LOWER SNAKE RIVER COMPENSATION PLAN:
Summer Steelhead Creel Surveys on the Grande Ronde, Wallowa, and Imnaha Rivers for the 2011-12 Run Year

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OREGON
Fish & Wildlife

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This report is available at: http://www.fws.gov/lsnakecomplan/reports/ODFWreports.html

Front cover photo: Looking downstream on the lower Grande Ronde River from the Troy, OR foot bridge, during late October 2011.

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PREFACE

This report is for the funding period 1 October 2011 to 30 September 2012. The sampling period was from 1 September 2011 to 15 April 2012. 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 2011-2012 run year were primarily from the 2008 and 2009 brood years. Results of creel surveys conducted prior to fall 2011 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, 2008b, 2009, 2010, 2011, 2012, and 2013), 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 2011 to 15 April 2012 in the Grande Ronde and Imnaha river basins.

ACKNOWLEDGMENTS

We would like to thank Mary Buckman for the statistical design and analysis of the data, Andy VanSickle and Brad Smith for their dedication in conducting the surveys, and Steve Yundt for reviewing the document. We would also like to thank Joe Bumgarner (Washington Department of Fish and Wildlife) for coordinating and Adam Reinhardt for conducting the Lower Grande Ronde survey during spring 2012. 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

In the 2011-12 run year, estimated angler effort (20,724 hrs) was higher than the average (approx. 15,000 hrs) recorded since surveys began in 1985 on the lower Grande Ronde River; however, on the Imnaha River effort (3,647 hrs) was below average (4,205 hrs). Total catch estimates became available for run year 2010-11, and they were well above average on both the lower Grande Ronde River and the Imnaha rivers, as was catch and release of wild steelhead on the lower Grande Ronde. Fifty-five percent of the catch on the lower Grande Ronde were wild fish that were subsequently released. On the Imnaha River the number of wild steelhead caught and released is unknown due to unmarked hatchery returns in recent years, although the number of unmarked hatchery and wild steelhead released was about average. On the lower Grande Ronde River we estimate that 1,427 hatchery steelhead were harvested, whereas 126 hatchery steelhead were harvested in the Imnaha River fishery.

This report includes angler harvest card data for the Wallowa River and Rondowa survey areas for the 2010-11 run year, summarized in the appendices. Based on creel and harvest card data, harvest was 3,355 fish and total catch was 6,702 fish. Wild fish comprised 18% and 26% of the respective Wallowa and Rondowa catch, which was similar to previous years.

In every Grande Ronde basin fishery surveyed, catch rates during the 2011-12 run year were nearly as good as the record setting 2009-10 run year (range: 3 – 6 hrs/fish), and were much better than the overall management goal of 10 hours per fish. On the Imnaha River, catch rates were 8 hrs/fish; the poorest rates since 1999-00.

Anglers harvested more one-ocean than two-ocean hatchery steelhead in every Grande Ronde and Imnaha fishery except at Rondowa, where the proportions were equal. More female steelhead were harvested in every fishery but the Wallowa River fishery. The percent of local resident anglers participating in summer steelhead fisheries was similar in Grande Ronde and Imnaha basin fisheries compared to the previous year except for Rondowa, which had a higher percent of local resident anglers. As is typical, the Imnaha River had a higher percent of local anglers compared to Grande Ronde basin fisheries.

For the third consecutive year, our creel surveyors scanned with a handheld wand detector all harvested steelhead adults to detect coded-wire tags, but we have yet to detect a stray adipose (Ad) -clipped adult. In the Imnaha River creel our surveyor did not recover any coded-wire tags from out of basin strays.

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 2007, 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 is expected to increase smolt-to-adult survival, and due to a reduction of Imnaha stock Big Sheep direct stream releases. In 2009, smolt releases were reduced again to approximately 1.015 million, due to reductions in releases of Imnaha stock into Big Sheep Creek. Released smolts 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 being 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 2011 and the spring of 2012 in the Grande Ronde and Imnaha river basins. In addition, this report contains estimates of total effort, catch, and harvest for all the spring fisheries in the Grande Ronde river basin, information that was not available for inclusion in the 2010-11 annual report. 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. As in recent years, the 2011-12 steelhead angling season in the Grande Ronde and Imnaha river basins was open from 1 September 2011 to 15 April 2012.

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 in the Palmer Junction area, located 5.6 km upstream of Rondowa on the

