that were from Washington Department of Fish and Wildlife releases on the Grande Ronde River at the Cottonwood Conditioning Pond, Washington (Table 3).

On the upper Grande Ronde River, the catch rate index averaged 11 hours per fish (Figure 4, Appendix A-2). The percent of steelhead caught that were hatchery origin was 0% in March (Figure 7, Appendix B). No harvested fish were sampled. Eighty-seven percent of the anglers were from Union or Wallowa counties, 10% were from other Oregon counties and 3% resided outside the states of Oregon and Washington (Table 2).

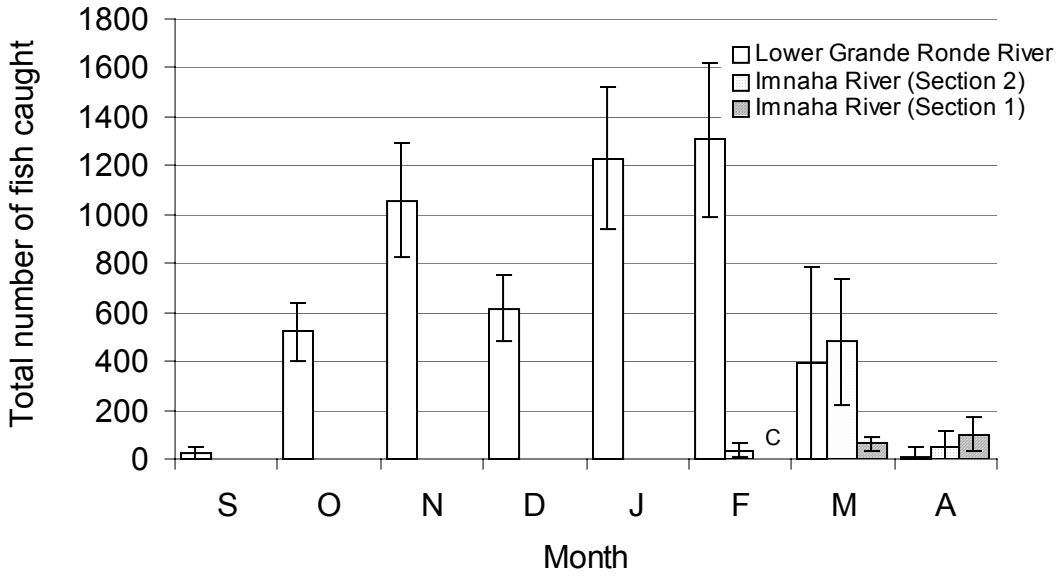

Figure 2. Estimated total catch of summer steelhead (±95% confidence intervals) on the lower Grande Ronde River and two sections of the Imnaha River during the 2001-02 run year. C indicates no catch. Surveys were conducted from 1 September 2001 to 15 April 2002 on the lower Grande Ronde River and from 1 February to 15 April 2002 on the Imnaha River.

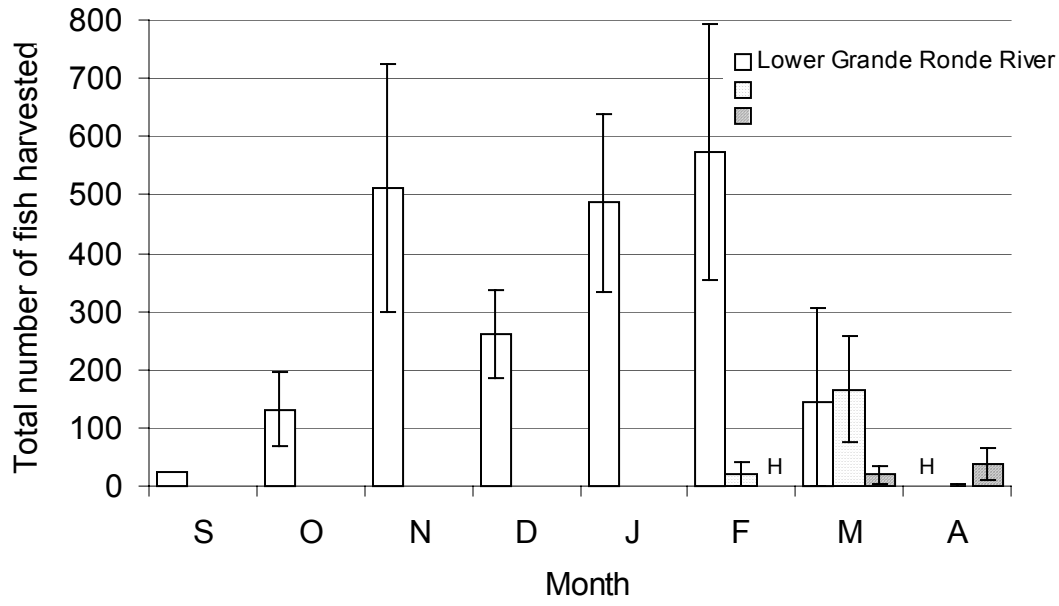

Figure 3. Estimated total harvest of summer steelhead (±95% confidence intervals) on the lower Grande Ronde River and two sections of the Imnaha River during the 2001-02 run year. H indicates no harvest. Surveys were conducted from 1 September 2001 to 15 April 2002 on the lower Grande Ronde River and from 1 February to 15 April 2002 on the Imnaha River.

