

LOWER SNAKE RIVER COMPENSATION PLAN:  
Summer Steelhead Creel Surveys on the  
Grande Ronde, Wallowa, and Imnaha  
Rivers for the 2006-07 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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Front cover photo of ODFW Wallowa Hatchery manager Ron Harrod releasing hatchery steelhead residuals into Kinney Lake, April 2009.

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## PREFACE

This report is for the funding period 1 April 2007 to 31 March 2008. The sampling period was from 1 September 2006 to 15 April 2007. 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 2006-2007 run year were primarily from the 2003 and 2004 brood years. Results of creel surveys conducted prior to fall 2006 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, 2004a, 2004b, 2005, 2007, 2008a, and 2008b), many of which are available at: <http://www.fws.gov/lsnakecomplan/reports/ODFWreports.html>. The steelhead angling season surveyed in this report, during which only adipose fin-clipped fish could be harvested, was open from 1 September 2006 to 15 April 2007 in the Grande Ronde and Imnaha river basins.

## **ACKNOWLEDGMENTS**

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## SUMMARY

During the 2006-07 run year, angler effort was lower than the previous year, but higher than the overall average since surveys began in 1985 on the lower Grande Ronde and Imnaha river recreational summer steelhead fisheries. Similarly, harvest was lower than the previous year, but higher than the average on both the lower Grande Ronde and Imnaha rivers. Total catch (harvested and released) has increased over time in both the lower Grande Ronde and Imnaha river steelhead fisheries, as has the wild released component on the lower Grande Ronde River. However, the number of wild steelhead caught and released on the Imnaha River since surveys began is unknown due to unmarked hatchery returns in recent years. Catch rates were similar to the previous year on the Wallowa River, but lower than the previous year in the Rondowa (mouth of the Wallowa River), lower Grande Ronde, and Imnaha fisheries. Hatchery fish dominated the catch during the fall and winter months on the lower Grande Ronde River and during the spring months on the Wallowa River and at Rondowa, and hatchery fish contributed substantially to the Imnaha River fishery, although many hatchery fish were not clipped and thus were indistinguishable from wild fish. Anglers harvested similar numbers of one and two-ocean hatchery steelhead, and more females than males in Grande Ronde and Imnaha basin fisheries. The percent of local resident anglers participating in summer steelhead fisheries increased from the prior year in the lower Grande Ronde, and decreased in all other fisheries in the Grande Ronde and Imnaha basins, including the Wallowa, Rondowa, and Imnaha fisheries. We sampled adipose and left ventral and right ventral fin-clipped and coded-wire-tagged (AdLV+CWT and AdRV+CWT) summer steelhead in both the Grande Ronde and Imnaha basin fisheries. Expanded estimates for the Wallowa and Rondowa fisheries will not be determined until statewide angler harvest tag summaries become available, however harvest, catch, and angler effort for the 2005-06 run year are reported in the appendices. Eighty-nine adult steelhead were recycled back into the Wallowa River fishery from the Big Canyon Facility during the spring 2007 and they provided some additional harvest opportunities for anglers.

## INTRODUCTION

Summer steelhead (*Oncorhynchus mykiss*) fisheries in the Grande Ronde and Imnaha river 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 (USACOE 1996), and low steelhead redd counts on index streams in the Grande Ronde and Imnaha river 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 the Snake River above Lower Granite Dam (Rkm 173), the uppermost of these four dams. 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 river basins (Carmichael 1989). Approximately 1.68 million steelhead smolts were targeted for release in Oregon each

year during April and May in the Grande Ronde and Imnaha river basins between 1984 and 1999. In 2000, we reduced releases to approximately 1.2 million smolts in response to the National Marine Fisheries Service's recommendation to help reduce straying of Wallowa hatchery stock steelhead, primarily into the Deschutes River (mid-Columbia tributary). In 2006, we further reduced smolt releases to approximately 1.065 million, partly due to an increased release size from five to four fish per pound (fpp) for Wallowa stock which increased smolt-to-adult survival, and a reduction of Imnaha stock Big Sheep direct stream releases. 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 river basins. The goal of these surveys is to provide annual harvest information needed to assess LSRCP 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 2006 and the spring of 2007 in the Grande Ronde and Imnaha river basins. In addition, this report contains estimates of total effort, catch, and harvest for all fisheries in the Grande Ronde river basin not reported in the previous annual report for the 2005-06 run year. The Grande Ronde and Imnaha river basins encompass the major steelhead fisheries that occur in Oregon tributaries to 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, 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 Wallowa survey. Because vehicle access into Rondowa was limited, anglers parked their vehicles at Palmer Junction, located 5.6 km upstream of Rondowa on the Grande Ronde River, and on Smith Mountain Road at the Forest Capital Partners gate, approximately 16 km by road to Rondowa. Thus, for the Rondowa survey, we interviewed anglers leaving the parking areas at Palmer Junction and at the gate on Smith Mountain Road when they were encountered. 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).

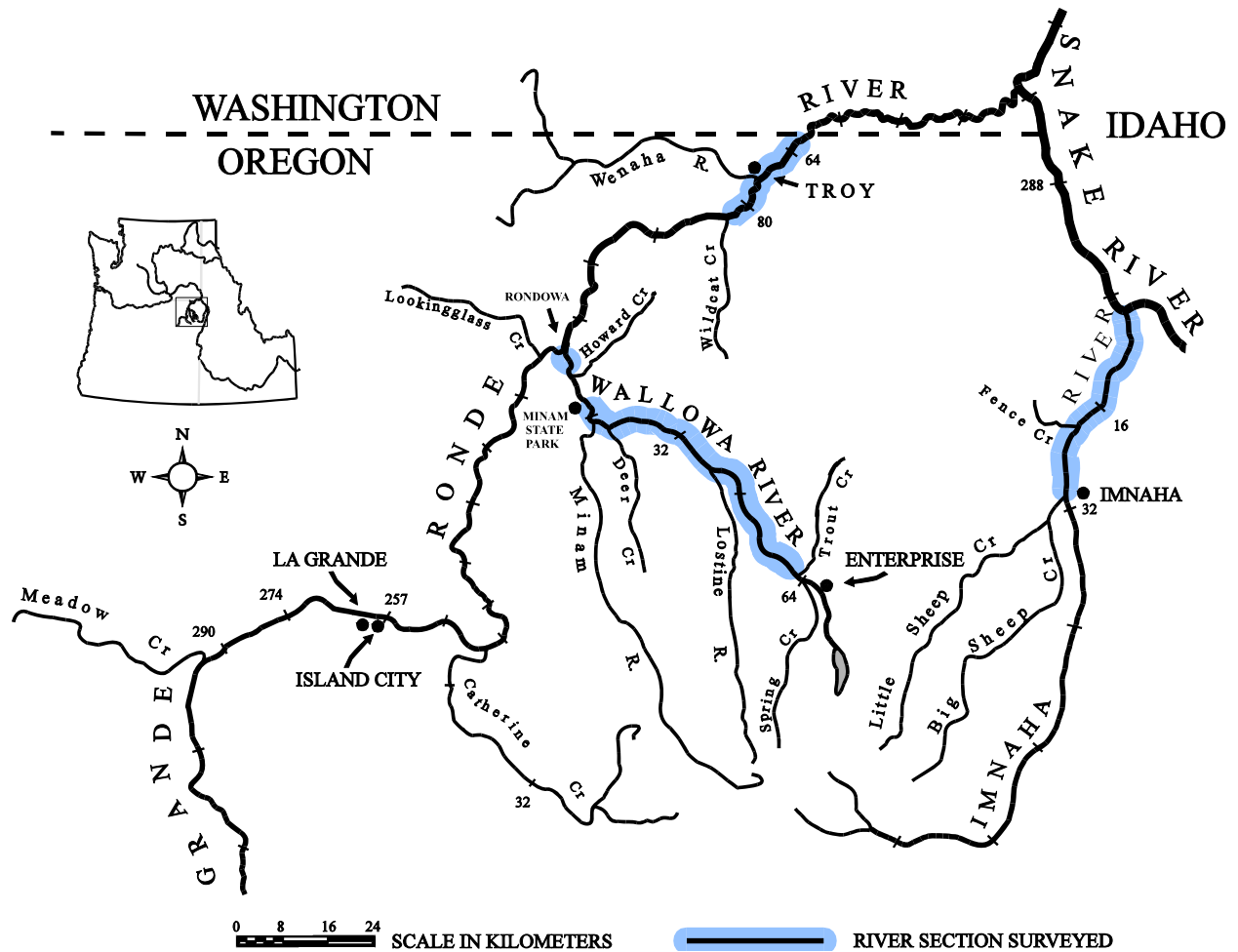


Figure 1. Map of northeastern Oregon showing where summer steelhead creel surveys were conducted in the Grande Ronde and Imnaha river basins during the 2006-07 run year.

## METHODS

For the lower Grande Ronde River survey, we used the methodology described by Carmichael et al. (1988). The survey on the lower Grande Ronde River was conducted from 1 September 2006 through 15 April 2007. Our goal was to sample 50% of the weekends (Saturday and Sunday) and holidays and 30% of the weekdays (Monday through Friday) during each month of each survey. Sample days were chosen randomly in two-day blocks, representing two strata (weekend days and holidays, and weekdays). On each sample day, beginning at a randomly selected start time, the creel 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, what species of fish they were angling for, what type of angling gear they were using, their residence, the number of hours they had fished, and the number and species of fish caught. The surveyor also sampled all harvested fish by recording fork length (mm), gender, fin clips, and any external tags. If the fish was coded-wire-tagged (CWT), as indicated by adipose and either left or right ventral fin-clips (AdLV or AdRV), the surveyor asked permission from the angler to collect the snout, then excised the snout behind the eye and placed it with an identification number in a plastic bag for later processing.

Surveys on the Imnaha River were conducted from 1 February through 15 April 2007. 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. Our goal was to survey 50% of the weekends and 30% of the weekdays 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 during the two-day period and did not exit through the check station. 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 catch and harvest data was expanded to account for the unsampled time.

For the Wallowa River and Rondowa survey areas, one surveyor conducted angler interviews from 1 February to 15 April 2007. We surveyed the Wallowa River area each sample day and surveyed both the Wallowa and Rondowa survey areas every other sample day. For the Wallowa River survey, the surveyor drove the survey route from Trout Creek downstream to Minam State Park, stopped to interview anglers, then waited at the park for approximately one hour and interviewed returning anglers that had hiked below the park to fish, and then repeated this sequence. On alternate

sample days, the surveyor drove the survey route from Minam State Park upstream to Trout Creek, stopping to interview anglers along the way, then drove to the Smith Mountain parking area that anglers use to access Rondowa and interviewed anglers returning from Rondowa for approximately one hour, and then repeated the sequence. Throughout the season, the surveyor would occasionally drive to Palmer Junction (on the Grande Ronde River) to check for anglers accessing Rondowa. All harvested fish observed were sampled. From 1 February to 3 March, we surveyed five days each week (Sunday – Saturday) from 0900-1800 hours. From 4 March to 15 April, we surveyed four days each week from 0800-1900 hours.