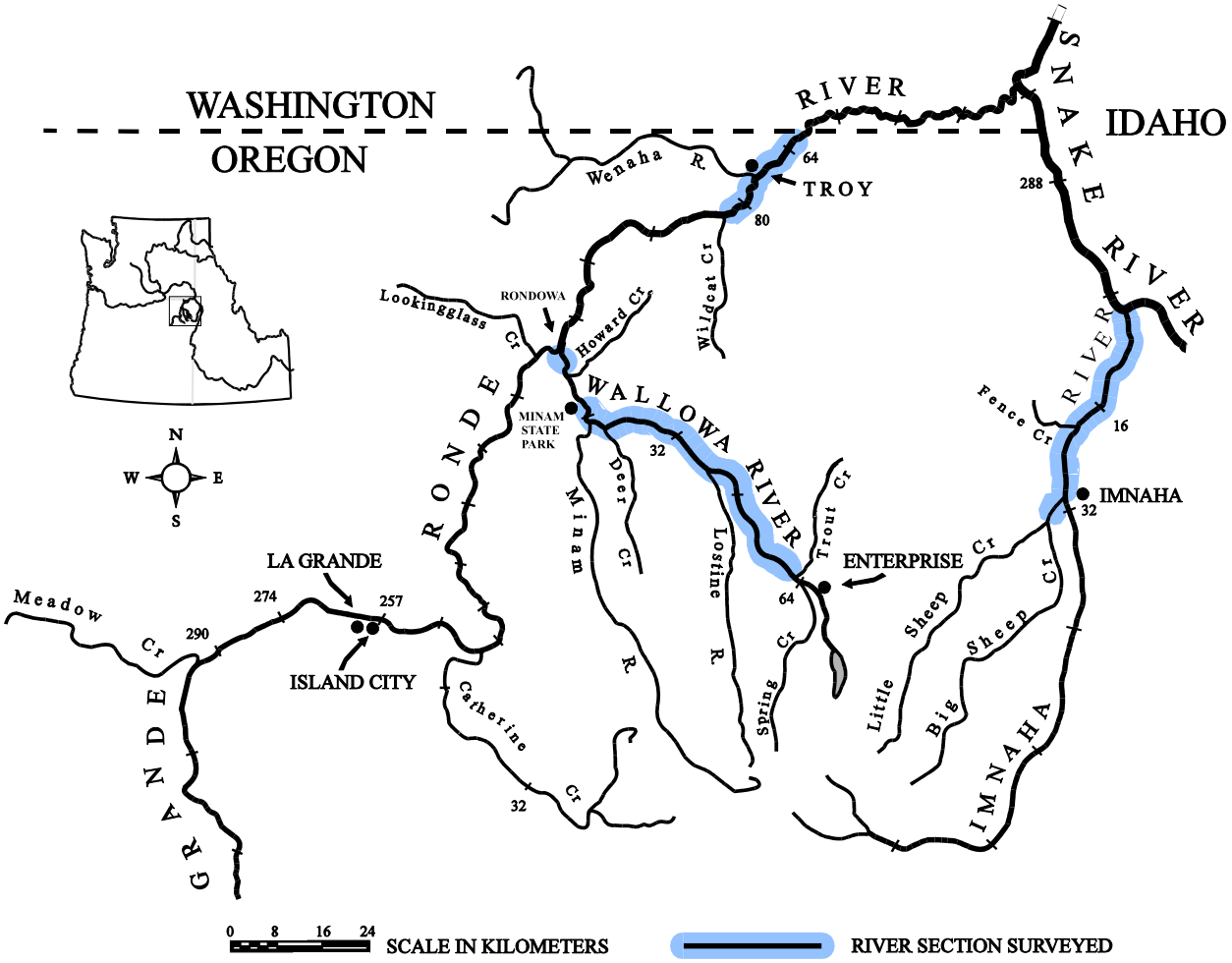

Figure 1. Map of northeastern Oregon showing where summer steelhead creel surveys were conducted in the Grande Ronde and Imnaha river basins during the 2011-12 run year.

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 near 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, and beginning in 2010, on the lower 5 km section of Big Sheep Creek from the mouth upstream to Little Sheep Creek (Rkm 5, Figure 1).

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 to 8 December 2011 and from 14 December 2011 to 15 April 2012. The survey was not conducted from 9-13 December 2011 because there was no angling effort due to the river freezing over within the survey area. Our goal was to sample 50**%** of the weekends and holidays and 30% of the weekdays 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 a hatchery fish, as indicated by an adipose (Ad) clip, was coded-wire-tagged (CWT), as indicated by either a left or right ventral fin-clip (AdLV or AdRV) or by use of a wire detector (Northwest Marine Technology, handheld wand detector), 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 in the Imnaha basin were conducted from 1 February through 15 April 2012. For these surveys we used a check station for the Imnaha River area below Fence Creek (Rkm 23) and a roving survey in the area above Fence Creek and at Big Sheep 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 anglers were interviewed 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, then up Big Sheep Creek to the mouth of Little Sheep Creek and then 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 2012. We surveyed the Wallowa River area each sample day and surveyed the Rondowa area every other sample day. At the Wallowa River, the surveyor drove a route from Trout Creek downstream to Minam State Park, stopping to interview anglers along the way, 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 spent an hour interviewing anglers returning from Rondowa, and then repeated the sequence. For the month of February, 2012, the Smith Mountain road is closed to reduce vehicle disturbance of wildlife. Anglers also access Rondowa from the community of Palmer Junction on the Grande Ronde River, so our surveyor also went there for angler interviews. During the rest of the season, the surveyor would occasionally drive to the Palmer Junction area to check for anglers accessing Rondowa. All harvested fish observed were sampled. From 1 February to 25 February, we surveyed five days each week (Sunday – Saturday) from 0900-1800 hours. From 26 February 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, AdRV+CWT, AdRV-only, and Ad+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, percent hatchery fish in the catch, and the number of AdRV-only and CWT marked fish harvested. 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 cannot creel certain springtime fishery locations in the Grande Ronde basin (e.g., Catherine Creek), and on the Wallowa River and Rondowa our creel is limited to angler interviews and sampling their catch. In these instances we rely on angler harvest card data for additional information. For example, we estimate total monthly harvest by regressing angler harvest card estimates against creel survey harvest estimates for specific reaches in the Grande Ronde and Imnaha basins. The

regression is updated annually as harvest data become available. However, there is usually a one or two-year delay in obtaining final angler harvest card estimates. For this reason the current annual report has harvest estimates for run year 2010-2011. Total catch for these areas is estimated by multiplying total harvest estimates by the ratio of sampled catch to sampled harvest as determined by creel surveys. Total angler effort (hours) is total catch divided by the sample catch rate (fish/ hour).

Figures 8, 9, 10, and 11, and Table 6 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 2012, hatchery adult returns were recycled from the Big Canyon Facility back into the Wallowa River fishery, using methodology described by Flesher et al. (2007). Between 9 March and 30 March 2012, 95 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 1.6 Rkm below 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. When creeling occurred after a recycled steelhead release our surveyor checked harvested fish for opercle punches.

ACCOMPLISHMENTS AND FINDINGS

On the lower Grande Ronde River from 1 September to 8 December 2011 and from 14 December 2011 to 15 April 2012, we sampled 52.8% of the weekends and holidays (38 days) and 29.8% of the weekdays (45 days) for a total of 83 sample days. On the Wallowa River from 1 February to 15 April 2012, we sampled 87.0% of the weekends and holidays (20 days) and 46.2% of the weekdays (24 days) for a total of 44 sample days. During the same time period at Rondowa, we sampled 47.8% of the weekends and holidays (11 days) and 25.0% of the weekdays (13 days) for a total of 24 sample days. On the Imnaha River and Big Sheep Creek from 1 February to 15 April 2012, we sampled 52.2% of the weekends and holidays (12 days) and 32.7% of the weekdays (17 days) for a total of 29 sample days.

We estimate that 4,174 anglers fished for 20,724 hours on the lower Grande Ronde River during the 2011-12 season. They caught and released 2,460 wild and 398 hatchery steelhead, and harvested 1,427 hatchery steelhead for an average catch rate index of 5 hours per fish (Figures 2-6, Appendix Table A-1). The percent of steelhead caught that were hatchery origin ranged from 0% in March 2012 to 50% in December 2011 (Figure 7, Appendix Table B). Fifty-nine percent of harvested hatchery steelhead spent one year in freshwater and one year in saltwater (hereafter designated 1:1), and 41% spent one year in freshwater and two years in saltwater (designated 1:2, Table 1). Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 586

(±5) mm for age 1:1, and 682 (±8) mm for age 1:2 (Table 1). Gender composition was 43% male and 57% female (Table 1). Fifty-four percent of the anglers on the lower Grande Ronde River were local Oregon resident anglers, 28% were non-local Oregon resident anglers, 5% were Washington State residents and 13% resided outside the states of Oregon and Washington (Table 2). On the lower Grande Ronde River, anglers harvested an estimated 566 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's hatchery release site at the Cottonwood Conditioning Pond on the lower Grande Ronde River (Table 3).