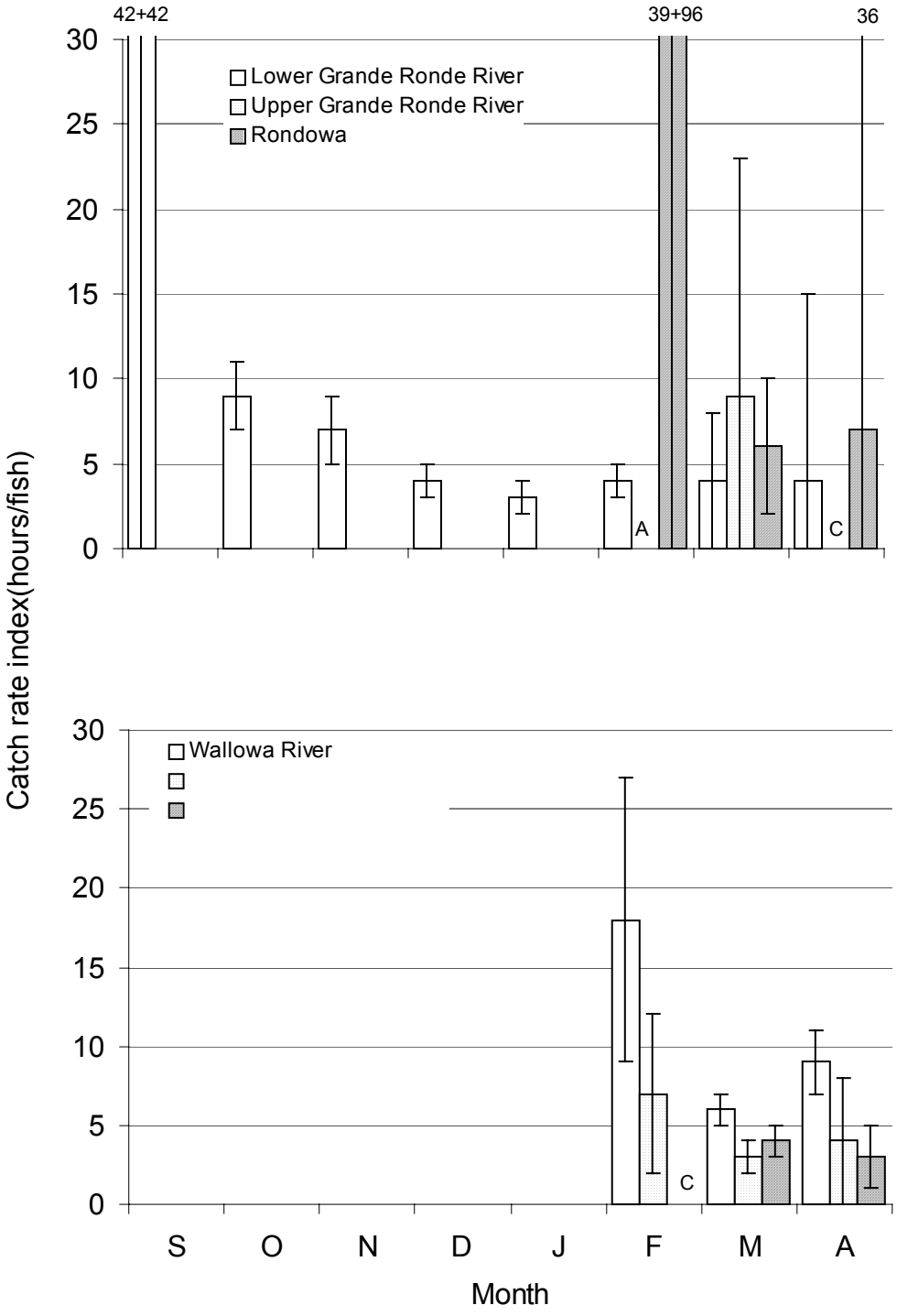

Figure 4. Estimated catch rate index (hours/fish) for summer steelhead (±95% confidence intervals) in the Grande Ronde and Imnaha basins during the 2001-02 run year. A indicates no anglers and C indicates no catch. Survey areas and times include the lower Grande Ronde River (1 September-2001to 15 April 2002), upper Grande Ronde River, Rondowa, Wallowa River, and two sections of the Imnaha River (1 February-15 April 2002). Note: A lower catch rate index implies better angling success.

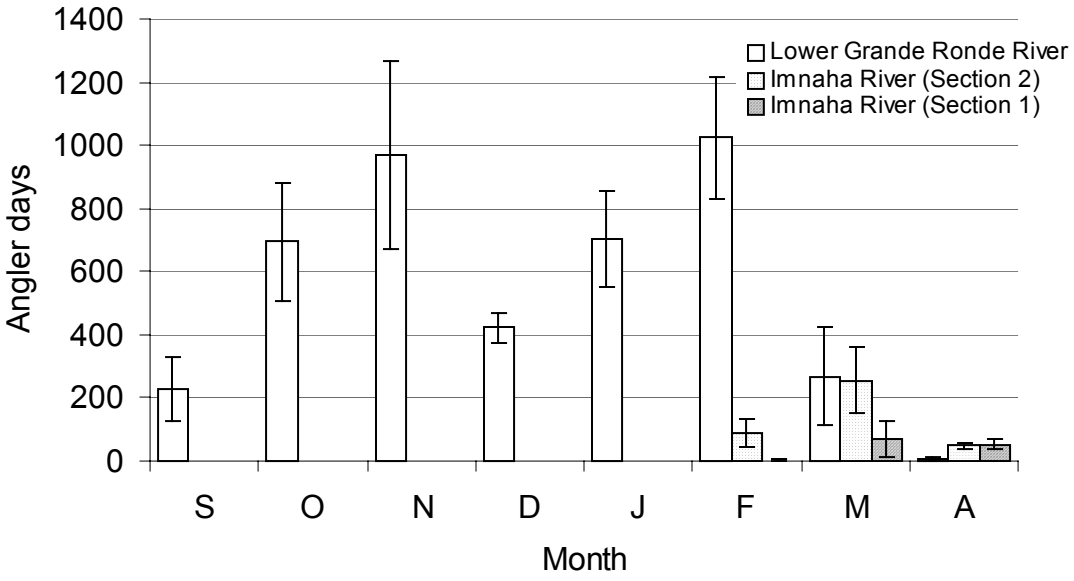

Figure 5. Estimated number of angler days for summer steelhead (±95% confidence intervals) on the lower Grande Ronde River and two sections of the Imnaha River during the 2001-02 run year. Surveys were conducted from 1 September 2001 to 15 April 2002 on the lower Grande Ronde River and from 1 February to 15 April 2002 on the Imnaha River.

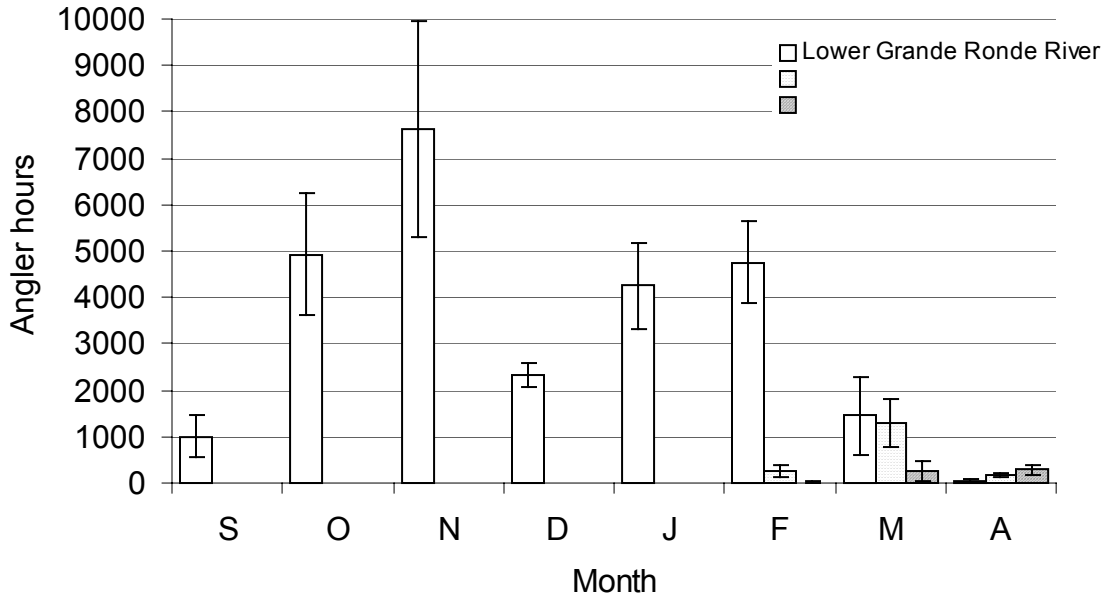

Figure 6. Estimated number of angler hours for summer steelhead (±95% confidence intervals) on the lower Grande Ronde River and two sections of the Imnaha River during the 2001-02 run year. Surveys were conducted from 1 September 2001 to 15 April 2002 on the lower Grande Ronde River and from 1 February to 15 April 2002 on the Imnaha River.