For the lower Grande Ronde 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 and AdRV+CWT marked fish harvested (see Carmichael et al. 1988). Similar statistics were estimated for the Imnaha River surveys, except the percent of marked fish was substituted for percent of hatchery fish, since unmarked hatchery steelhead were not distinguishable from wild adults. For the Wallowa and Rondowa survey areas, we estimated catch rate and percent hatchery fish in the catch. In addition, we determined age and gender 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.

We estimated total harvest by month during spring fisheries in the Grande Ronde basin for the previous year (2005-06 run year) that do not have a statistical creel survey in place, by using the angler harvest card estimates of harvest and a regression between angler harvest card harvest and creel survey harvest for specific reaches within the Grande Ronde and Imnaha basins for previous years. The regression is updated annually with lower Grande Ronde and Imnaha fishery harvest estimates from angler harvest tag returns and from the statistical surveys that were conducted. However, there is usually a one or two-year delay in obtaining final angler harvest tag estimates of total harvest. To estimate total catch, we multiplied total harvest estimates by the ratio of sampled catch to sampled harvest from creel surveys. To estimate total angler effort in hours, we used total catch divided by the sample catch rate (fish per hour) reported in the previous years' annual report (Flesher et al. 2008b).

Figure 8, 9, 10, and 11, and Table 5 in this report also include data from creel surveys conducted on the upper Grande Ronde River from 1989 to 2002 and Catherine Creek in 1992, 1993, and 1997 to 1999, and were originally reported on in Carmichael et al. (1989, 1990), and Flesher et al. (1991, 1992, 1993, 1994, 1995, 1996, 1997, 1999, 2000, 2001, 2004a, and 2004b).

In spring 2007, we recycled hatchery adult returns from the Big Canyon Facility back into the Wallowa River fishery, using methodology described by Flesher et al. (2007). Between 16 March and 6 April, 89 adipose fin-clipped adults trapped at the Big Canyon Facility (located at the mouth of Deer Creek) were transported and released into the Wallowa River either 1.6 Rkm below or 6.4 Rkm above the mouth of Deer Creek. As in

past years, fish were uniquely marked using an opercle punch to identify them as recycled. Recaptures at the Big Canyon Facility were enumerated by opercle punch and euthanized. The creel surveyor checked for opercle punches on all harvested fish that were sampled after the recycled group was released.

## ACCOMPLISHMENTS AND FINDINGS

On the lower Grande Ronde River from 1 September 2006 to 15 April 2007, we sampled 54.2% of the weekends and holidays (39 days) and 31.0% of the weekdays (48 days) for a total of 87 sample days. On the Wallowa River from 1 February to 15 April 2007, we sampled 87.0% of the weekends and holidays (20 days) and 49.0% of the weekdays (25 days) for a total of 45 sample days. During the same time period at Rondowa, we sampled 52.2% of the weekends and holidays (12 days) and 29.4% of the weekdays (15 days) for a total of 27 sample days. On the Imnaha River from 1 February to 15 April 2007, we sampled 56.5% of the weekends and holidays (13 days) and 31.4% of the weekdays (16 days) for a total of 29 sample days.

We estimate that 2,822 anglers fished for 16,207 hours on the lower Grande Ronde River during the 2006-07 season. They caught and released 814 wild and 641 hatchery steelhead, and harvested 999 hatchery steelhead for an average catch rate index of 8 hours per fish (Figures 2-6, Appendix Table A-1). The percent of steelhead caught that were hatchery origin ranged from 0% in April to 75% in January (Figure 7, Appendix Table B). Fifty-six percent of harvested hatchery steelhead spent one year in freshwater and one year in saltwater (hereafter designated 1:1) and 44% spent one year in freshwater and two years in saltwater (designated 1:2; Table 1). Mean fork length ( $\pm 95\%$  confidence interval) of harvested hatchery steelhead was 588 ( $\pm 6$ ) mm for age 1:1 and 702 ( $\pm 13$ ) mm for age 1:2 (Table 1). Gender composition was 43% male and 57% female (Table 1). Seventy-one percent of the anglers on the lower Grande Ronde River were local Oregon resident anglers, 16% were non-local Oregon resident anglers, 3% were Washington State residents and 10% resided outside the states of Oregon and Washington (Table 2). On the lower Grande Ronde River, anglers harvested an estimated 307 AdLV+CWT and AdRV+CWT marked steelhead from our hatchery releases and an estimated 4 AdLV+CWT marked steelhead from Washington Department of Fish and Wildlife releases on the Grande Ronde River at the Cottonwood Conditioning Pond, Washington (Table 3).

At Rondowa, the catch rate index averaged 6 hours per fish (Figure 4, Appendix Table A-2). The percent of steelhead caught that were hatchery origin ranged from 67% in April to 83% in March (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 53% 1:1 and 47% 1:2 (Table 1). Mean fork length ( $\pm 95\%$  confidence interval) of harvested hatchery steelhead was 594 ( $\pm 7$ ) mm for age 1:1 and 693 ( $\pm 16$ ) mm for age 1:2 (Table 1). Gender composition was 48% male and 52% female (Table 1). Fifty-six percent of the anglers at Rondowa were local Oregon resident anglers, 32% were non-local Oregon resident anglers, 2% were Washington State residents and 10% resided outside the states of Oregon and Washington (Table



2). At Rondowa, anglers harvested 11 AdLV+CWT and AdRV+CWT marked steelhead from our hatchery releases, however expanded estimates for the entire fishery will not be determined until state angler harvest tag data become available, as reported in Table 3.

On the Willowa River, the catch rate index averaged 7 hours per fish (Figure 4, Appendix Table A-3). The percent of steelhead caught that were hatchery origin ranged from 77% in February to 86% in March (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 47% 1:1 and 53% 1:2 (Table 1). Mean fork length ( $\pm 95\%$  confidence interval) of harvested hatchery steelhead was 591 ( $\pm 4$ ) mm for age 1:1 and 696 ( $\pm 7$ ) mm for age 1:2 (Table 1). Gender composition was 37% male and 63% female (Table 1). Sixty-three percent of the anglers on the Willowa River were local Oregon residents, 29% were non-local Oregon residents, 2% were Washington State residents and 6% resided outside the states of Oregon and Washington (Table 2). On the Willowa River, anglers harvested 54 AdLV+CWT and AdRV+CWT marked steelhead from our hatchery releases, however expanded estimates for the entire fishery, as reported on in Table 3, will not be determined until state angler harvest tag data become available.

On the Imnaha River, we estimate that 1,409 anglers fished for 4,854 hours. They caught and released 465 unmarked (wild and hatchery) and 70 hatchery steelhead, and harvested 225 hatchery steelhead for an average catch rate index of 6 hours per fish (Figures 2-6, Appendix Tables A-4 and A-5). The percent of steelhead caught that were known hatchery origin ranged from 0% in February in Section 1 to 44% in April in Section 1 (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 55% 1:1, 44% 1:2, and 1% 2:1 (Table 1). Mean fork length ( $\pm 95\%$  confidence interval) of harvested hatchery steelhead was 576 ( $\pm 9$ ) mm for age 1:1, 678 ( $\pm 19$ ) mm for age 1:2, and 615 mm for age 2:1 (Table 1). Gender composition was 27% male and 73% female (Table 1). Seventy-seven percent of the anglers on the Imnaha River were local Oregon residents, 13% were non-local Oregon residents, 3% were Washington State residents and 7% resided outside the states of Oregon and Washington (Table 2). On the Imnaha River, anglers harvested an estimated 69 AdLV+CWT marked steelhead from our hatchery releases (Table 3).

Angler effort on both the lower Grande Ronde and Imnaha rivers was lower than last year but higher than the overall average (Figure 8). Harvest on both the lower Grande Ronde and Imnaha rivers was also lower than last year, but higher than the overall average since surveys began (Figure 9). Although total catch (harvested and released) was lower than the previous year, catch of steelhead on the lower Grande Ronde and Imnaha rivers has increased since surveys began with the 1985-86 run year, especially in recent years (Table 4). Catch and release of wild steelhead has also increased over time on the lower Grande Ronde River, however on the Imnaha River, catch and release of wild fish over time is unknown due to returns of unmarked hatchery fish in recent years. Catch rates were similar to last year on the Willowa River, but lower at

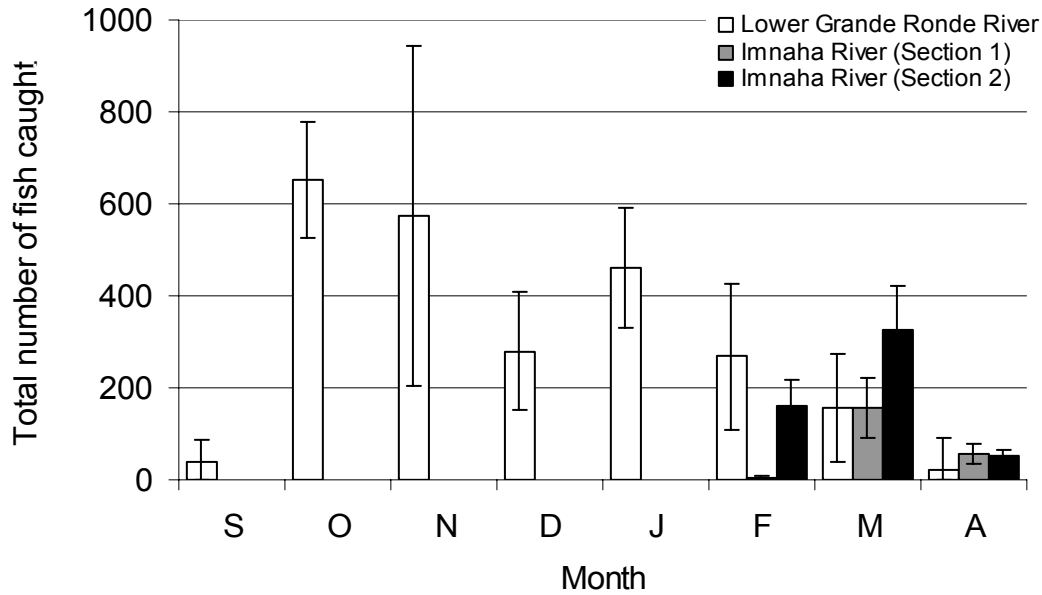


Figure 2. Estimated total catch of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2006-07 run year. Surveys were conducted from 1 September 2006 to 15 April 2007 on the lower Grande Ronde River, and from 1 February to 15 April 2007 on the Imnaha River.