At Rondowa, the catch rate index averaged 3 hours per fish (Figure 4, Appendix Table A-2). The percent of steelhead caught that were hatchery origin ranged from 72% in March to 80% in February (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 50% 1:1 and 50% 1:2 (Table 1). Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 577 (±9) mm for age 1:1 and 678 (±12) mm for age 1:2 (Table 1). Gender composition was 20% male and 80% female (Table 1). Eighty-one percent of the anglers at Rondowa were local Oregon resident anglers, and 19% were non-local Oregon resident anglers (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 card data become available, as reported in Table 3.

On the Wallowa River, the catch rate index averaged 6 hours per fish (Figure 4, Appendix Table A-3). The percent of steelhead caught that were hatchery origin ranged from 47% in April to 84% in February (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 59% 1:1, and 40% 1:2, and 1% spent two years in freshwater and one year in saltwater (designated 2:1; Table 1). Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 586 (±4) mm for age 1:1, 680 (±6) mm for age 1:2, and 583 (±0) mm for age 2:1 (Table 1). Gender composition was 53% male and 47% female (Table 1). Sixty-three percent of the anglers on the Wallowa River were local Oregon residents, 33% were non-local Oregon residents, 2% were Washington State residents and 2% resided outside the states of Oregon and Washington (Table 2). On the Wallowa River, anglers harvested 132 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 card data become available.

On the Imnaha River and Big Sheep Creek, we estimate that 1,174 anglers fished for 3,729 hours. They caught and released 238 unmarked (wild and hatchery) and 71 hatchery steelhead, and harvested 126 hatchery steelhead for an average catch rate index of 8 hours per fish (Figures 2-6, Appendix Tables A-4, A-5, and A-6). The percent of steelhead caught that were known hatchery origin ranged from 23% in April in Section 2 (mouth upstream to Fence Creek) to 100% in February in Section 1 (Fence Creek upstream to Big Sheep Creek, Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 77% 1:1 and 23% 1:2 (Table 1). Mean fork length

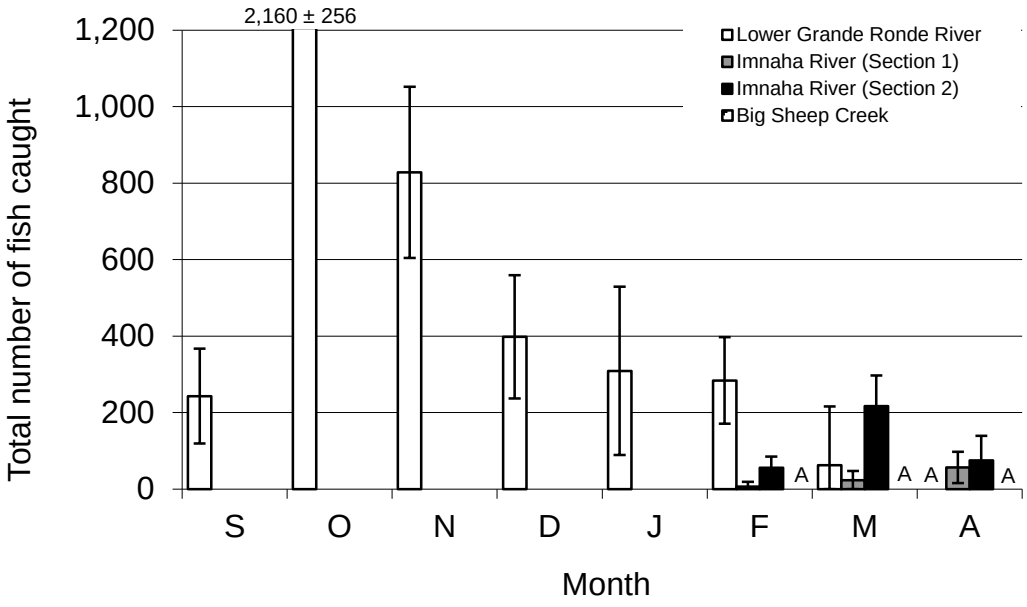

Figure 2. Estimated total catch of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, two sections of the Imnaha River, and Big Sheep Creek during the 2011-12 run year. "A" indicates no anglers. Surveys were conducted from 1 September 2011 to 15 April 2012 on the lower Grande Ronde River, and from 1 February to 15 April 2012 on the Imnaha River and Big Sheep Creek.

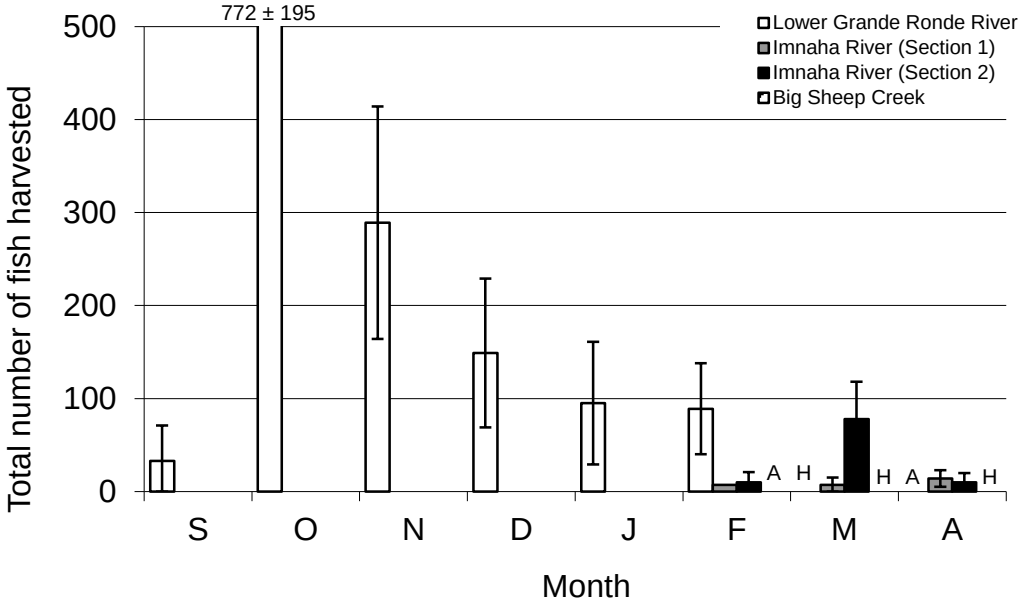

Figure 3. Estimated total harvest of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, two sections of the Imnaha River, and Big Sheep Creek during the 2011-12 run year. "A" indicates no anglers and "H" indicates no harvest. Surveys were conducted from 1 September 2011 to 15 April 2012 on the lower Grande Ronde River, and from 1 February to 15 April 2012 on the Imnaha River and Big Sheep Creek.