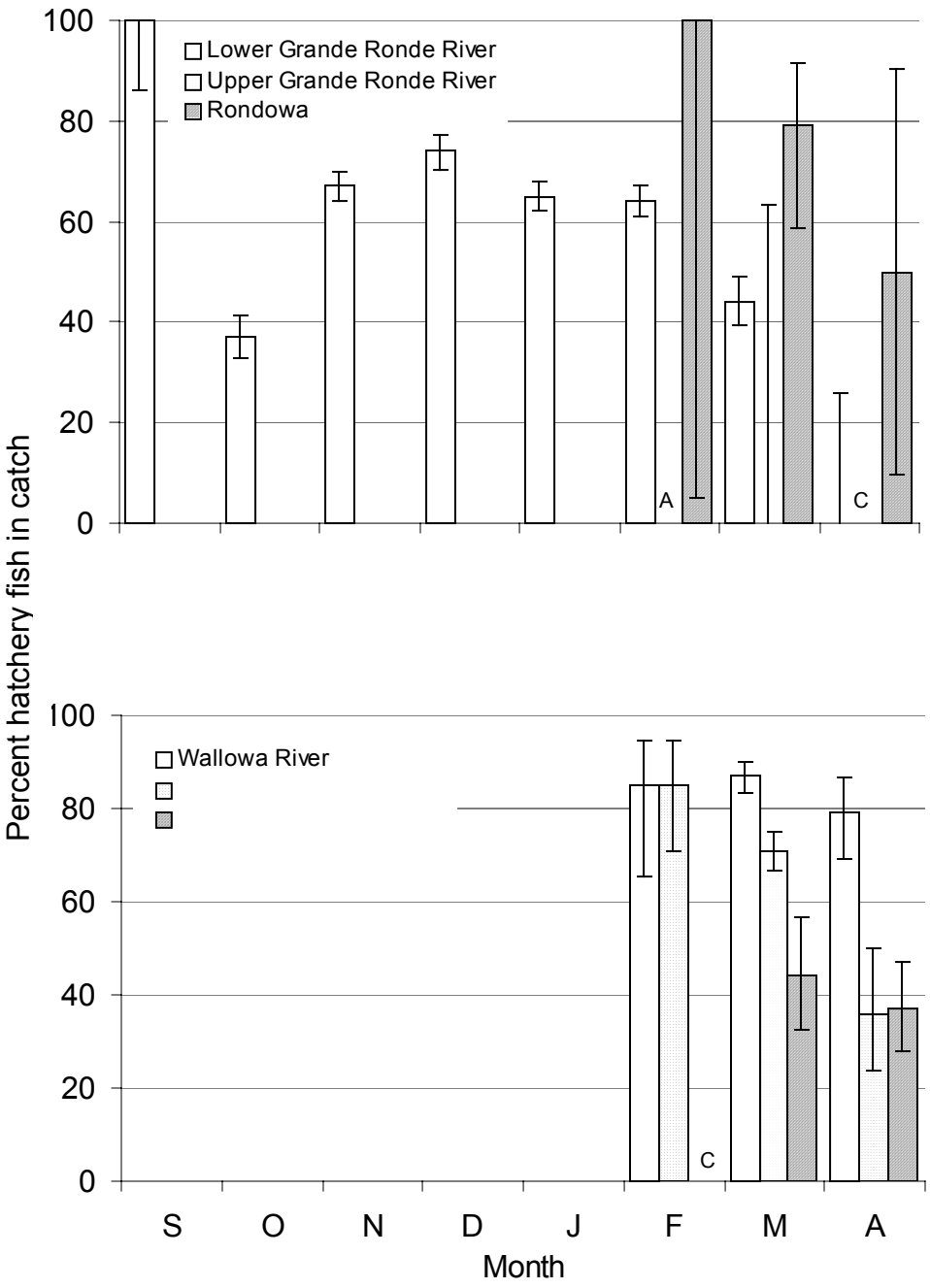

Figure 7. Estimated percent of summer steelhead caught (±95% confidence intervals; using a binomial distribution) in the Grande Ronde and Imnaha basins during the 2001-02 run year that were hatchery fish. A indicates no anglers and C indicates no catch. Survey areas and times include the lower Grande Ronde River (1 September 2001 to 15 April 2002), upper Grande Ronde River, Rondowa, Wallowa River, and two sections of the Imnaha River (1 February-15 April 2002).

Table 1. Percent age composition and mean fork length of hatchery summer steelhead sampled in creel surveys in the Grande Ronde and Imnaha basins during the 2001-02 run year. Age composition and mean fork length by age estimated from fork lengths of harvested fish and age-length keys developed from hatchery returns to Wallowa Fish Hatchery and Little Sheep Creek Facility (for the Imnaha River survey area) in 2002. No harvested fish were sampled on the upper Grande Ronde River. Age is expressed as years spent in freshwater prior to ocean migration:years spent in the ocean prior to spawning migration. Mean fork length includes ±95% confidence intervals.

Creek survey		Age composition (%)				Mean fork length (mm)			
area, sex	N	1:1	1:2	2:1	1:3	1:1	1:2	2:1	1:3
Lower GR River									
Males	143	57	43	0	0	620±6	729±17	-	-
Females	233	42	57	0	1	613±4	717±8	-	700
Total	376	48	51	0	1	616±4	721±7	-	700
Rondowa									
Males	8	80	20	0	0	613±29	680±381	-	-
Females	11	33	65	0	0	603±72	711±39	-	-
Total	19	53	47	0	0	610±20	705±32	-	-
Wallowa River									
Males	132	66	34	0	0	621±6	716±17	-	-
Females	129	50	48	0	2	607±6	706±12	-	700
Total	261	58	41	0	1	615±4	710±10	-	700
Imnaha River									
Males	42	71	24	5	0	596±13	705±53	567±32	-
Females	47	70	30	0	0	597±12	700±21	-	-
Total	89	71	27	2	0	596±9	702±22	567±32	-

Table 2. Residence (%) of summer steelhead anglers interviewed during creel surveys in the Grande Ronde and Imnaha basins during the 2001-02 run year.

		Angler residence (%)			
Creel survey area	Number of anglers	Union or Wallowa counties	Other Oregon counties	Washington	Other states
Lower GR River	1214	71	16	4	9
Upper GR River	31	87	10	0	3
Rondowa	28	32	61	0	7
Wallowa River	1043	68	27	2	3
Imnaha River	198	78	17	3	2

Table 3. Number of AdLV+CWT marked summer steelhead recovered during creel surveys in the Grande Ronde and Imnaha basins during the 2001-02 run year. No AdLV+CWT marked fish were recovered in the upper Grande Ronde River. Recoveries were expanded for the entire fishery.