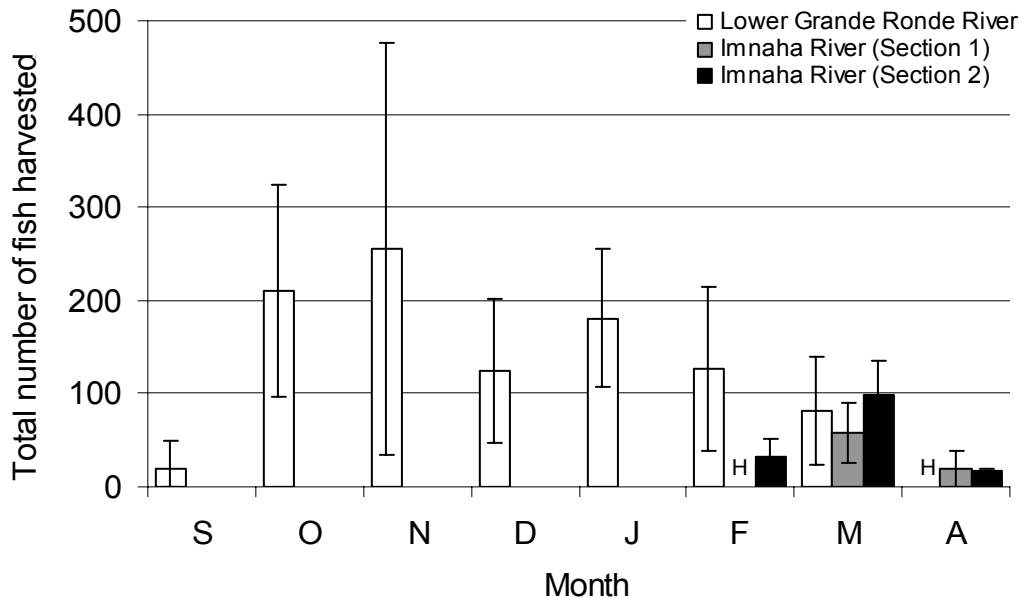


Figure 3. Estimated total harvest of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2006-07 run year. "H" indicates no harvest. Surveys were conducted from 1 September 2006 to 15 April 2007 on the lower Grande Ronde River, and from 1 February to 15 April 2007 on the Imnaha River.

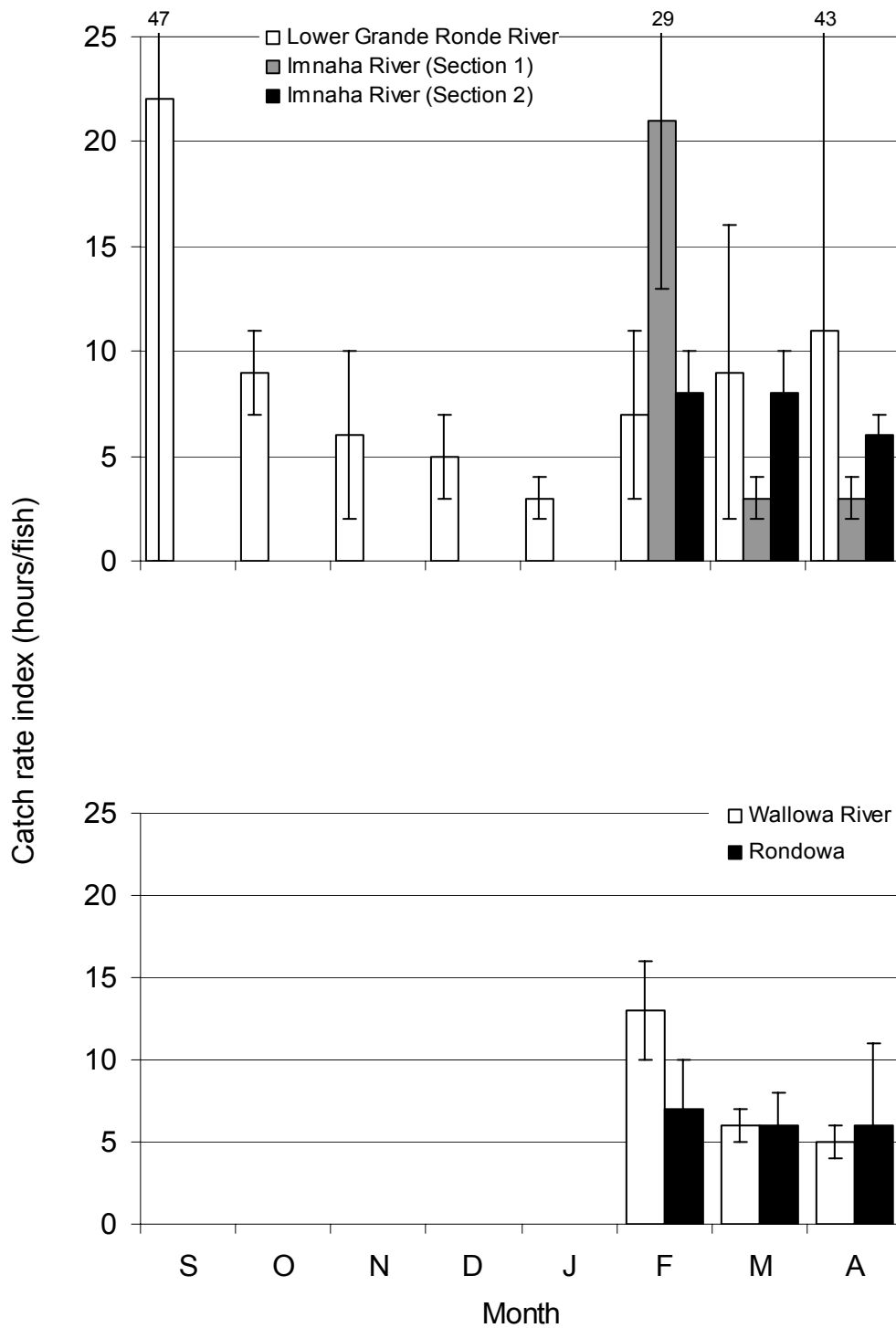


Figure 4. Estimated catch rate index (hours/fish) for summer steelhead (vertical bars show 95% confidence intervals) in the Grande Ronde and Imnaha river basins during the 2006-07 run year. Survey areas and times include the lower Grande Ronde River (1 September 2006 - 15 April 2007), and Rondowa, Wallowa River, and two sections of the Imnaha River (1 February - 15 April 2007). Note: A lower catch rate index implies better angling success.

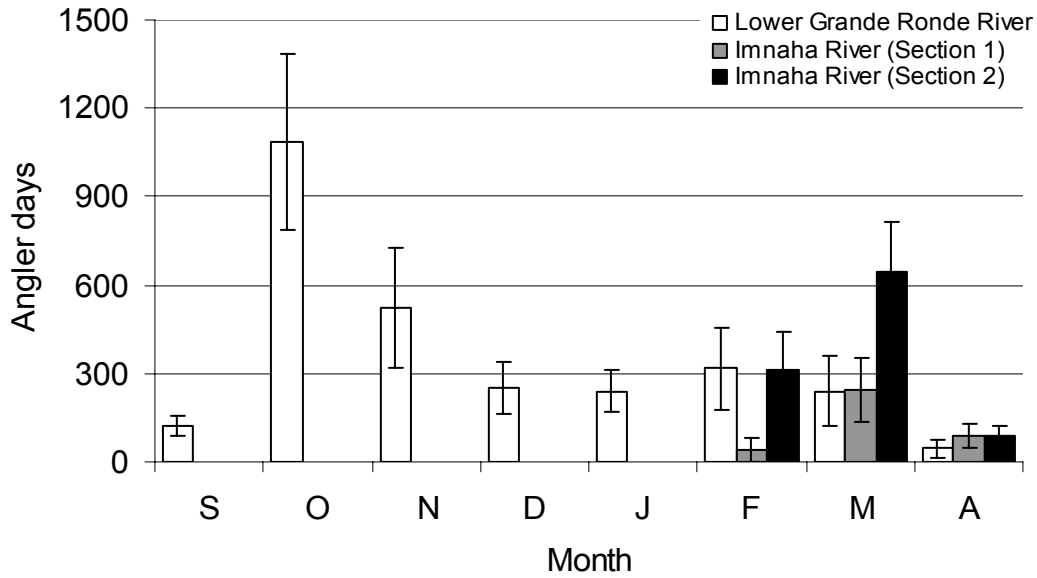


Figure 5. Estimated number of angler days for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2006-07 run year. Surveys were conducted from 1 September 2006 to 15 April 2007 on the lower Grande Ronde River, and from 1 February to 15 April 2007 on the Imnaha River.

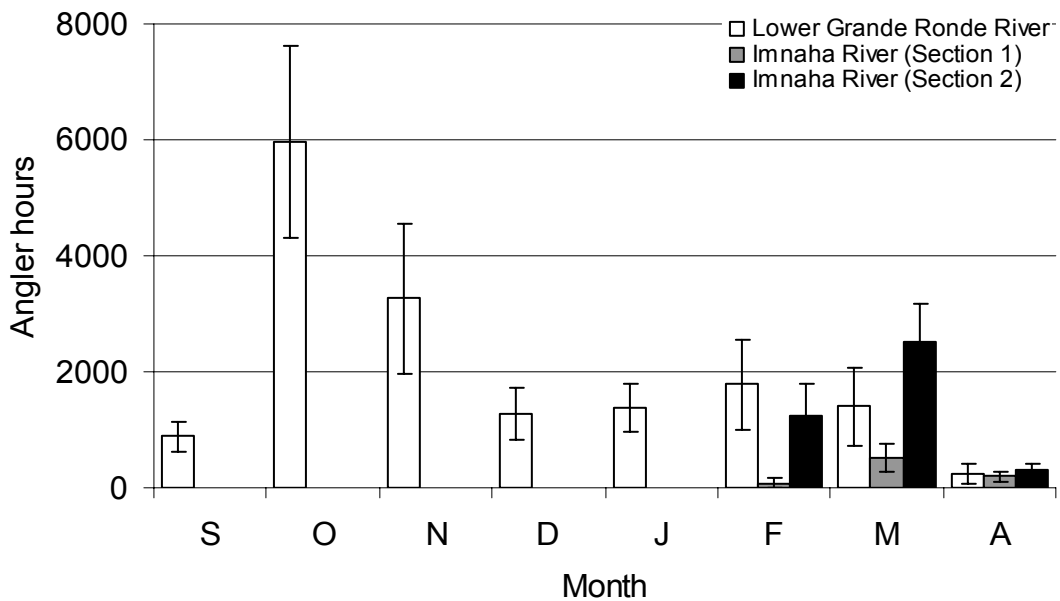


Figure 6. Estimated number of angler hours for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2006-07 run year. Surveys were conducted from 1 September 2006 to 15 April 2007 on the lower Grande Ronde River, and from 1 February to 15 April 2007 on the Imnaha River.