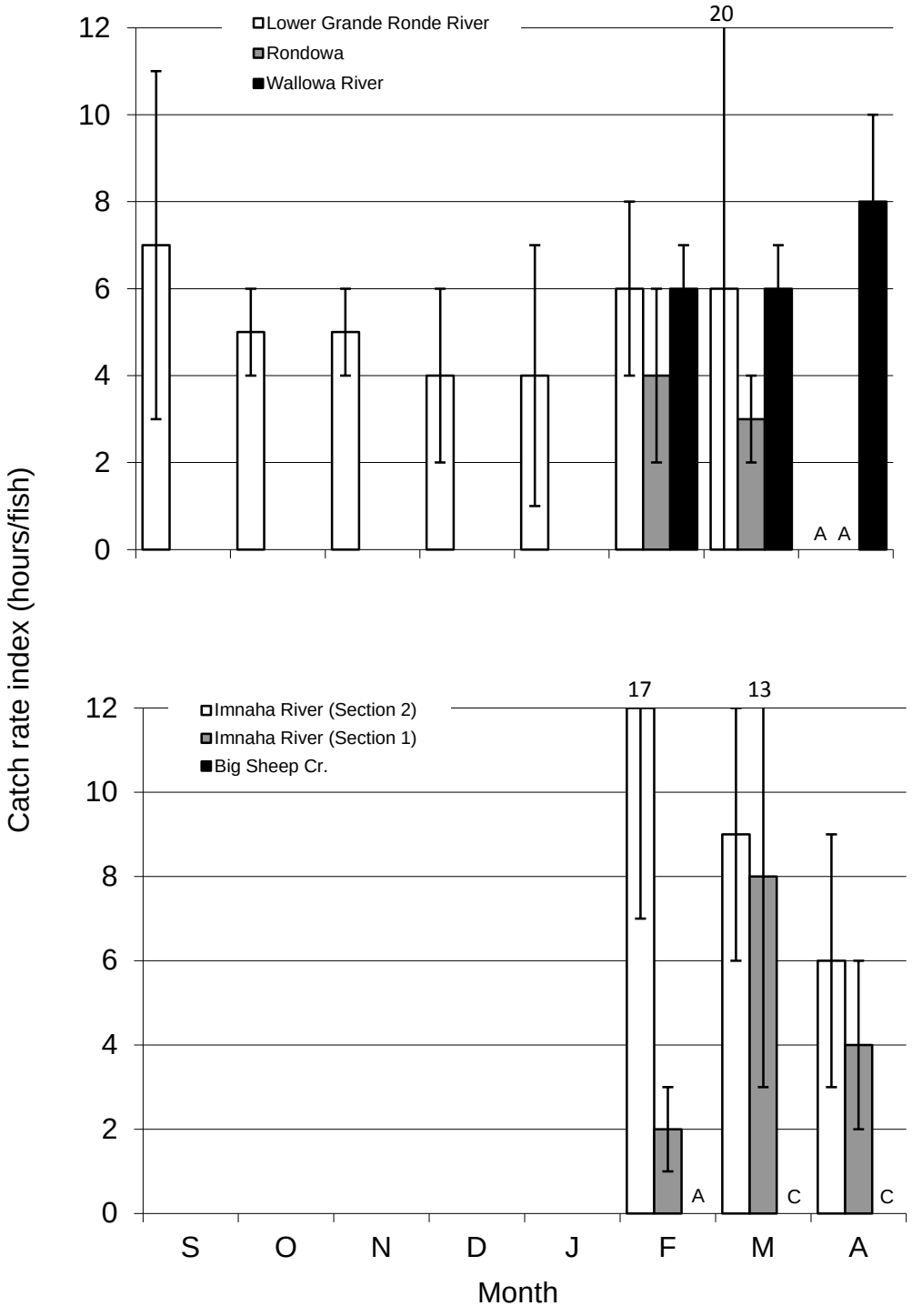

Figure 4. Estimated catch rate index (hours/fish) for summer steelhead (vertical bars show 95% confidence intervals) in the Grande Ronde and Imnaha river basins during the 2011-12 run year. "A" indicates no anglers and "C" indicates no catch. Survey areas and times include the lower Grande Ronde River (1 September 2011 – 15 April 2012), and Rondowa, Wallowa River, two sections of the Imnaha River, and Big Sheep Creek (1 February – 15 April 2012). Note: A lower catch rate index implies better angling success.

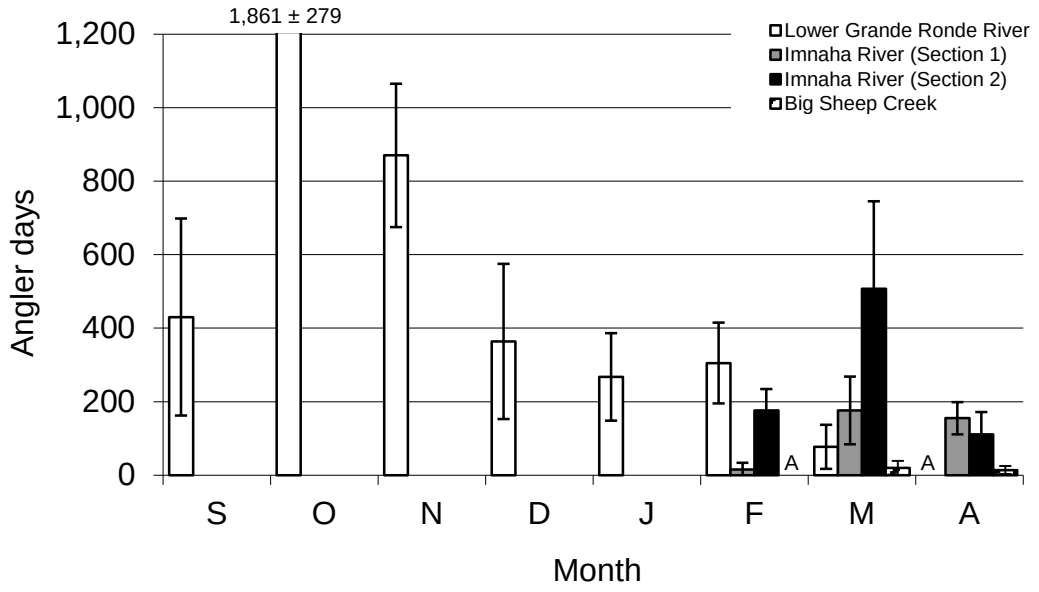

Figure 5. Estimated number of angler days for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, two sections of the Imnaha River, and Big Sheep Creek during the 2011-12 run year. "A" indicates no anglers. Surveys were conducted from 1 September 2011 to 15 April 2012 on the lower Grande Ronde River, and from 1 February to 15 April 2012 on the Imnaha River and Big Sheep Creek.