Creel survey area	Tag code	Release site	Experimental group[a]	Brood year	Number recovered	
					Observed	Expanded[b]
Lower Grande Ronde River	09 25 62	Deer Cr.	Volitional/April	98	2	5
	09 25 63	Deer Cr.	Forced/April	98	5	21
	09 26 01	Spring Cr.	Forced/April	98	1	3
	09 26 02	Spring Cr.	Volitional/April	98	2	11
	09 26 04	Deer Cr.	Forced/May	98	3	21
	09 26 05	Spring Cr.	Volitional/May	98	5	27
	09 29 30	Spring Cr.	Prod./April	99	9	58
	09 29 31	Spring Cr.	Prod./April	99	1	7
	09 29 32	Spring Cr.	Volitional/May	99	1	5
	09 29 34	Deer Cr.	Prod./April	99	5	29
	09 29 35	Deer Cr.	Prod./April	99	7	35
	09 29 36	Deer Cr.	Volitional/May	99	3	11
	63 04 60	--	WDFW[c]	98	6	26
	63 13 09	--	WDFW[c]	99	2	27
Wallowa River	09 25 62	Deer Cr.	Volitional/April	98	3	ND
	09 25 63	Deer Cr.	Forced/April	98	2	ND
	09 26 02	Spring Cr.	Volitional/April	98	2	ND
	09 26 03	Deer Cr.	Volitional/May	98	1	ND
	09 26 04	Deer Cr.	Forced/May	98	3	ND
	09 26 05	Spring Cr.	Volitional/May	98	1	ND
	09 29 31	Spring Cr.	Prod./April	99	2	ND
	09 29 33	Spring Cr.	Forced/May	99	1	ND
	09 29 34	Deer Cr.	Prod./April	99	10	ND
	09 29 35	Deer Cr.	Prod./April	99	6	ND
	09 29 37	Deer Cr.	Forced/May	99	3	ND
Rondowa	09 25 63	Deer Cr.	Forced/April	98	1	ND
	09 26 04	Deer Cr.	Forced/May	98	1	ND
	09 29 31	Spring Cr.	Prod./April	99	1	ND
Imnaha River						
	09 25 60	L. Sheep Cr.	Graded large	98	1	3
	09 26 34	L. Sheep Cr.	Graded medium	98	2	7
	09 29 27	L. Sheep Cr.	Prod./April	99	1	3
	09 29 28	L. Sheep Cr.	Prod./April	99	4	13
	09 29 29	L. Sheep Cr.	Prod./May	99	1	3

[a] *Prod. indicates production releases.*
[b] *ND indicates expansions not determined until statewide annual harvest card data become available.*
[c] *Steelhead with tag codes 63 04 60 and 63 13 09 were released by Washington Department of Fish and Wildlife (WDFW) in the lower Grande Ronde River at the Cottonwood Conditioning Pond, Washington, on 15 April 1999 and 1 April 2000, respectively.*

At Rondowa, the catch rate index averaged 7 hours per fish (Figure 4, Appendix A-3). The percent of steelhead caught that were hatchery origin ranged from 50% in April to 100% in February (Figure 7, Appendix B). Age composition of harvested hatchery

steelhead was 53% 1:1's and 47% 1:2's. Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 610 (±20) mm for 1:1's and 705 (±32) mm for 1:2's (Table 1). Sex composition was 42% male and 58% female (Table 1). Thirty-two percent of the anglers were from Union or Wallowa counties, 61% were from other Oregon counties, and 7% resided outside the states of Oregon and Washington (Table 2). At Rondowa, anglers harvested 3 AdLV+CWT marked steelhead from our hatchery releases, however, expanded estimates for the entire fishery will not be determined until state harvest tag data become available (Table 3).

On the Wallowa River, the catch rate index averaged 7 hours per fish (Figure 4, Appendix A-4). The percent of steelhead caught that were hatchery origin ranged from 79% in April to 87% in March (Figure 7, Appendix B). Age composition of harvested hatchery steelhead was 58% 1:1's, 41% 1:2's, and 1% 1:3's. Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 615 (±4) mm for 1:1's, 710 (±10) mm for 1:2's, and 700 mm for 1:3's (Table 1). Sex composition was 51% male and 49% female (Table 1). Sixty-eight percent of the anglers were from Union or Wallowa counties, 27% were from other Oregon counties, 2% were Washington State residents and 3% resided outside the states of Oregon and Washington (Table 2). On the Wallowa River, anglers harvested 34 AdLV+CWT marked steelhead from our hatchery releases, however, expanded estimates for the entire fishery will not be determined until state harvest tag data become available (Table 3).

On the Imnaha River, we estimated that 521 anglers fished for 2,275 hours. They caught and released 273 wild and 210 hatchery steelhead and kept 242 hatchery steelhead for a catch rate index of 3 hours per fish (Figures 2-6, Appendices A-5 and A-6). The percent of steelhead caught that were hatchery origin ranged from 36% in April in Section 2 to 85% in February in Section 2 (Figure 7, Appendix B). Age composition of harvested hatchery steelhead was 71% 1:1's, 27% 1:2's, and 2% 2:1's. Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 596 (±9) mm for 1:1's, 702 (±22) mm for 1:2's, and 567 (±32) mm for 2:1's (Table 1). Sex composition was 47% male and 53% female (Table 1). Seventy-eighty percent of the anglers were from Union or Wallowa counties, 17% were from other Oregon counties, 3% were Washington State residents and 2% resided outside the states of Oregon and Washington (Table 2). On the Imnaha River, anglers harvested an estimated 29 AdLV+CWT marked steelhead from our hatchery releases (Table 3).

Angler effort (Figure 8) was 131% and harvest (Figure 9) was 151% of the previous year on the lower Grande Ronde River. On the Imnaha River, angler effort was 84% but harvest was 250% of the previous year. Catch rates on the lower Grande Ronde, upper Grande Ronde and Imnaha rivers were the highest observed since surveys began (Table 4). The best catch rate indexes (3-4 hours per fish) occurred each month from December to April on the lower Grande Ronde River and during March and April on the Imnaha River. Catch and release of wild steelhead was 160% of the previous year and almost 5 times higher than the average (1989-90 to 2000-01 run years) on the lower Grande Ronde River. Catch of wild steelhead on the Imnaha River was 88% of