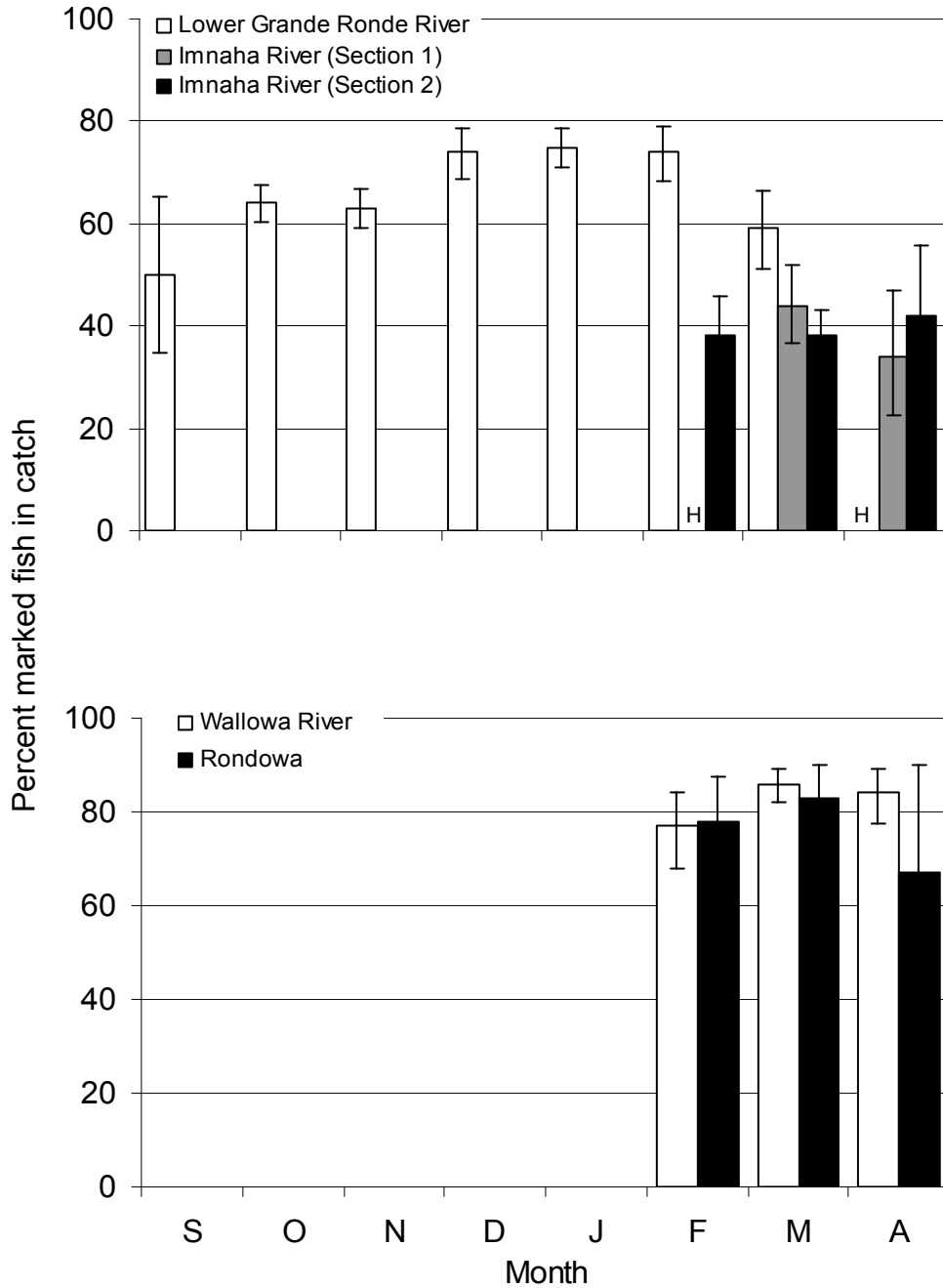


Figure 7. Estimated percent of summer steelhead caught (vertical bars show 95% confidence intervals; using a binomial distribution) in the Grande Ronde and Imnaha river basins during the 2006-07 run year that were marked. In the Grande Ronde basin all unmarked fish were wild, whereas in the Imnaha basin unmarked fish were of both wild and hatchery origin. "H" indicates no marked fish in catch. Survey areas and times include the lower Grande Ronde River (1 September 2006 - 15 April 2007), and Rondowa, Wallowa River, and two sections of the Imnaha River (1 February-15 April 2007).

Table 1. Percent age composition and mean fork length ( $\pm$  95% confidence intervals) of hatchery summer steelhead sampled in creel surveys in the Grande Ronde and Imnaha river basins during the 2006-07 run year. Age composition and mean fork length by age are estimated from fork lengths of harvested fish and age-length keys developed from hatchery returns to Wallowa Hatchery in 2007 and Little Sheep Creek Facility (for the Imnaha River survey area) in 2006 and 2007. Age is expressed as years spent in freshwater prior to ocean migration:years spent in the ocean prior to spawning migration.

Creel survey area, Gender	Age composition (%)					Mean fork length (mm)					
	N	1:1	1:2	2:1	1:3	N	1:1	N	1:2	N	2:1
Lower GR River											
Males	66	71	29	0	0	47	591 $\pm$ 8	19	734 $\pm$ 28	0	-
Females	86	44	56	0	0	38	583 $\pm$ 7	47	689 $\pm$ 12	0	-
Total	152	56	44	0	0	85	588 $\pm$ 6	66	702 $\pm$ 13	0	-
Rondowa											
Males	37	70	30	0	0	26	596 $\pm$ 7	10	719 $\pm$ 29	0	-
Females	40	38	63	0	0	15	589 $\pm$ 14	25	682 $\pm$ 19	0	-
Total	77	53	47	0	0	41	594 $\pm$ 7	35	693 $\pm$ 16	0	-
Wallowa River											
Males	121	58	42	0	0	70	601 $\pm$ 5	51	713 $\pm$ 15	0	-
Females	202	41	59	0	0	82	582 $\pm$ 5	120	688 $\pm$ 8	0	-
Total	323	47	53	0	0	152	591 $\pm$ 4	171	696 $\pm$ 7	0	-
Imnaha River											
Males	23	78	22	0	0	15	585 $\pm$ 20	4	666 $\pm$ 41	0	-
Females	61	46	52	2	0	23	570 $\pm$ 9	27	680 $\pm$ 21	1	615
Total	84	55	44	1	0	38	576 $\pm$ 9	31	678 $\pm$ 19	0	-

Table 2. Residence of summer steelhead anglers interviewed during creel surveys in the Grande Ronde and Imnaha river basins during the 2006-07 run year. Local Oregon resident anglers were from Union and Wallowa counties.

Creel survey area	Number of anglers	Percent			
		Local Oregon resident anglers	Non-local Oregon resident anglers	Washington resident anglers	Other out-of-state anglers
Lower GR River	586	71	16	3	10
Rondowa	156	56	32	2	10
Wallowa River	1008	63	29	2	6
Imnaha River	561	77	13	3	7

Table 3. Number of AdLV+CWT marked summer steelhead recovered during creel surveys in the Grande Ronde and Imnaha river basins during the 2006-07 run year. Recoveries were expanded for the entire fishery.

Creel survey area	Tag code	Release site	Experimental group <sup>a</sup>	Brood Year	Number recovered	
					Observed	Expanded <sup>b</sup>
Lower Grande Ronde River	09 39 14	Spring Cr.	Prod./April	2003	3	13
	09 39 15	Deer Cr.	Prod./April	2003	4	12
	09 39 17	Deer Cr.	Volitional/May	2003	1	4
	09 41 04	Spring Cr.	Prod./April	2004	5	43
	09 41 05	Spring Cr.	Prod./April	2004	1	4
	09 41 07	Spring Cr.	Prod./April	2004	1	4
	09 41 08	Spring Cr.	Fall Brood/April	2004	6	41
	09 41 09	Spring Cr.	Fall Brood/April	2004	10	57
	09 41 10	Spring Cr.	Fall Brood/April	2004	7	87
	09 41 11	Spring Cr.	Fall Brood/May	2004	2	28
	09 41 12	Deer Cr.	Prod./April	2004	1	6
	09 41 13	Deer Cr.	Volitional/May	2004	1	4
	63 15 28	-	WDFW <sup>c</sup>	2003	1	4
	Wallowa River	09 39 14	Spring Cr.	Prod./April	2003	2
09 39 15		Deer Cr.	Prod./April	2003	7	ND
09 39 16		Spring Cr.	Volitional/May	2003	2	ND
09 39 17		Deer Cr.	Volitional/May	2003	4	ND
09 41 04		Spring Cr.	Prod./April	2004	1	ND
09 41 05		Spring Cr.	Prod./April	2004	3	ND
09 41 06		Spring Cr.	Prod./April	2004	4	ND
09 41 07		Spring Cr.	Prod./April	2004	1	ND
09 41 08		Spring Cr.	Fall Brood/April	2004	4	ND
09 41 09		Spring Cr.	Fall Brood/April	2004	5	ND
09 41 10		Spring Cr.	Fall Brood/April	2004	6	ND
09 41 11		Spring Cr.	Fall Brood/May	2004	1	ND
09 41 12		Deer Cr.	Prod./April	2004	8	ND
09 41 13		Deer Cr.	Volitional/May	2004	6	ND
Rondowa	09 39 15	Deer Cr.	Prod./April	2003	1	ND
	09 41 04	Spring Cr.	Prod./April	2004	1	ND
	09 41 05	Spring Cr.	Prod./April	2004	2	ND
	09 41 06	Spring Cr.	Prod./April	2004	1	ND
	09 41 07	Spring Cr.	Prod./April	2004	1	ND
	09 41 08	Spring Cr.	Fall Brood/April	2004	1	ND
	09 41 09	Spring Cr.	Fall Brood/April	2004	1	ND
	09 41 12	Deer Cr.	Prod./April	2004	3	ND
Imnaha River	09 36 35	L. Sheep Cr.	Prod./May	2002	1	2
	09 39 11	B. Sheep Cr.	Direct St./April	2003	8	28
	09 39 12	L. Sheep Cr.	Prod./April	2003	2	10
	09 40 20	B. Sheep Cr.	Direct St./April	2004	8	18
	09 41 03	L. Sheep Cr.	Volitional/April	2004	4	11

<sup>a</sup> Prod. indicates production releases that are forced-released over a 24-hour period. Direct St. indicates direct stream releases. The volitional releases in May (usually over a one-week period) are a current management strategy designed to help remove steelhead smolts that may residualize.