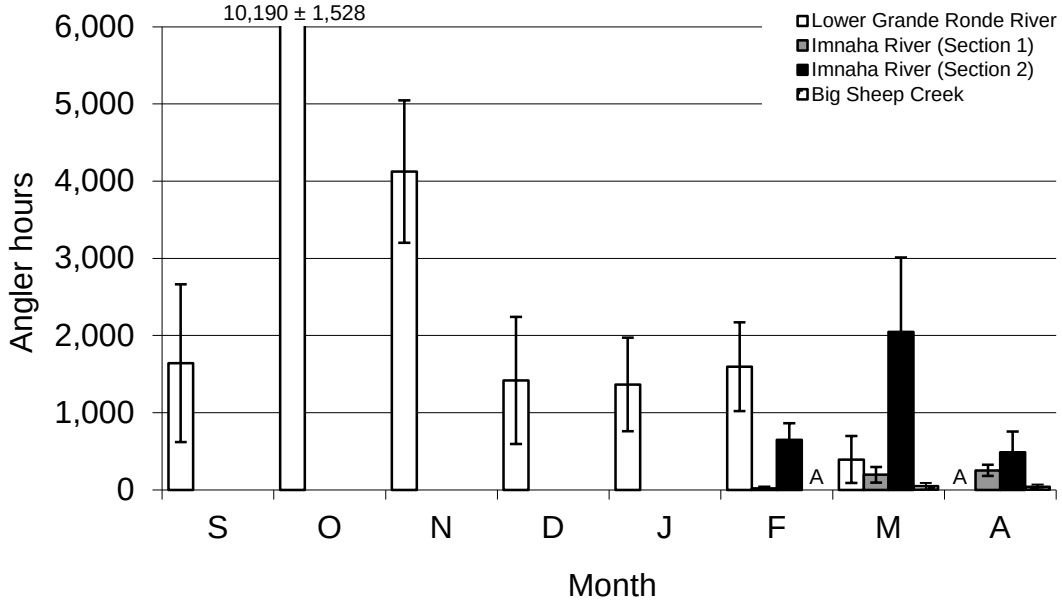

Figure 6. Estimated number of angler hours for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, two sections of the Imnaha River, and Big Sheep Creek during the 2011-12 run year. "A" indicates no anglers. Surveys were conducted from 1 September 2011 to 15 April 2012 on the lower Grande Ronde River, and from 1 February to 15 April 2012 on the Imnaha River and Big Sheep Creek.

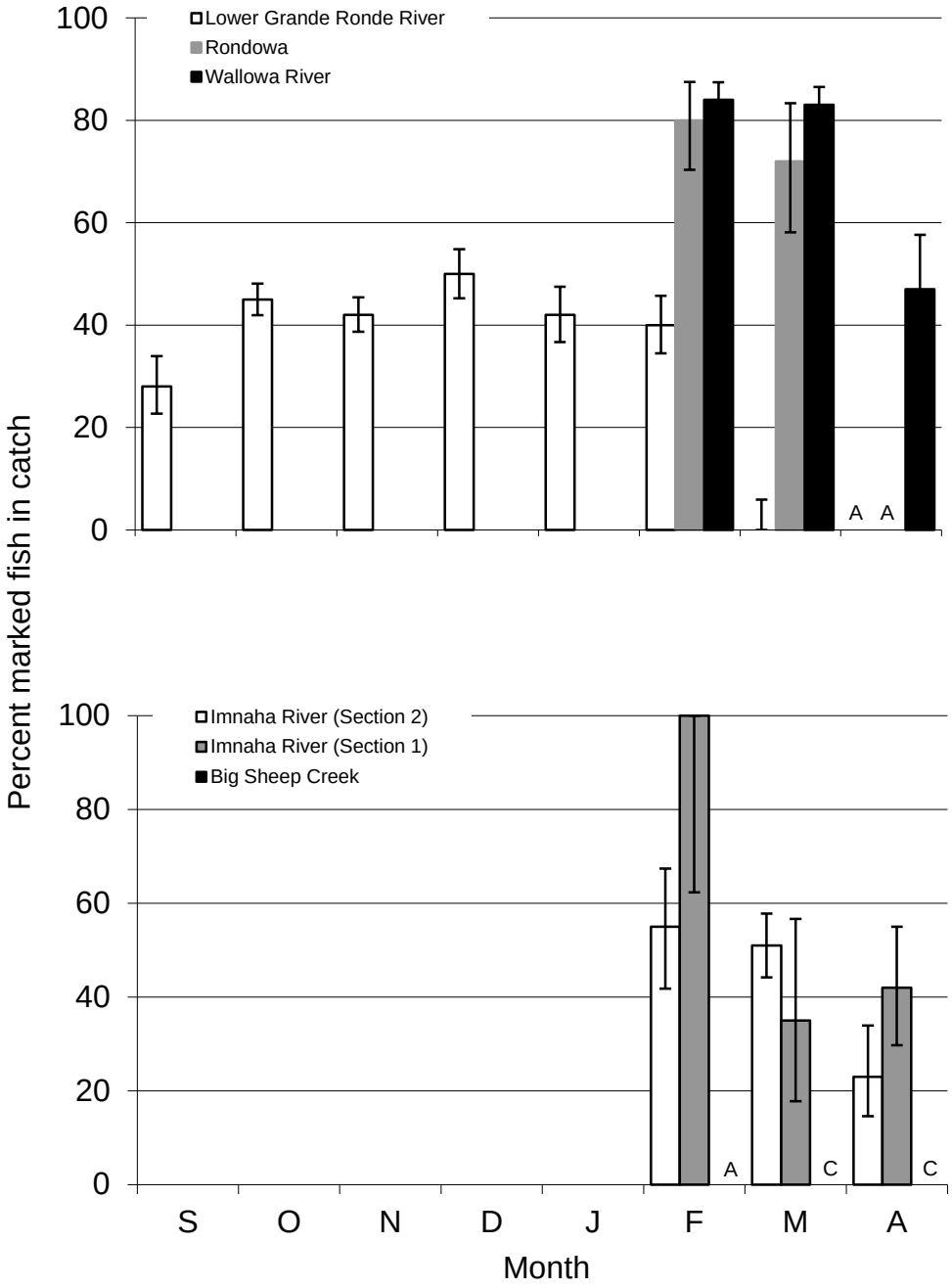

Figure 7. Estimated percent of summer steelhead caught (vertical bars show 95% confidence intervals; using a binomial distribution) in the Grande Ronde and Imnaha river basins during the 2011-12 run year that were marked. "A" indicates no anglers and "C" indicates no catch. In the Grande Ronde basin all unmarked fish were wild, whereas in the Imnaha basin unmarked fish were of both wild and hatchery origin. Survey areas and times include the lower Grande Ronde River (1 September 2011 – 15 April 2012), and Rondowa, Wallowa River, two sections of the Imnaha River, and Big Sheep Creek (1 February - 15 April 2012).