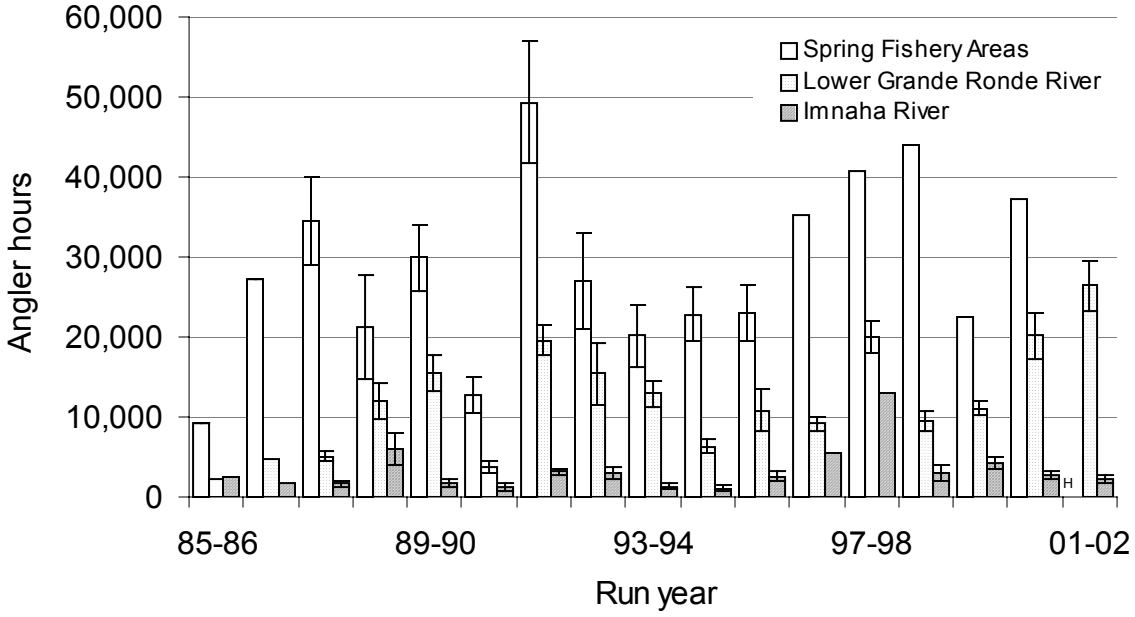

Figure 8. Angler effort for summer steelhead (±95% confidence intervals) in spring fishery areas (upper Grande Ronde River, Wallowa River, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2001-02 run years. H indicates this value must be estimated from harvest card data, which was not available when this report was submitted. Confidence intervals not available for the 85-86 and 86-87 run years, the Imnaha fishery for the 96-97 and 97-98 run years, and for spring fishery areas beginning with the 96-97 run year.

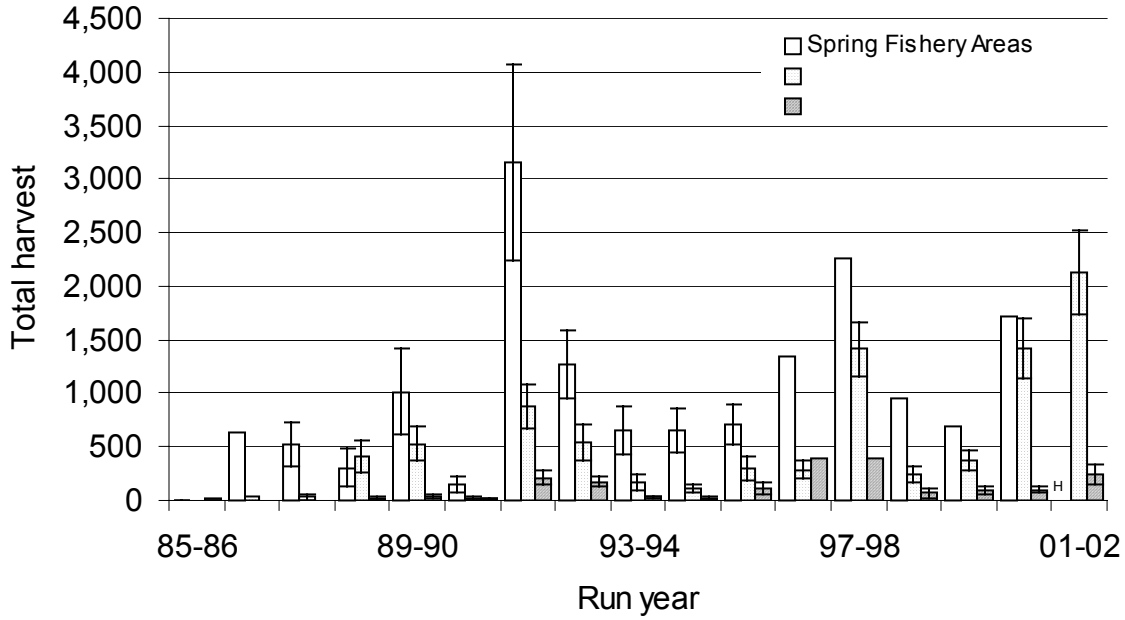

Figure 9. Number of hatchery summer steelhead harvested (±95% confidence intervals) by recreational anglers in spring fishery areas (upper Grande Ronde River, Wallowa River, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2001-02 run years. H indicates this value must be estimated from harvest card data, which was not available when this report was submitted. Confidence intervals not available for the 85-86 and 86-87 run years, the Imnaha fishery for the 96-97 and 97-98 run years, and for spring fishery areas beginning with the 96-97 run year.

Table 4. Catch rate index (hours/fish ±95% confidence intervals) in summer steelhead fisheries creel survey areas in the Grande Ronde and Imnaha basins for the 1985-86 to 2001-02 run years. Note that a lower catch rate index implies greater angling success. "--" indicates not sampled or undefined.

Run year	Catch rate index (hours/fish)					
	Lower GR River	Upper GR River	Catherine Creek	Rondowa	Wallowa River	Imnaha River
85-86	8±7	--	--	--	7±7	15±7
86-87	9±3	--	--	--	11±3	9±8
87-88	10±4	--	--	11±9	16±3	24±9
88-89	14±4	40±55	--	--	43±21	18±11
89-90	14±4	14±8	--	34±27	17±5	20±8
90-91	19±8	24±11	--	--	6±2	13±6
91-92	11±3	10±3	3±3	6±1	10±2	4±1
92-93	9±2	14±4	49±49	--	11±2	8±1
93-94	18±5	31±17	--	12±4	17±3	13±3
94-95	21±6	25±13	--	15±5	17±3	17±8
95-96	11±2	15±4	--	--	21±4	7±2
96-97	14±4	18±9	33±69	--	13±3	6±2
97-98	7±1	13±9	7±10	11±6	10±1	18±9
98-99	17±4	19±9	14±20	--	18±4	20±7
99-2000	11±2	25±19	--	8±7	17±4	12±3
2000-01	6±1	18±17	--	6±4	11±2	6±1
2001-02	5±1	11±17	--	7±4	7±1	3±1

the previous year and almost twice as high as the twelve year average. The residence of anglers participating in summer steelhead fisheries in the Grande Ronde and Imnaha basins was similar to the previous year, with 21 percent of the anglers coming from Oregon counties other than Union and Wallowa (Figure 10). The fishery at Rondowa had the highest percentage (61%) of non-local Oregon anglers, while the percent of anglers from other states (6%) was similar to the previous year.