<sup>b</sup> ND indicates expansions not determined until statewide annual harvest card data become available.

<sup>c</sup> Steelhead with tag codes 63 15 28 were Wallowa stock released by Washington Department of Fish and Wildlife (WDFW) in the lower Grande Ronde River at the Cottonwood Conditioning Pond, Washington, from 13-30 April 2004.

Rondowa and on the Grande Ronde and Imnaha rivers, however all were higher than the average catch rates of 10 to 13 hours per fish since surveys began in 1985 (Table 5). Compared to the previous year, the percent of local resident anglers participating in summer steelhead fisheries increased on the Lower Grande Ronde River, and decreased in all other fisheries surveyed, including the Wallowa, Rondowa (mouth of the Wallowa River), and Imnaha fisheries (Table 2). Similar to last year, the Imnaha fishery had the highest percent of local resident anglers (77%), and the fishery at Rondowa had the highest percentage (32%) of non-local Oregon resident anglers, while the lower Grande Ronde River and Rondowa fisheries had the highest percent (10%) of out-of-state anglers. However, the percent of local resident anglers in the Grande Ronde and Imnaha basin fisheries as a whole has decreased while the percent of non-local resident anglers has increased since surveys began (Figure 10). This trend is due to an increase in the number of non-local residents and out-of-state anglers.

We found a statistically significant linear relationship ( $P < 0.001$ ) between angler harvest tag harvest estimates and creel harvest estimates for summer steelhead fisheries in the Grande Ronde and Imnaha river basins (Figure 11). Total harvest estimates for spring steelhead fisheries in the 2005-06 run year were 23 fish in the upper Grande Ronde River, 1,667 fish at Rondowa, 1,638 fish in the Wallowa River, 29 fish in the Wenaha River, and 332 fish in the middle Grande Ronde River, for a total harvest estimate of 3,689 fish in the Grande Ronde basin, excluding the lower Grande Ronde River (Figure 9, Appendix Table C-1). We estimated 110 coded-wire-tagged fish were harvested at Rondowa, and 151 coded-wire-tagged fish were harvested in the Wallowa River in the 2005-06 run year. Total catch estimates for spring steelhead fisheries in the 2005-06 run year were 42 fish in the upper Grande Ronde River, 4,803 fish at Rondowa, 2,973 fish in the Wallowa River, 79 fish in the Wenaha River, and 611 fish in the middle Grande Ronde River, for a total catch estimate of 8,508 fish in the Grande Ronde basin, excluding the lower Grande Ronde River (Appendix Table C-2). Angler effort for the 2005-06 run year was estimated to be 280 hours in the upper Grande Ronde River, 9,509 hours at Rondowa, 20,732 hours in the Wallowa River, 418 hours in the Wenaha River, and 4,047 hours in the middle Grande Ronde River, for a total effort estimate of 34,986 hours in the Grande Ronde basin, excluding the lower Grande Ronde River (Appendix Table C-3).

We recycled 89 summer steelhead to the Wallowa River fishery in 2007. Twenty-six recycled fish were recaptured at the Big Canyon Facility and an estimated 23 recycled fish were harvested in the fishery for a total estimated recovery of 49 recycled fish (Appendix Table D).

## **MANAGEMENT IMPLICATIONS AND RECOMMENDATIONS**

Angler effort was lower than last year but higher than the overall average on both the lower Grande Ronde and Imnaha rivers. Similarly, harvest was lower than last year on both the lower Grande Ronde and Imnaha rivers but higher than the average since surveys began in 1985. Total catch (harvested and released) has increased in the



lower Grande Ronde and Imnaha river fisheries over time, as has the wild component on the lower Grande Ronde. However, it is unknown whether a trend exists for wild steelhead caught and released in the Imnaha River fishery because of returning unmarked hatchery fish. Catch rates were similar on the Wallowa River, lower on the lower Grande Ronde, Rondowa, and Imnaha fisheries compared to the previous year, but higher than the overall average of 10-13 hours per fish since surveys began. Hatchery fish dominated the catch during the fall and winter months on the lower Grande Ronde River and in the spring months on the Wallowa River and at Rondowa. Also, unmarked hatchery fish, which are indistinguishable from natural fish, and marked hatchery fish contributed substantially to the Imnaha River fishery from February through mid-April. These fishery statistics continue to illustrate the importance of current hatchery programs to the success of recreational summer steelhead fisheries in both the Grande Ronde and Imnaha river basins. Statistics for the Wallowa and Rondowa fisheries for the 2006-07 run year will be reported in the 2007-08 annual report.

Recycling adult steelhead returning to the Big Canyon Facility back into the Wallowa River for the recreational fishery in 2007 provided additional harvest and sport opportunities for anglers, and reduced the number of surplus adults at the facility. We estimate that 55% of the fish were accounted for either by returning to the Big Canyon Facility or in the harvest. Although only 26% were estimated to be harvested in this year's fishery, the higher harvest rates reported in prior years provides the rationale for our recommendation to continue recycling of adipose fin-clipped steelhead back into the Wallowa River.

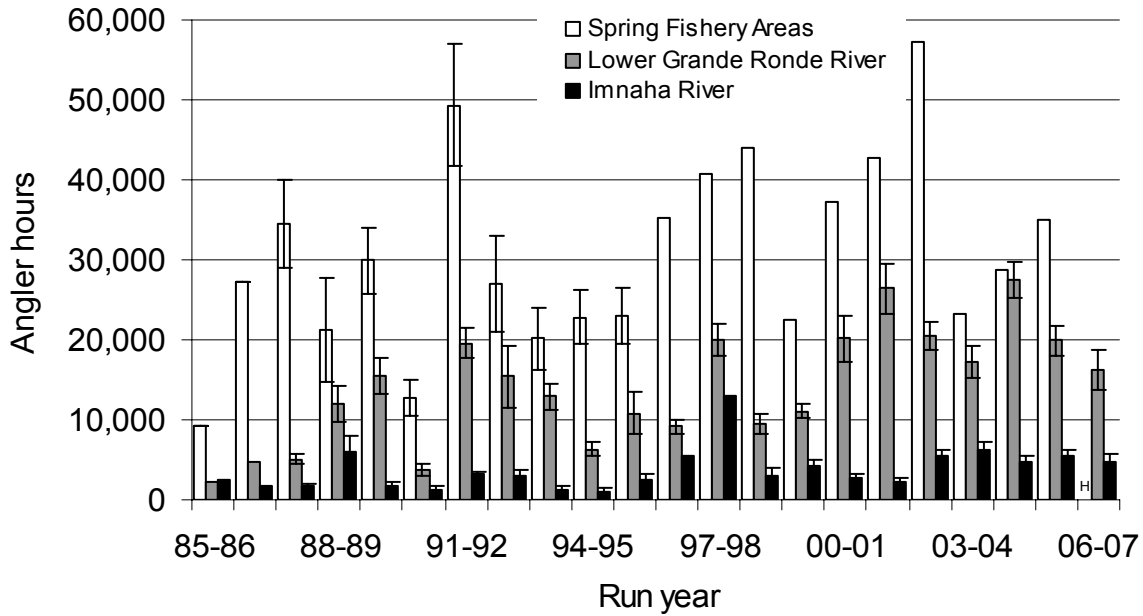


Figure 8. Angler effort for summer steelhead (vertical bars show 95% confidence intervals) in spring fishery areas (upper Grande Ronde River, Wallowa River, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2006-07 run years. “H” indicates this value must be estimated from harvest tag data, which was not available when this report was submitted. Confidence intervals are 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.

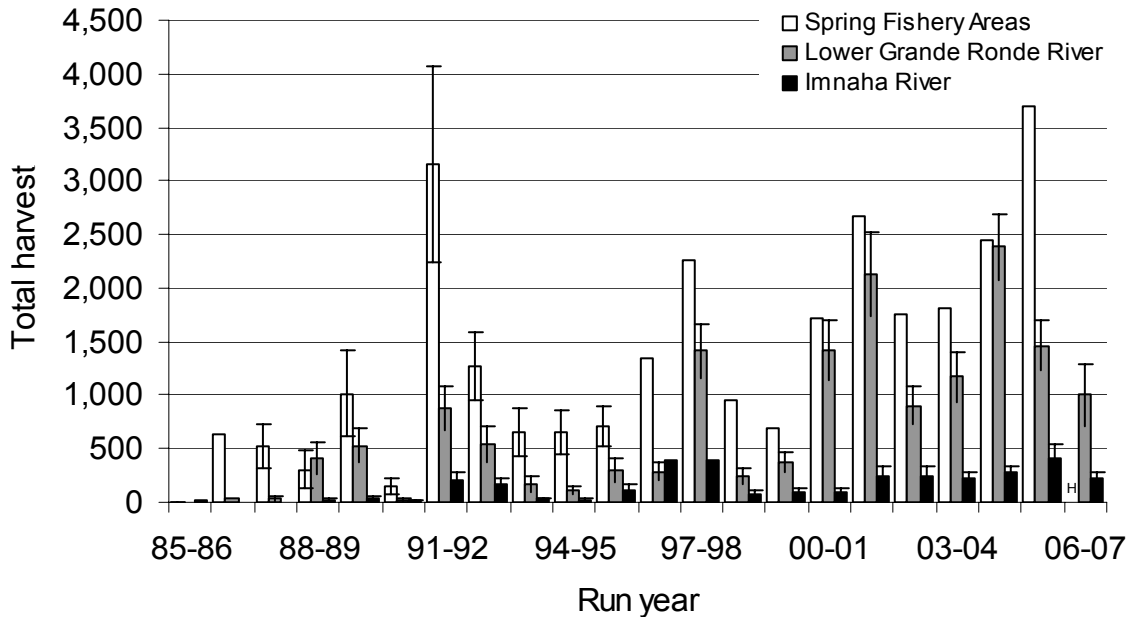


Figure 9. Number of hatchery summer steelhead harvested (vertical bars show 95% confidence intervals) by recreational anglers in spring fishery areas (upper Grande Ronde River, Wallowa River, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2006-07 run years. H indicates this value must be estimated using harvest tag data, which was not yet available. Confidence intervals are 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. Harvested and released total catch of hatchery and wild summer steelhead from statistical angler surveys on the lower Grande Ronde River from 1 September to 15 April, and Imnaha River from 1 February to 15 April for the 1985-86 to 2006-07 run years. Fishing regulations were not consistent among years and river sections, which probably affected the number of harvested hatchery fish. "--" indicates a statistical angler survey was not conducted.