Table 1. Percent age composition and mean fork length (± 95% confidence intervals) of hatchery summer steelhead sampled in creel surveys in the Grande Ronde and Imnaha river basins during the 2011-12 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 2012 and Little Sheep Creek Facility (for the Imnaha River basin including the Imnaha River and Big Sheep Creek) in 2011 and 2012. Age is expressed as years spent in freshwater prior to ocean migration:years spent in the ocean prior to spawning migration. "-" indicates not sampled or undefined.

Creek survey	Age composition (%)				Mean fork length (mm)					
area, gender	N	1:1	1:2	2:1	N	1:1	N	1:2	N	2:1
Lower GR R.										
Males	89	78	22	0	66	591±6	19	693±17	0	-
Females	117	44	55	1	49	579±8	61	682±8	1	582
Total	206	59	41	0	115	586±5	80	682±8	1	582
Rondowa										
Males	11	82	18	0	8	584±17	2	710	0	-
Females	45	42	58	0	18	574±12	24	675±12	0	-
Total	56	50	50	0	26	577±9	26	678±12	0	-
Wallowa R.										
Males	213	78	21	1	166	589±4	45	693±12	1	583
Females	187	37	62	1	70	580±6	116	675±7	1	583
Total	400	59	40	1	236	586±4	161	680±6	2	583±0
Imnaha R. basin										
Males	13	85	15	0	7	567±37	1	700	0	-
Females	35	74	26	0	14	548±17	5	648±24	0	-
Total	48	77	23	0	21	554±15	6	657±29	0	-

Table 2. Residence of summer steelhead anglers interviewed during creel surveys in the Grande Ronde and Imnaha river basins during the 2011-12 run year. Local Oregon resident anglers were from Union and Wallowa counties.

		Percent			
Creel survey area	Number of anglers	Local Oregon resident anglers	Non-local Oregon resident anglers	Washington resident anglers	Other out-of-state anglers[a]
Lower GR River	847	54	28	5	13
Rondowa	69	81	19	0	0
Wallowa River	1,532	63	33	2	2
Imnaha River	379	74	20	0	6
Big Sheep Creek	14	72	7	0	21

Table 3. Number of AdLV+CWT or AdRV+CWT marked summer steelhead recovered during creel surveys in the Grande Ronde and Imnaha river basins during the 2011-12 run year. 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 45 80	Spring Cr.	Fall Brood/April	2008	2	14
	09 45 81	Spring Cr.	Prod./April	2008	1	10
	09 45 82	Spring Cr.	Prod./April	2008	1	10
	09 45 83	Spring Cr.	Prod./April	2008	3	29
	09 45 84	Spring Cr.	Fall Brood/April	2008	2	17
	09 45 85	Spring Cr.	Fall Brood/April	2008	6	42
	09 45 86	Spring Cr.	Fall B./Vol./May	2008	4	31
	09 45 88	Spring Cr.	Prod./Vol./May	2008	2	13
	09 45 89	Deer Cr.	Volitional/May	2008	1	9
	09 46 71	Spring Cr.	Fall Brood/April	2009	3	20
	09 46 72	Spring Cr.	Prod./April	2009	10	80
	09 46 73	Spring Cr.	Prod./April	2009	6	43
	09 46 74	Spring Cr.	Prod./April	2009	8	53
	09 46 75	Spring Cr.	Fall Brood/April	2009	2	13
	09 46 76	Spring Cr.	Fall Brood/April	2009	6	49
	09 46 77	Spring Cr.	Fall Brood/April	2009	2	14
	09 46 78	Spring Cr.	Prod./April	2009	5	38
	09 46 79	Deer Cr.	Volitional/May	2009	5	29
	09 46 80	Deer Cr.	Prod./April	2009	6	52
	63 46 82	-	WDFW[c]	2008	1	4
Wallowa River	09 45 80	Spring Cr.	Fall Brood/April	2008	4	ND
	09 45 81	Spring Cr.	Prod./April	2008	4	ND
	09 45 82	Spring Cr.	Prod./April	2008	2	ND
	09 45 83	Spring Cr.	Prod./April	2008	2	ND
	09 45 84	Spring Cr.	Fall Brood/April	2008	2	ND
	09 45 85	Spring Cr.	Fall Brood/April	2008	5	ND
	09 45 86	Spring Cr.	Fall B./Vol./May	2008	6	ND
	09 45 87	Deer Cr.	Prod./April	2008	7	ND
	09 45 88	Spring Cr.	Prod./Vol./May	2008	3	ND
	09 45 89	Deer Cr.	Volitional/May	2008	8	ND
	09 46 71	Spring Cr.	Fall Brood/April	2009	2	ND
	09 46 72	Spring Cr.	Prod./April	2009	14	ND
	09 46 73	Spring Cr.	Prod./April	2009	8	ND
	09 46 74	Spring Cr.	Prod./April	2009	6	ND
	09 46 75	Spring Cr.	Fall Brood/April	2009	4	ND
	09 46 76	Spring Cr.	Fall Brood/April	2009	9	ND
	09 46 77	Spring Cr.	Fall Brood/April	2009	8	ND
	09 46 78	Spring Cr.	Prod./April	2009	8	ND
	09 46 79	Deer Cr.	Volitional/May	2009	15	ND
	09 46 80	Deer Cr.	Prod./April	2009	15	ND
Rondowa	09 45 80	Spring Cr.	Fall Brood/April	2008	1	ND
	09 45 84	Spring Cr.	Fall Brood/April	2008	1	ND
	09 45 87	Deer Cr.	Prod./April	2008	1	ND
	09 46 75	Spring Cr.	Fall Brood/April	2009	1	ND
	09 46 77	Spring Cr.	Fall Brood/April	2009	2	ND
	09 46 79	Deer Cr.	Volitional/May	2009	1	ND
	09 46 80	Deer Cr.	Prod./April	2009	4	ND

Table 3. Continued.

Creel survey area	Tag Code	Release site	Experimental group[a]	Brood Year	Number recovered Observed	Expanded[b]
Imnaha River	09 45 79	L. Sheep Cr.	Volitional/April	2008	1	3
	09 46 70	L. Sheep Cr.	Volitional/April	2009	3	8

[a] *Production (Prod.) and Fall Brood (Fall B.) releases are forced-released over a 24-hour period. The volitional (Vol.) releases are a current management strategy designed to help remove steelhead smolts that may residualize.*

[b] *ND indicates expansions not determined until statewide annual harvest card data become available.*

[c] *Steelhead with tag code 63 46 82 were Wallowa stock released by WDFW in 2009 in the lower Grande Ronde River at the Cottonwood Conditioning Pond, Washington.*

(±95% confidence interval) of harvested hatchery steelhead was 554 (±15) mm for age 1:1 and 657 (±29) mm for age 1:2 (Table 1). Gender was 27% male and 73% female (Table 1). Seventy-four percent of the anglers on the Imnaha River were local Oregon residents, 20% were non-local Oregon residents, and 6% resided outside the states of Oregon and Washington (Table 2). On Big Sheep Creek, 72 percent of the anglers were local Oregon residents, 7% were non-local Oregon residents, and 21% resided outside the states of Oregon and Washington (Table 2). On the Imnaha River and Big Sheep Creek, anglers harvested an estimated 11 AdLV+CWT marked steelhead from our hatchery releases (Table 3).