We estimated total harvest and harvest of AdLV+CWT marked steelhead for previous spring steelhead fisheries (upper Grande Ronde, Wallowa, and Imnaha rivers, Rondowa, and Catherine Creek) for the 2000-01 run year (Figure 9, Appendix C-1) using the relationship between punch card (angler tag) harvest and creel survey harvest for years when these harvest estimates for specific reaches were available (Figure 11). From total harvest estimates, we calculated total catch (Appendix C-2), and total angler effort in hours (Figure 8, Appendix C-3) for the 2000-01 run year.

MANAGEMENT IMPLICATIONS AND RECOMMENDATIONS

We observed the highest monthly catch rate index (3 hours/fish) on the lower Grande Ronde River from December through April and on the Imnaha River in March and April since we began surveys in the fall of 1985. Hatchery fish dominated the catch in 12 of the 20 months surveyed in Grande Ronde and Imnaha basin fisheries. These fishery statistics illustrate the importance of current hatchery programs to the success of recreational summer steelhead fisheries in these basins.

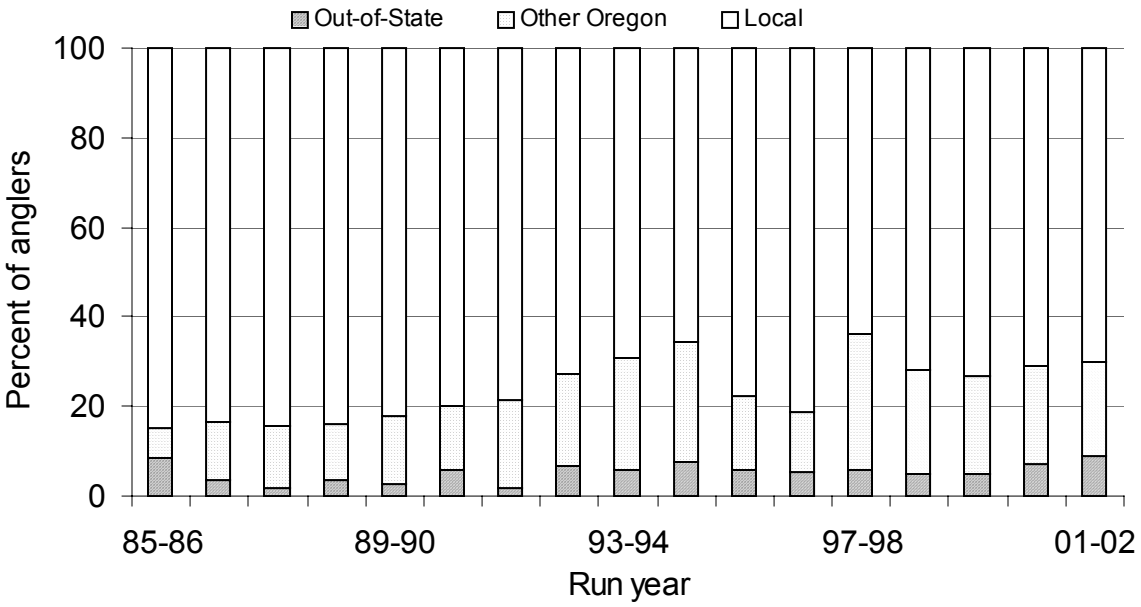

Figure 10. Percent of local (Union or Wallowa county), other Oregon county, and out-of-state anglers that fished in summer steelhead fisheries in the Grande Ronde and Imnaha basins for the 1985-86 to 2001-02 run years.

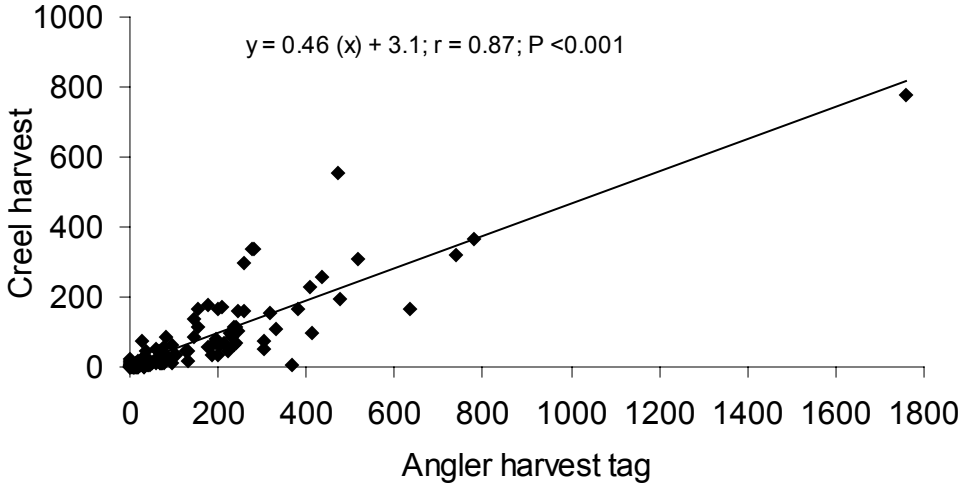

Figure 11. Relationship of angler harvest tag (punch card) and creel survey harvest for summer steelhead fisheries in the Grande Ronde and Imnaha basins for years when harvest estimates for specific reaches were available (1993-1996 for the upper Grande Ronde, Wallowa, and Rondowa, 1992-1993 for Catherine Creek, 1993-2001 for the lower Grande Ronde, and 1986-2000 for the Imnaha fishery areas.

Estimates of total harvest and harvest of AdLV+CWT marked steelhead, total catch, and angler effort (in hours) for the 2000-01 run year spring fisheries are shown in Appendix B. These same estimates for the 2001-02 spring angler surveys will not be available until statewide angler harvest tag data become available (usually a two-year delay).

We recommend discontinuing sampling of the upper Grande Ronde River in the future due to the low angler effort expended there and the elimination of hatchery releases of steelhead resulting from the present management program.

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APPENDIX A

Fishery statistics for the 2001-02 run year

Appendix Table A-1. Fishery statistics for summer steelhead on the lower Grande Ronde River during the 2001-02 run year. Statistics include mean estimates ±95% confidence intervals. Only adipose fin-clipped fish were harvested. "--" indicates not sampled or undefined.