Run year	Lower Grande Ronde River				Imnaha River			
	Harvest	Released		Total catch	Harvest	Released		Total catch
		Hatchery	Natural <sup>a</sup>			Hatchery	Natural <sup>a</sup>	
85-86 <sup>b</sup>	0	0	289	289	18	0	153	171
86-87 <sup>b</sup>	45	45	524	569	0	8	192	200
87-88 <sup>b</sup>	31	40	455	495	4	0	65	69
88-89 <sup>b</sup>	413	500	385	885	19	4	308	331
89-90 <sup>b</sup>	530	590	512	1102	37	9	43	89
90-91 <sup>b</sup>	18	105	99	204	15	35	50	100
91-92 <sup>b</sup>	879	1373	410	1783	212	180	321	713
92-93 <sup>b</sup>	544	1111	573	1684	171	65	130	366
93-94 <sup>b</sup>	168	252	483	735	29	0	72	101
94-95 <sup>b</sup>	107	152	150	302	24	0	39	63
95-96 <sup>b</sup>	300	563	387	950	112	67	210	389
96-97	286	465	193	658	--	--	--	--
97-98	1415	2323	432	2755	--	--	--	--
98-99	244	363	213	576	67	39	44	150
99-00	380	500	474	974	98	50	190	338
00-01	1417	2036	1240	3276	97	86	309	492
01-02	2132	3191	1968	5159	242	210	273	725
02-03	898	1228	1181	2409	239	134	552	925
03-04	1172	1928	1052	2980	228	120	921	1269
04-05	2381	3849	2627	6476	278	154	1050	1482
05-06	1462	2470	1692	4162	338	281	972	1862
06-07	999	641	814	2454	225	70	465	760
Average	719	1078	734	1858	123	76	318	530

<sup>a</sup> Includes unmarked hatchery fish for run years 85-86 to 88-89 on the lower Grande Ronde River, and run years beginning with 02-03 on the Imnaha River.

<sup>b</sup> Angler surveys were conducted only during selected months (in parentheses) on the lower Grande Ronde River during run years 85-86 (Oct-Nov), 86-87 and 87-88 (Sept-Dec), 88-89 and 92-93 (Sept-Dec, 15Feb-15Apr), 89-90 and 93-94 (Sept-Dec, Feb-15Apr), 90-91 (Sept-Dec, Mar-15Apr), 95-96 (Sept-Jan, 16Feb-15Apr), and on the Imnaha River during run years 85-86 and 86-87 (Oct-Nov, Mar), 87-88 and 89-90 through 94-95 (Mar-15Apr), 88-89 (Mar-30Apr), and 95-96 (Sept-15Nov, Mar-15Apr).

Table 5. Catch rate index (hours/fish  $\pm$ 95% confidence intervals) in summer steelhead creel survey areas in the Grande Ronde and Imnaha river basins for the 1985-86 to 2006-07 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 $\pm$ 7	-	-	-	7 $\pm$ 7	15 $\pm$ 7
86-87	9 $\pm$ 3	-	-	-	11 $\pm$ 3	9 $\pm$ 8
87-88	10 $\pm$ 4	-	-	11 $\pm$ 9	16 $\pm$ 3	24 $\pm$ 9
88-89	14 $\pm$ 4	40 $\pm$ 55	-	-	43 $\pm$ 21	18 $\pm$ 11
89-90	14 $\pm$ 4	14 $\pm$ 8	-	34 $\pm$ 27	17 $\pm$ 5	20 $\pm$ 8
90-91	19 $\pm$ 8	24 $\pm$ 11	-	-	6 $\pm$ 2	13 $\pm$ 6
91-92	11 $\pm$ 3	10 $\pm$ 3	3 $\pm$ 3	6 $\pm$ 1	10 $\pm$ 2	4 $\pm$ 1
92-93	9 $\pm$ 2	14 $\pm$ 4	49 $\pm$ 49	-	11 $\pm$ 2	8 $\pm$ 1
93-94	18 $\pm$ 5	31 $\pm$ 17	-	12 $\pm$ 4	17 $\pm$ 3	13 $\pm$ 3
94-95	21 $\pm$ 6	25 $\pm$ 13	-	15 $\pm$ 5	17 $\pm$ 3	17 $\pm$ 8
95-96	11 $\pm$ 2	15 $\pm$ 4	-	-	21 $\pm$ 4	7 $\pm$ 2
96-97	14 $\pm$ 4	18 $\pm$ 9	33 $\pm$ 69	-	13 $\pm$ 3	6 $\pm$ 2
97-98	7 $\pm$ 1	13 $\pm$ 9	7 $\pm$ 10	11 $\pm$ 6	10 $\pm$ 1	18 $\pm$ 9
98-99	17 $\pm$ 4	19 $\pm$ 9	14 $\pm$ 20	-	18 $\pm$ 4	20 $\pm$ 7
99-00	11 $\pm$ 2	25 $\pm$ 19	-	8 $\pm$ 7	17 $\pm$ 4	12 $\pm$ 3
00-01	6 $\pm$ 1	18 $\pm$ 17	-	6 $\pm$ 4	11 $\pm$ 2	6 $\pm$ 1
01-02	5 $\pm$ 1	11 $\pm$ 17	-	7 $\pm$ 4	7 $\pm$ 1	3 $\pm$ 1
02-03	8 $\pm$ 1	-	-	8 $\pm$ 6	12 $\pm$ 2	6 $\pm$ 2
03-04	6 $\pm$ 1	-	-	3 $\pm$ 2	7 $\pm$ 1	5 $\pm$ 1
04-05	4 $\pm$ 0	-	-	5 $\pm$ 1	5 $\pm$ 1	4 $\pm$ 1
05-06	5 $\pm$ 1	-	-	2 $\pm$ 1	7 $\pm$ 1	3 $\pm$ 1
06-07	8 $\pm$ 1	-	-	6 $\pm$ 2	7 $\pm$ 1	6 $\pm$ 1
Average	11 $\pm$ 2	20 $\pm$ 5	21 $\pm$ 24	10 $\pm$ 5	13 $\pm$ 4	11 $\pm$ 3

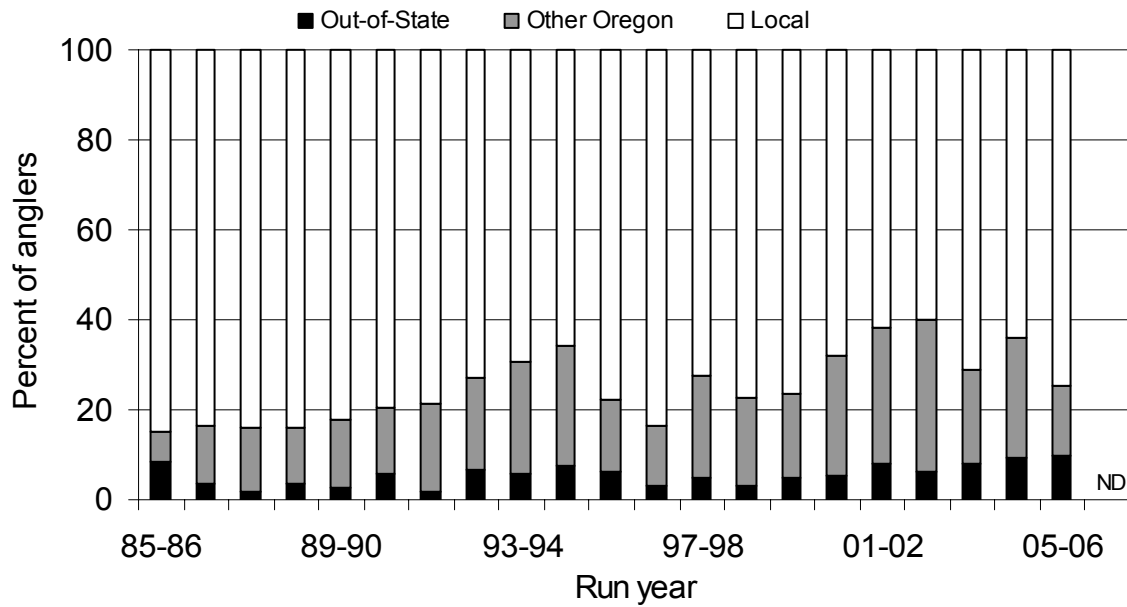


Figure 10. Percent of local resident anglers (Union or Wallowa county residents), non-local Oregon resident anglers, and out-of-state anglers that fished in summer steelhead fisheries in the Grande Ronde and Imnaha river basins for the 1985-86 to 2005-06 run years. ND indicates not determined until statewide annual harvest card data become available.

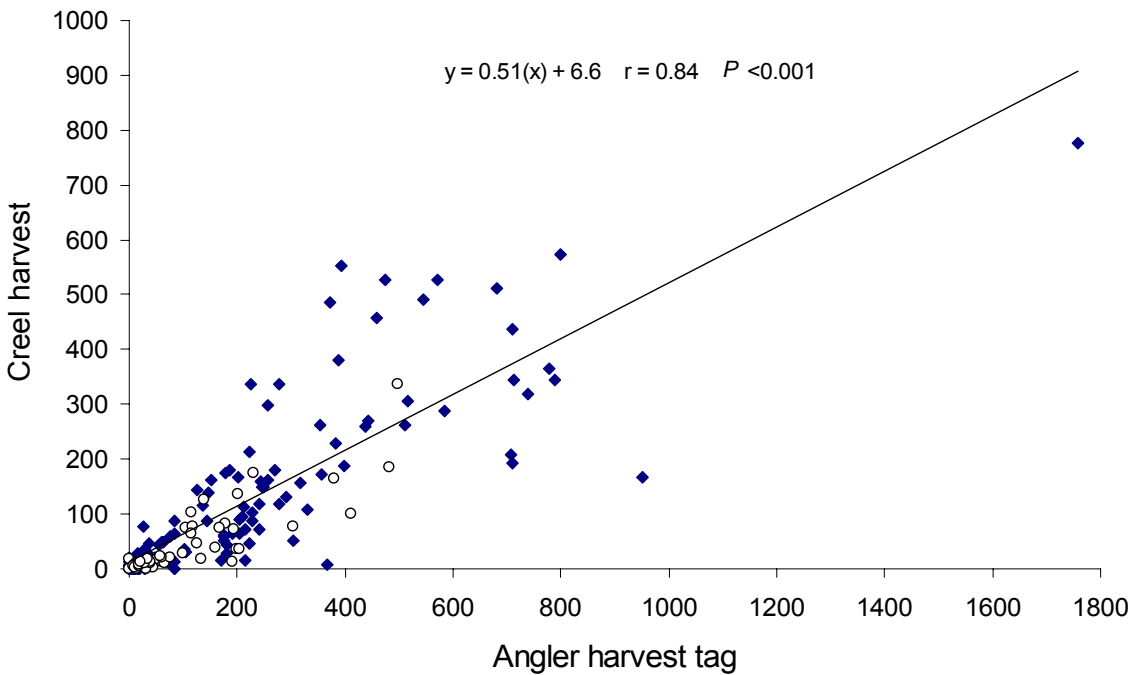


Figure 11. Relation between angler harvest tag (punch card) and creel survey harvest for summer steelhead fisheries in the Grande Ronde (◆) and Imnaha (○) river basins for years when harvest estimates for specific reaches were available (1993-1996 for the upper Grande Ronde and Wallowa, 1994-1995 for Rondowa, 1992-1993 for Catherine Creek, 1993-spring 2006 for the lower Grande Ronde, and 1986-1996, 1999 to 2006 for the Imnaha fishery areas).