Angler effort on the lower Grande Ronde was the fourth highest observed since we began surveys while effort on the Imnaha was just over half of last year's estimate and only about 85% of average of the previous years (Figure 8). Harvest on the lower Grande Ronde was fifth highest since we began surveys while harvest on the Imnaha was only 60% of average of the previous years and the lowest observed in the last 10 years (Figure 9). Total catch (harvested and released) was fourth highest since surveys began on the lower Grande Ronde and was the lowest observed on the Imnaha since the 1999-2000 run year eleven years ago (Table 4). Catch and release of wild steelhead was the second highest observed on the lower Grande Ronde and the percent of wild steelhead in the total catch was the highest since surveys began. On the Imnaha, the number of unmarked hatchery and wild fish released and the percent of unmarked fish in the total catch was the lowest observed in the last eleven run years. On the Wallowa and at Rondowa, estimates of total catch are from the previous run year (2010-11), and were the third and fourth highest harvest and third and fifth highest total catch estimated since surveys began during the 1985-86 run year (Table 5). Catch and release of wild fish was the second highest estimated on the Wallowa since the mid-eighties when there were wild and unmarked hatchery fish returning, and fourth highest at Rondowa for the years that were sampled. The percent of wild fish in the catch for both Wallowa and Rondowa was similar to previous years. Catch rates were similar to the previous two years of record catch rates in all fisheries except on the Imnaha which was still higher than the 10 hours per fish management goal (Table 6). The percent of local resident anglers participating in summer steelhead fisheries was lowest on the lower Grande Ronde River and highest at Rondowa (mouth of the Wallowa River, Table 2). For the Grande Ronde and Imnaha basin fisheries as a

whole, the percent of local resident anglers has decreased while the percent of non-local and out-of-state anglers has increased since we began surveys in the 1985-86 run year (Figure 10). This trend is primarily due to an increase in the number of non-local and out-of-state anglers.

We continue to see a statistically significant linear relationship (P<0.001) between harvest estimates generated from angler harvest cards and those from our creel surveys for summer steelhead fisheries in the Grande Ronde and Imnaha river basins (Figure 11). Total harvest estimates for spring steelhead fisheries in the previous run year (2010-11) were 26 fish in the upper Grande Ronde River, 1,577 fish at Rondowa, 1,526 fish in the Wallowa River, 14 fish in the Wenaha River, and 212 fish in the middle Grande Ronde River, for a record total harvest estimate of 3,355 fish in the Grande Ronde basin, excluding the lower Grande Ronde River (Figure 9, Appendix Table C-1). We estimated 229 coded-wire-tagged fish were harvested at Rondowa, and 306 coded-wire-tagged fish were harvested in the Wallowa River in the 2010-11 run year. Total catch estimates for spring steelhead fisheries in the 2010-11 run year were 50 fish in the upper Grande Ronde River, 3,286 fish at Rondowa, 2,927 fish in the Wallowa River, 35 fish in the Wenaha River, and 404 fish in the middle Grande Ronde River, for a total catch estimate of 6,702 fish in the Grande Ronde basin, excluding the lower Grande Ronde River (Appendix Table C-2). Angler effort for the 2010-11 run year was estimated to be 212 hours in the upper Grande Ronde River, 17,438 hours at Rondowa, 12,969 hours in the Wallowa River, 228 hours in the Wenaha River, and 1,687 hours in the middle Grande Ronde River, for a total effort estimate of 32,534 hours in the Grande Ronde basin, excluding the lower Grande Ronde River (Appendix Table C-3).

Ninety-five summer steelhead were recycled to the Wallowa River fishery in 2012. Fifty-six recycled fish were recaptured at the Big Canyon Facility and an estimated 22 recycled fish were harvested in the fishery for a total estimated recovery of 78 recycled fish (Appendix Table D).

MANAGEMENT IMPLICATIONS AND RECOMMENDATIONS

The 2011-12 adult Wallowa stock steelhead return to the Lower Snake River Compensation Plan Area (7,585 adults, estimated from PIT tag detections at Lower Granite Dam) was lower than the 10-year average of 12,918. Even so, our fisheries data are indicative of good angler participation, as angler effort, harvest and total catch were above average in fisheries on the Grande Ronde River. By contrast, the Imnaha stock steelhead return was 2,723 adults, below the 10-year average run of 4,033 adults, and fishing effort and catch were also below average. Anglers on the Imnaha River are predominantly local residents, whereas a greater portion of anglers in the Grande Ronde River are not locals. Local resident anglers may be more likely to curtail their fishing activity during poor run years.

This was the third year for a fishery at Big Sheep Creek, a tributary to the Imnaha River. Although we thought that angler effort may steadily increase as anglers became aware of this newly-opened stream section, the number of angler days still remains low. In the 2011-12 run year we estimate angler effort at 82 angler hours, compared to 61 angler hours in the prior year and 266 angler hours in 2009-10. Angler effort at Big Sheep Creek was 2.2% of the total Imnaha River fishing effort this year, 2.3% of the total effort in 2010-11, and 4.0% of the total effort in 2009-10. We now wonder if fishing effort on Big Sheep Creek will not increase substantially until another large steelhead run increases fishing pressure on the mainstem Imnaha River, which in turn could motivate anglers to seek out this lightly-fished stream section.

The 2010-11 run was the third year in which our creel surveyors electronically scanned all harvested hatchery fish for coded-wire tags, which allowed us to detect wire in non-ventral-clipped adult steelhead. Since non-ventral-clipped fish that have coded-wire are usually strays from out-of-basin hatchery releases, the electronic scanning procedure will assist with identifying and quantifying stray hatchery steelhead. To date, no harvested stray steelhead with an adipose-only fin clip have been sampled in either the Grande Ronde or Imnaha basin recreational fisheries. However, in the first two years of sampling we did detect stray Wallowa stock steelhead (with a ventral clip) in the Imnaha recreational fishery and at the Little Sheep Facility. These strays were from a brood year 2007 release at Wallowa Hatchery, and they had an exceptionally high survival and a record number of returning adults. This year there were no Wallowa stock steelhead sampled in the Imnaha River creel.