Month,	Sample size		Total	Total	Total	Catch rate		Angler
day type	Days	Anglers	Hours	catch	harvest	fish/h	h/fish	days
September:								
Weekday	6	23	580±431	24±24	24±24	0.042±0.041	24±23	95±71
Weekend	6	34	422±134	0	--	--	--	131±42
Total	12	57	1002±451	24±24	24	0.024±0.024	42±42	226±102
October:								
Weekday	7	77	2575±1186	306±103	73±55	0.119±0.040	8±3	425±196
Weekend	4	77	2354±594	217±59	59±33	0.092±0.025	11±3	269±68
Total	11	154	4929±1327	523±119	132±64	0.106±0.024	9±2	694±187
November:								
Weekday	6	121	4532±2040	638±200	362±200	0.141±0.044	7±2	604±272
Weekend	4	110	3105±1149	420±120	149±73	0.135±0.039	7±2	367±136
Total	10	231	7637±2341	1058±234	511±213	0.139±0.031	7±2	971±298
December:								
Weekday	6	56	1067±239	237±107	101±60	0.222±0.100	5±2	194±43
Weekend	8	124	1253±101	380±78	160±46	0.303±0.062	3±1	228±18
Total	14	180	2320±259	617±132	261±76	0.266±0.057	4±1	422±47
January:								
Weekday	5	62	1853±862	476±206	191±115	0.257±0.111	4±2	234±109
Weekend	5	94	2398±345	752±207	295±101	0.313±0.086	3±1	469±67
Total	10	156	4251±928	1228±291	486±153	0.289±0.069	3±1	703±153
February:								
Weekday	6	149	2904±640	889±302	404±213	0.306±0.104	3±1	584±129
Weekend	6	182	1857±620	418±92	170±52	0.225±0.050	4±1	440±147
Total	12	331	4761±891	1307±316	574±219	0.275±0.066	4±1	1024±192
March:								
Weekday	6	38	819±771	235±393	96±161	0.287±0.446	3±5	156±147
Weekend	6	62	635±343	156±58	48±24	0.246±0.091	4±1	112±61
Total	12	100	1454±844	391±397	144±163	0.269±0.254	4±4	268±156
April:								
Weekday	4	5	43±26	11±39	0	0.249±0.693	4±11	8±5
Weekend	2	0	0	0	--	--	--	0
Total	6	5	43±26	11±39	0	0.249±0.693	4±11	8±5
Grand total	87	1214	26397±3143	5159±656	2132±391	0.195±0.024	5±1	4316±514

Appendix Table A-2. Catch rate (±95% confidence intervals) for summer steelhead on the upper Grande Ronde River during the 2001-02 run year. Only adipose fin-clipped fish were harvested. "--" indicates not sampled or undefined.

Month, day type	Sample size		Catch rate	
	Days	Anglers	fish/h	h/fish
February:				
Weekday	3	0	--	--
Weekend	5	0	--	--
Total	8	0	--	--
March:				
Weekday	9	12	0.283±0.447	4±6
Weekend	4	14	--	--
Total	13	26	0.106±0.161	9±14
April:				
Weekday	5	2	--	--
Weekend	2	3	--	--
Total	7	5	--	--
Grand total	28	31	0.091±0.137	11±17

Appendix Table A-3. Catch rate (±95% confidence intervals) for summer steelhead at Rondowa during the 2001-02 run year. Only adipose fin-clipped fish were harvested. "--" indicates not sampled or undefined.

Month, day type	Sample size		Catch rate	
	Days	Anglers	fish/h	(h/fish)
February:				
Weekday	6	0	--	--
Weekend	6	7	0.026±0.062	39±96
Total	12	7	0.026±0.062	39±96
March:				
Weekday	7	7	0.230±0.312	4±6
Weekend	6	11	0.165±0.129	6±5
Total	13	18	0.182±0.112	6±4
April:				
Weekday	5	3	0.147±0.633	7±29
Weekend	2	0	--	--
Total	7	3	0.147±0.633	7±29
Grand total	32	28	0.146±0.085	7±4

Appendix Table A-4. Catch rate (±95% confidence intervals) for summer steelhead on the Wallowa River during the 2001-02 run year. Only adipose fin-clipped fish were harvested. "--" indicates not sampled or undefined.

Month, day type	Sample size		Catch rate	
	Days	Anglers	fish/h	(h/fish)
February:				
Weekday	6	50	0.169±0.088	6±3
Weekend	7	138	0.019±0.019	52±52
Total	13	188	0.055±0.027	18±9
March:				
Weekday	7	218	0.175±0.055	6±2
Weekend	7	436	0.156±0.033	6±1
Total	14	654	0.162±0.029	6±1
April:				
Weekday	5	122	0.141±0.042	7±2
Weekend	2	79	0.067±0.031	15±7
Total	7	201	0.110±0.028	9±2
Grand total	34	1043	0.136±0.020	7±1

Appendix Table A-5. Fishery statistics for summer steelhead in Section 2 (mouth to Fence Creek) on the Imnaha River during the 2001-02 run year. Statistics include mean estimates ±95% confidence intervals. Only adipose fin-clipped fish were harvested. "--" indicates not sampled or undefined.

Month, day type	Sample size		Total hours	Total catch	Total harvest	Catch rate		Angler days
	Days	Anglers				fish/h	h/fish	
February:								
Weekday	6	21	191±87	30±28	20±20	0.159±0.120	6±5	77±35
Weekend	4	7	57±81	4	0	0.070	14	14±20
Total	10	28	248±119	34±28	20±20	0.139±0.093	7±5	91±44
March:								
Weekday	6	46	828±445	373±243	110±79	0.450±0.248	2±1	168±90
Weekend	6	51	456±252	106±85	55±45	0.233±0.118	4±2	88±49
Total	12	97	1284±512	479±258	165±91	0.373±0.166	3±1	256±102
April:								
Weekday	4	12	140±27	48±61	0	0.345±0.345	3±3	36±7
Weekend	3	9	43±25	2±3	1±2	0.062±0.029	16±7	12±7
Total	7	21	183±37	50±61	1±2	0.279±0.264	4±4	48±10
Grand total	29	146	1715±526	563±266	186±93	0.329±0.128	3±1	395±121

Appendix Table A-6. Fishery statistics for summer steelhead in Section 1 (Fence Creek to town of Imnaha) on the Imnaha River during the 2001-02 run year. Statistics include mean estimates ±95% confidence intervals. Only adipose fin-clipped fish were harvested. "--" indicates not sampled or undefined.

Month,	Sample size		Total	Total	Total	Catch rate		Angler
day type	Days	Anglers	hours	catch	harvest	fish/h	h/fish	days
February:								
Weekday	6	1	9±16	0	--	--	--	2±4
Weekend	4	0	0	--	--	--	--	0
Total	10	1	9±16	0	--	--	--	2±4
March:								
Weekday	6	14	175±199	47±19	12±10	0.263±0.061	4±1	54±61
Weekend	6	13	89±86	15±21	7±9	0.168±0.098	6±4	17±16
Total	12	27	264±217	62±28	19±14	0.231±0.052	4±1	71±58
April:								
Weekday	4	17	230±93	99±70	36±27	0.430±0.241	2±1	43±17
Weekend	3	7	57±31	1±3	1	0.024±0.025	42±44	10±5
Total	7	24	287±98	100±70	37±27	0.350±0.194	3±2	53±18
Grand total	29	52	560±238	162±75	56±30	0.288±0.102	3±1	126±54

Appendix Table A-7. Percent of the catch that were hatchery summer steelhead during each survey month in the Grande Ronde and Imnaha basins during the 2001-02 run year. Total catch for the Lower Grande Ronde and Imnaha rivers and sampled catch for the Upper Grande Ronde and Wallowa rivers and Rondowa are shown in parentheses. On the Imnaha River, Section 2 is from the mouth upstream to Fence Creek, and Section 1 is from Fence Creek upstream to the town of Imnaha. "--" indicates not sampled or undefined.