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## **APPENDIX A**

Fishery Statistics for the 2006-07 run year

Appendix Table A-1. Fishery statistics for summer steelhead on the lower Grande Ronde River during the 2006-07 run year. Statistics include mean estimates  $\pm$ 95% confidence intervals. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour.

Month, day type	Sample size		Total Hours	Total Catch	Total harvest	Catch rate		Angler days
	Days	Anglers				fish/h	h/fish	
September:								
Weekday	6	16	342 $\pm$ 197	7 $\pm$ 8	0	0.021 $\pm$ 0.023	48 $\pm$ 53	48 $\pm$ 28
Weekend	5	29	549 $\pm$ 160	33 $\pm$ 46	20 $\pm$ 30	0.060 $\pm$ 0.084	17 $\pm$ 24	74 $\pm$ 22
Total	11	45	891 $\pm$ 254	40 $\pm$ 47	20 $\pm$ 30	0.045 $\pm$ 0.052	22 $\pm$ 25	122 $\pm$ 35
October:								
Weekday	7	55	3343 $\pm$ 1510	456 $\pm$ 85	136 $\pm$ 100	0.137 $\pm$ 0.025	7 $\pm$ 1	699 $\pm$ 316
Weekend	5	50	2621 $\pm$ 664	196 $\pm$ 91	74 $\pm$ 54	0.075 $\pm$ 0.035	13 $\pm$ 6	386 $\pm$ 98
Total	12	105	5964 $\pm$ 1650	652 $\pm$ 125	210 $\pm$ 114	0.109 $\pm$ 0.021	9 $\pm$ 2	1085 $\pm$ 300
November:								
Weekday	6	27	1535 $\pm$ 1268	176 $\pm$ 336	104 $\pm$ 199	0.114 $\pm$ 0.219	9 $\pm$ 17	252 $\pm$ 208
Weekend	5	72	1726 $\pm$ 215	398 $\pm$ 156	152 $\pm$ 97	0.231 $\pm$ 0.090	4 $\pm$ 2	271 $\pm$ 34
Total	11	99	3261 $\pm$ 1286	574 $\pm$ 370	256 $\pm$ 221	0.176 $\pm$ 0.114	6 $\pm$ 4	523 $\pm$ 206
December:								
Weekday	6	32	699 $\pm$ 419	183 $\pm$ 120	90 $\pm$ 73	0.262 $\pm$ 0.171	4 $\pm$ 3	120 $\pm$ 72
Weekend	6	41	579 $\pm$ 172	97 $\pm$ 44	34 $\pm$ 25	0.167 $\pm$ 0.076	6 $\pm$ 3	129 $\pm$ 38
Total	12	73	1278 $\pm$ 453	280 $\pm$ 128	124 $\pm$ 77	0.219 $\pm$ 0.100	5 $\pm$ 2	249 $\pm$ 88
January:								
Weekday	7	40	846 $\pm$ 351	370 $\pm$ 122	135 $\pm$ 69	0.438 $\pm$ 0.145	2 $\pm$ 1	140 $\pm$ 58
Weekend	5	51	540 $\pm$ 229	90 $\pm$ 46	46 $\pm$ 26	0.166 $\pm$ 0.086	6 $\pm$ 3	99 $\pm$ 42
Total	12	91	1386 $\pm$ 419	460 $\pm$ 131	181 $\pm$ 74	0.332 $\pm$ 0.094	3 $\pm$ 1	239 $\pm$ 72
February:								
Weekday	6	35	984 $\pm$ 669	228 $\pm$ 154	114 $\pm$ 87	0.231 $\pm$ 0.146	4 $\pm$ 3	197 $\pm$ 134
Weekend	5	46	795 $\pm$ 404	40 $\pm$ 33	12 $\pm$ 14	0.051 $\pm$ 0.041	20 $\pm$ 16	121 $\pm$ 61
Total	11	81	1779 $\pm$ 782	268 $\pm$ 158	126 $\pm$ 88	0.151 $\pm$ 0.083	7 $\pm$ 4	318 $\pm$ 140
March:								
Weekday	7	43	902 $\pm$ 510	124 $\pm$ 113	53 $\pm$ 50	0.137 $\pm$ 0.123	7 $\pm$ 6	161 $\pm$ 91
Weekend	5	30	497 $\pm$ 452	33 $\pm$ 30	29 $\pm$ 29	0.066 $\pm$ 0.060	15 $\pm$ 14	79 $\pm$ 72
Total	12	73	1399 $\pm$ 681	157 $\pm$ 117	82 $\pm$ 58	0.112 $\pm$ 0.082	9 $\pm$ 7	240 $\pm$ 117
April:								
Weekday	4	6	128 $\pm$ 169	8 $\pm$ 67	0	0.064 $\pm$ 0.518	16 $\pm$ 130	22 $\pm$ 29
Weekend	2	9	121 $\pm$ 12	15 $\pm$ 10	0	0.124 $\pm$ 0.086	8 $\pm$ 6	24 $\pm$ 2
Total	6	15	249 $\pm$ 170	23 $\pm$ 67	0	0.093 $\pm$ 0.271	11 $\pm$ 32	46 $\pm$ 31
Grand total	87	582	16207 $\pm$ 2434	2454 $\pm$ 481	999 $\pm$ 292	0.133 $\pm$ 0.021	8 $\pm$ 1	2822 $\pm$ 424

Appendix Table A-2. Catch rate ( $\pm 95\%$  confidence intervals) for summer steelhead at Rondowa during the 2006-07 run year. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour.

Month, day type	Sample size		Catch rate	
	Days	Anglers	fish/h	(h/fish)
February:				
Weekday	6	30	0.144 $\pm$ 0.091	7 $\pm$ 4
Weekend	4	27	0.165 $\pm$ 0.104	6 $\pm$ 4
Total	10	57	0.154 $\pm$ 0.067	7 $\pm$ 3
March:				
Weekday	7	33	0.163 $\pm$ 0.105	6 $\pm$ 4
Weekend	5	57	0.165 $\pm$ 0.063	6 $\pm$ 2
Total	12	90	0.165 $\pm$ 0.054	6 $\pm$ 2
April:				
Weekday	2	2	-	-
Weekend	3	7	0.269 $\pm$ 0.215	4 $\pm$ 3
Total	5	9	0.178 $\pm$ 0.153	6 $\pm$ 5
Grand total	27	156	0.161 $\pm$ 0.040	6 $\pm$ 2

Appendix Table A-3. Catch rate ( $\pm 95\%$  confidence intervals) for summer steelhead on the Wallowa River during the 2006-07 run year. Only adipose fin-clipped fish were harvested. "h" indicates hour.

Month, day type	Sample size		Catch rate	
	Days	Anglers	fish/h	(h/fish)
February:				
Weekday	11	160	0.075 $\pm$ 0.025	13 $\pm$ 4
Weekend	8	181	0.082 $\pm$ 0.027	12 $\pm$ 4
Total	19	341	0.078 $\pm$ 0.018	13 $\pm$ 3
March:				
Weekday	10	210	0.171 $\pm$ 0.040	6 $\pm$ 1
Weekend	8	286	0.144 $\pm$ 0.028	7 $\pm$ 1
Total	18	496	0.155 $\pm$ 0.023	6 $\pm$ 1
April:				
Weekday	4	68	0.201 $\pm$ 0.077	5 $\pm$ 2
Weekend	4	103	0.195 $\pm$ 0.045	5 $\pm$ 1
Total	8	171	0.198 $\pm$ 0.042	5 $\pm$ 1
Grand total	45	1008	0.139 $\pm$ 0.015	7 $\pm$ 1

Appendix Table A-4. Fishery statistics for summer steelhead in Section 1 (Fence Creek to town of Imnaha) of the Imnaha River during the 2006-07 run year. Statistics include mean estimates  $\pm$ 95% confidence intervals. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour.

Month, day type	Sample size		Total Hours	Total catch	Total harvest	Catch rate		Angler days
	Days	Anglers				fish/h	h/fish	
February:								
Weekday	6	4	53 $\pm$ 82	0	-	-	-	30 $\pm$ 46
Weekend	5	16	30 $\pm$ 18	4 $\pm$ 3	0	0.128 $\pm$ 0.050	8 $\pm$ 3	11 $\pm$ 7
Total	11	20	83 $\pm$ 84	4 $\pm$ 3	0	0.047 $\pm$ 0.018	21 $\pm$ 8	41 $\pm$ 41
March:								
Weekday	7	34	278 $\pm$ 211	100 $\pm$ 52	44 $\pm$ 30	0.358 $\pm$ 0.155	3 $\pm$ 1	163 $\pm$ 124
Weekend	5	37	237 $\pm$ 91	57 $\pm$ 40	14 $\pm$ 11	0.240 $\pm$ 0.113	4 $\pm$ 2	79 $\pm$ 30
Total	12	71	515 $\pm$ 229	157 $\pm$ 66	58 $\pm$ 32	0.304 $\pm$ 0.099	3 $\pm$ 1	242 $\pm$ 108
April:								
Weekday	3	13	94 $\pm$ 80	41 $\pm$ 22	16 $\pm$ 19	0.442 $\pm$ 0.128	2 $\pm$ 1	45 $\pm$ 38
Weekend	3	22	98 $\pm$ 33	17 $\pm$ 3	4 $\pm$ 2	0.170 $\pm$ 0.020	6 $\pm$ 1	44 $\pm$ 15
Total	6	35	192 $\pm$ 87	58 $\pm$ 22	20 $\pm$ 19	0.303 $\pm$ 0.064	3 $\pm$ 1	89 $\pm$ 40
Grand total	29	126	790 $\pm$ 259	219 $\pm$ 69	78 $\pm$ 37	0.277 $\pm$ 0.066	4 $\pm$ 1	372 $\pm$ 122

Appendix Table A-5. Fishery statistics for summer steelhead in Section 2 (mouth to Fence Creek) of the Imnaha River during the 2006-07 run year. Statistics include mean estimates  $\pm$ 95% confidence intervals. Only adipose fin-clipped fish were harvested. "h" indicates hour.

Month, day type	Sample size		Total Hours	Total catch	Total harvest	Catch rate		Angler days
	Days	Anglers				fish/h	h/fish	
February:								
Weekday	6	48	681 $\pm$ 479	107 $\pm$ 35	13 $\pm$ 14	0.157 $\pm$ 0.043	6 $\pm$ 2	168 $\pm$ 118
Weekend	5	88	565 $\pm$ 245	56 $\pm$ 40	19 $\pm$ 14	0.099 $\pm$ 0.044	10 $\pm$ 4	141 $\pm$ 61
Total	11	136	1246 $\pm$ 538	163 $\pm$ 53	32 $\pm$ 20	0.131 $\pm$ 0.031	8 $\pm$ 2	309 $\pm$ 133
March:								
Weekday	7	128	1498 $\pm$ 655	201 $\pm$ 78	60 $\pm$ 33	0.134 $\pm$ 0.043	7 $\pm$ 2	401 $\pm$ 175
Weekend	5	134	1020 $\pm$ 147	124 $\pm$ 54	38 $\pm$ 18	0.122 $\pm$ 0.036	8 $\pm$ 2	242 $\pm$ 35
Total	12	262	2518 $\pm$ 671	325 $\pm$ 95	98 $\pm$ 38	0.129 $\pm$ 0.029	8 $\pm$ 2	643 $\pm$ 171
April:								
Weekday	3	13	151 $\pm$ 119	40 $\pm$ 7	17 $\pm$ 3	0.264 $\pm$ 0.039	4 $\pm$ 1	43 $\pm$ 34
Weekend	3	25	149 $\pm$ 23	13 $\pm$ 9	0	0.089 $\pm$ 0.040	11 $\pm$ 5	42 $\pm$ 6
Total	6	38	300 $\pm$ 121	53 $\pm$ 12	17 $\pm$ 3	0.178 $\pm$ 0.028	6 $\pm$ 1	85 $\pm$ 34
Grand total	29	436	4064 $\pm$ 869	541 $\pm$ 110	147 $\pm$ 43	0.133 $\pm$ 0.021	8 $\pm$ 1	1037 $\pm$ 222

## APPENDIX B

### Percent of Summer Steelhead That Were Marked Hatchery Fish and Caught in 2006-07 Run Year

Appendix Table B. Percent of marked hatchery summer steelhead caught during each survey month in the Grande Ronde and Imnaha River basins during the 2006-07 run year. For the Imnaha River, percentages include catch of marked hatchery fish only. In parentheses are total catch for the Lower Grande Ronde and Imnaha rivers and sampled catch for the Upper Grande Ronde and Wallowa rivers and Rondowa. On the Imnaha River, Section 1 is from Fence Creek upstream to the town of Imnaha, and Section 2 is from the mouth upstream to Fence Creek. "-" indicates not sampled or undefined.

Creel survey area	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Lower GR River	50(40)	64(652)	63(574)	74(280)	75(460)	74(268)	59(157)	0(23)
Rondowa	-	-	-	-	-	78(51)	83(84)	67(9)
Wallowa River	-	-	-	-	-	77(110)	86(348)	84(159)
Imnaha River (Section 1)	-	-	-	-	-	0(4)	44(157)	34(58)
Imnaha River (Section 2)	-	-	-	-	-	38(163)	38(325)	42(53)

## **APPENDIX C**

Fishery Statistics for Spring Fisheries for the 2005-06 Run Year

Appendix Table C-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 2005-06 run year. Total harvest = 0.511 (harvest card) + 6.644. 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 code, statistics, tag code	Fishery statistics and number of tags recovered by month									Expanded tags <sup>a</sup>
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total	
Upper Grande Ronde (233)										
Angler harvest cards	0	0	0	0	15	0	4	0		
Total harvest	-	-	-	-	14	-	9	-	23	
Catherine Creek (120)										
Angler harvest cards	0	0	0	0	0	0	0	0		
Total harvest	-	-	-	-	-	-	-	-	0	
Rondowa (234)										
Angler harvest cards	0	7	18	0	436	1118	1503	103		
Sampled fish	0	0	0	0	0	51	87	0		
Total harvest	-	10	16	-	229	578	775	59	1667	
Sample rate expansion	-	-	-	-	-	11.3	8.9	-		
09 36 30						1	1	0	2	20
09 36 31						3	0	0	3	34
09 36 32						0	1	0	1	9
09 39 14						0	1	0	1	9
09 39 15						1	1	0	2	20
09 39 17						0	1	0	1	9
63 15 28						0	1	0	1	9
Wallowa (235)										
Angler harvest cards	4	0	11	0	136	645	1694	638		
Sampled fish	0	0	0	0	0	163	275	81		
Total harvest	9	-	12	-	76	336	872	333	1638	
Sample rate expansion	-	-	-	-	-	2.1	3.2	4.1		
09 36 30						1	0	0	1.0	2
09 36 31						3	6.0	1	10.0	29
09 36 32						3	3.3	0	6.3	16
09 36 33						4	6.0	0	10.0	27
09 39 14						1	4.0	1	6.0	19
09 39 15						2	3.0	5	10.0	35
09 39 16						0	1.1	0	1.1	3
09 39 17						1	3.0	2	6.0	20
Wenaha (184)										
Angler harvest cards	0	4	0	0	0	7	0	7		
Total harvest	-	9	-	-	-	10	-	10	29	
Middle Grande Ronde (232)										
Angler harvest cards	0	21	39	4	33	194	279	0		
Total harvest	-	17	27	9	24	106	149	-	332	
Total Grande Ronde harvest (excluding lower Grande Ronde)									3689	

<sup>a</sup> For Wallowa, two lost coded-wire tags expanded for in March.

Appendix Table C-2. Estimated catch of summer steelhead in spring fisheries in the Grande Ronde basin for the 2005-06 run year. Total catch = (sampled catch/sample 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 <sup>a</sup> , statistics	Fishery statistics by month								
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
Upper Grande Ronde									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	-	-	-	14	-	9	-	23
Total catch	-	-	-	-	25	-	17	-	42
Catherine Creek									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	-	-	-	-	-	-	-	0
Total catch	-	-	-	-	-	-	-	-	0
Rondowa									
Sampled harvest	-	-	-	-	-	51	87	-	138
Sampled catch	-	-	-	-	-	182	208	-	390
Total harvest	-	10	16	-	229	578	775	59	1667
Total catch	-	28	45	-	647	2063	1853	167	4803
Wallowa									
Sampled harvest	-	-	-	-	-	163	275	81	519
Sampled catch	-	-	-	-	-	290	521	133	944
Total harvest	9	-	12	-	76	336	872	333	1638
Total catch	16	-	22	-	138	598	1652	547	2973
Wenaha									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	9	-	-	-	10	-	10	29
Total catch	-	28	-	-	-	23	-	28	79
Middle Grande Ronde									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	17	27	9	24	106	149	-	332
Total catch	-	31	49	16	44	189	282	-	611
Total Grande Ronde catch (excluding lower Grande Ronde)									8508

<sup>a</sup> Wallowa data were used for the upper Grande Ronde, middle Grande Ronde, and Catherine Creek; lower Grande Ronde data, in Flesher et al. 2008b, were used for the Wenaha.



Appendix Table C-3. Estimated angler effort (hours) for summer steelhead in spring fisheries in the Grande Ronde basin for the 2005-06 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 <sup>a</sup> , statistics	Fishery statistics by month								
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
Upper Grande Ronde									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	-	-	-	25	-	17	-	42
Angler effort	-	-	-	-	172	-	108	-	280
Catherine Creek									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	-	-	-	-	-	-	-	0
Angler effort	-	-	-	-	-	-	-	-	0
Rondowa									
Catch rate	-	-	-	-	-	0.593	0.438	-	0.493
Total catch	-	28	45	-	647	2063	1853	167	4803
Angler effort	-	57	91	-	1312	3479	4231	339	9509
Wallowa									
Catch rate	-	-	-	-	-	0.147	0.157	0.111	0.145
Total catch	16	-	22	-	138	598	1652	547	2973
Angler effort	110	-	152	-	952	4068	10522	4928	20732
Wenaha									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	28	-	-	-	23	-	28	79
Angler effort	-	231	-	-	-	53	-	134	418
Middle Grande Ronde									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	31	49	16	44	189	282	-	611
Angler effort	-	214	338	110	303	1286	1796	-	4047
Upper Grande Ronde									
Total Grande Ronde angler effort (excluding lower Grande Ronde)									34986

<sup>a</sup> Wallowa data were used for the upper Grande Ronde, middle Grande Ronde, and Catherine Creek; lower Grande Ronde data, in Flesher et al. 2008b, were used for the Wenaha.

## APPENDIX D

### Summary of Recycled Steelhead for the 2006-07 Run Year

Appendix Table D. Summary of adult steelhead recycled back to the Wallowa River fishery from the Big Canyon Facility for the 2006-07 run year. “-“ indicates not sampled or undefined.

Date of release, Percent of Of release	Location and number of fish <sup>a</sup>						Total	Percent of Release
	Upstream		Downstream		Subtotal			
	M	F	M	F	M	F		
	Released							
16 March 2007	5	10	22	13	27	23	50	
23 March 2007	0	0	8	10	8	10	18	
6 April 2007	0	0	6	15	6	15	21	
Subtotal	5	10	36	38				
Total	15		74		41	48	89	
	Recaptured at Big Canyon <sup>b</sup>							
16 March 2007	3	2	3	3	6	5	11	22%
23 March 2007	-	-	5	3	5	3	8	44%
6 April 2007	-	-	4	3	4	3	7	33%
Subtotal	3	2	12	9				
Total	5		21		15	11	26	29%
% of release	33%		28%		37%	23%		
	Observed and estimated (in parentheses) harvest <sup>c</sup>							
16 March 2007	0	0	5(14)	1(3)	5(14)	1(3)	6(17)	34%
23 March 2007	-	-	0	1(3)	0	1(3)	1(3)	17%
6 April 2007	-	-	1(3)	0	1(3)	0	1(3)	14%
Subtotal	0	0	6(17)	2(6)				
Total	0		8(23)		6(17)	2(6)	8(23)	26%
% of release	0%		31%		41%	13%		
	Total recovered (Big Canyon + estimated harvest)							
16 March 2007	3	2	17	6	20	8	28	56%
23 March 2007	-	-	5	6	5	6	11	61%
6 April 2007	-	-	7	3	7	3	10	48%
Subtotal	3	2	29	15				
Total	5		44		32	17	49	55%
% of release	33%		59%		78%	35%		

<sup>a</sup> Release sites 6.4 km upstream and 1.6 km downstream of Deer Creek (Rkm 18) on the Wallowa River.

<sup>b</sup> Recaptures of recycled fish were euthanized.

<sup>c</sup> Expanded for unsampled fish kept by sampled anglers, unsampled anglers on sample days and unsampled days.