Creel survey Area	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Lower GR River	100(24)	37(523)	67(1058)	74(617)	65(1228)	64(1307)	44(391)	0(11)
Upper GR River	--	--	--	--	--	--(0)	0(3)	--(0)
Rondowa	--	--	--	--	--	100(1)	79(24)	50(4)
Wallowa River	--	--	--	--	--	85(26)	87(362)	79(85)
Imnaha River (Section 2)	--	--	--	--	--	85(34)	71(479)	36(50)

Imnaha River (Section 1)	--	--	--	--	--	--	44(62)	37(100)

APPENDIX B

Fishery statistics for spring fisheries for the 2000-01 run year

Appendix Table B-1. Estimated harvest of summer steelhead and observed and expanded harvest of AdLV+CWT marked steelhead in spring fisheries in the Grande Ronde Basin for the 2000-01 run year. Total harvest = 0.463 (harvest card) + 3.10. Sample rate expansion = total harvest/sampled fish. A sample rate expansion of 25 or greater was considered unreliable, therefore expanded equals observed. Harvest estimates made only for months when steelhead angling season was open (Sept - April) and angler harvest card data was greater than zero. Does not include the lower Grande Ronde (location code 231) fishery. "--" indicates not sampled or undefined.

Fishery, location	Fishery statistics and number of tags recovered by month									Expanded
code, statistics, tagcode	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total	tags
Upper Grande Ronde (233)										
Angler harvest cards	0	16	4	0	0	0	35	114		
Total harvest	--	11	5	--	--	--	19	56	91	
Catherine Creek (120)										
Angler harvest cards	4	0	0	0	0	4	8	4		
Total harvest	5	--	--	--	--	5	7	5	22	
Rondowa (234)										
Angler harvest cards	0	8	0	0	8	39	702	213		
Total harvest	--	7	--	--	7	21	328	102	465	
Wallowa (235)										
Angler harvest cards	0	4	8	0	0	12	1368	572		
Sampled fish	0	0	0	0	0	1	120	37		
Total harvest	--	5	7	--	--	9	636	268	925	
Sample rate expansion	--	--	--	--	--	9.0	5.3	7.2		
092327						0	1	0	1	5
092562						0	1	0	1	5
092604						0	1	0	1	5
Wenaha (184)										
Angler harvest cards	0	0	0	0	0	0	0	0		
Total harvest	--	--	--	--	--	--	--	--	0	
Middle Grande Ronde (232)										
Angler harvest cards	0	16	4	0	24	55	252	59		
Total harvest	--	11	5	--	14	29	120	30	209	
Total Grande Ronde harvest (excluding lower Grande Ronde)									1712	

Appendix Table B-2. Estimated catch of summer steelhead in spring fisheries in the Grande Ronde Basin for the 2000-01 run year. Total catch = (sampled catch/sampled harvest) x total harvest. For months with little or no sampling, the average proportion was used. For areas with little or no sampling, data from the survey in closest proximity was used. Does not include the lower Grande Ronde fishery. "--" indicates not sampled or undefined.

	Fishery statistics by month								
Fishery[a], statistics	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
Upper Grande Ronde									
Sampled harvest	--	--	--	--	--	0	0	3	3
Sampled catch	--	--	--	--	--	0	1	5	6
Total harvest	--	11	5	--	--	--	19	56	91
Total catch	--	22	10	--	--	--	38	93	163
Catherine Creek									
Sampled harvest	--	--	--	--	--	--	--	--	--
Sampled catch	--	--	--	--	--	--	--	--	--
Total harvest	5	--	--	--	--	5	7	5	22
Total catch	10	--	--	--	--	10	14	8	42
Rondowa									
Sampled harvest	--	--	--	--	--	1	10	6	17
Sampled catch	--	--	--	--	--	1	18	10	29
Total harvest	--	7	--	--	7	21	328	102	465
Total catch	--	12	--	--	12	36	590	170	820
Wallowa									
Sampled harvest	--	--	--	--	--	1	120	37	158
Sampled catch	--	--	--	--	--	2	234	71	307
Total harvest	--	5	7	--	--	9	636	268	925
Total catch	--	10	14	--	--	17	1240	514	1795
Wenaha									
Sampled harvest	--	--	--	--	--	--	--	--	--
Sampled catch	--	--	--	--	--	--	--	--	--
Total harvest	--	--	--	--	--	--	--	--	0
Total catch	--	--	--	--	--	--	--	--	0
Middle Grande Ronde									
Sampled harvest	--	--	--	--	--	--	--	--	--
Sampled catch	--	--	--	--	--	--	--	--	--
Total harvest	--	11	5	--	14	29	120	30	209
Total catch	--	21	10	--	27	56	234	58	406
Total Grande Ronde catch (excluding lower Grande Ronde)									3226

[a] *We used upper Grande Ronde data for Catherine Creek, Wallowa data for the middle Grande Ronde, and lower Grande Ronde data (in Flesher et al. 2001) for the Wenaha.*

Appendix Table B-3. Estimated angler effort (in hours) for summer steelhead in spring fisheries in the Grande Ronde Basin for the 2000-01 run year. Angler effort in hours = Total catch/sampled catch rate in fish per hour. For months with little or no sampling, the average proportion was used. For areas with little or no sampling, data from the survey in closest proximity was used. Does not include the lower Grande Ronde fishery. "--" indicates not sampled or undefined.

	Fishery statistics by month								
Fishery[a], statistics	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
Upper Grande Ronde									
Catch rate	--	--	--	--	--	--	0.021	0.078	0.054
Total catch	--	22	10	--	--	--	38	93	163
Angler effort	--	407	185	--	--	--	1810	1192	3594
Catherine Creek									
Catch rate	--	--	--	--	--	--	--	--	--
Total catch	10	--	--	--	--	10	14	10	44
Angler effort	185	--	--	--	--	185	667	128	1165
Rondowa									
Catch rate	--	--	--	--	--	0.083	0.204	0.150	0.174
Total catch	--	12	--	--	12	36	590	170	820
Angler effort	--	69	--	--	69	434	2892	1133	4597
Wallowa									
Catch rate	--	--	--	--	--	0.012	0.103	0.085	0.094
Total catch	--	10	14	--	--	17	1240	514	1795
Angler effort	--	106	149	--	--	1417	12039	6047	19758
Wenaha									
Catch rate	--	--	--	--	--	--	--	--	--
Total catch	--	--	--	--	--	--	--	--	0
Angler effort	--	--	--	--	--	--	--	--	0
Middle Grande Ronde									
Catch rate	--	--	--	--	--	--	--	--	--
Total catch	--	21	10	--	27	56	234	58	406
Angler effort	--	223	106	--	287	4667	2272	682	8237
Total Grande Ronde angler effort (excluding lower Grande Ronde)									37351

[a] *We used upper Grande Ronde data for Catherine Creek, Wallowa data for the middle Grande Ronde, and lower Grande Ronde data (in Flesher et al. 2001) for the Wenaha.*