Recycling adult steelhead returns to the Big Canyon Facility back into the Wallowa River for the recreational fishery in 2012 provided a small additional catch and harvest opportunity for anglers, and reduced the number of surplus adults at the facility. However, we estimate that only 82% of the fish were accounted for either by their return to the Big Canyon Facility or in the harvest. Although the percentage of recycled fish that could be accounted for was higher than normal—the average for the proceeding five years is 65.8%--any unaccounted for adults may potentially spawn in nature; thus, managers should weigh this risk against the fisheries benefits from recycling.

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 2011-12 run year will be reported in the 2012-13 annual report.

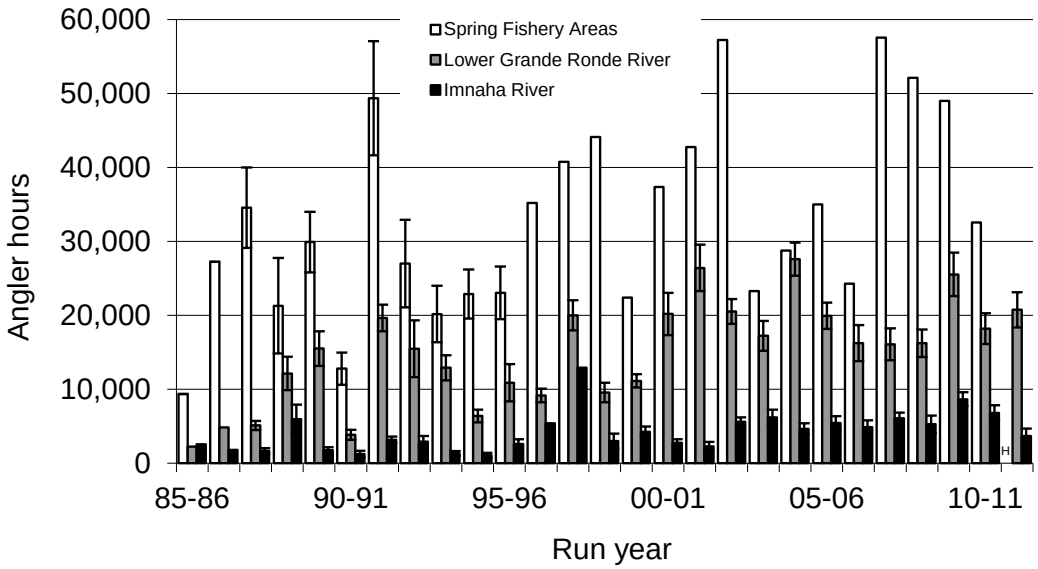

Figure 8. Angler effort (in hours) for summer steelhead in spring fishery areas (upper Grande Ronde and Wallowa rivers, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2011-12 run years. Not shown are 266, 61, and 82 angler hours on Big Sheep Creek (Imnaha basin) for the 09-10,10-11, and 11-12 run years, respectively. "H" is a value to be estimated from harvest tag data, which was not available when this report was submitted. Vertical bars are 95% confidence intervals, which are unavailable 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.

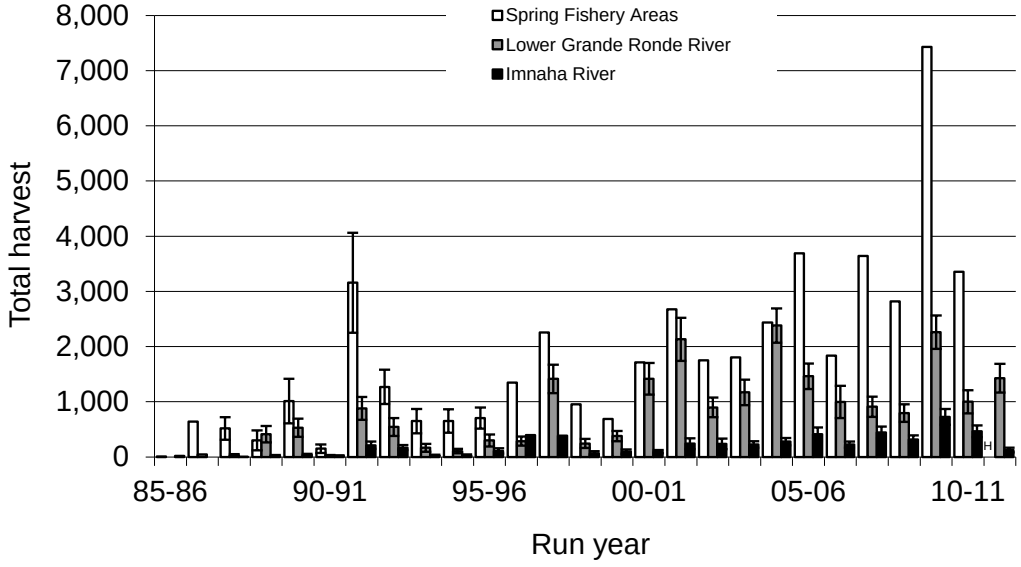

Figure 9. Number of hatchery summer steelhead harvested by recreational anglers in spring fishery areas (upper Grande Ronde and Wallowa rivers, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2010-11 run years. Not shown are 8, 0, and 0 hatchery fish harvested on Big Sheep Creek (Imnaha basin) for the 09-10, 10-11, and 11-12 run years, respectively. "H" is a value to be estimated from harvest tag data, which was not available when this report was submitted. Vertical bars are 95% confidence intervals, which are unavailable 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. Estimated total catch (harvested and released) of hatchery and wild summer steelhead from statistical angler surveys conducted on the lower Grande Ronde River from 1 September to 15 April, and in the Imnaha River basin (includes Big Sheep Creek beginning with the 2009-10 run year) from 1 February to 15 April for the 1985-86 to 2011-12 run years. Angling regulations were not consistent among years and river sections, which may have affected the number of harvested hatchery fish. "-" indicates a statistical angler survey was not conducted.

	Lower Grande Ronde River				Imnaha River Basin			
		Released		Total		Released		Total
Run year	Harvest	Hatchery	Natural[a]	catch	Harvest	Hatchery	Natural[a]	Catch
85-86[b]	0	0	289	289	18	0	153	171
86-87[b]	45	0	524	569	0	8	192	200
87-88[b]	31	9	455	495	4	0	65	69
88-89[b]	413	87	385	885	19	4	308	331
89-90[b]	530	60	512	1,102	37	9	43	89
90-91[b]	18	87	99	204	15	35	50	100
91-92[b]	879	494	410	1,783	212	180	321	713
92-93[b]	544	567	573	1,684	171	65	130	366
93-94[b]	168	84	483	735	29	0	72	101
94-95[b]	107	45	150	302	24	0	39	63
95-96[b]	300	263	387	950	112	67	210	389
96-97	286	179	193	658	-	-	-	-
97-98	1,415	908	432	2,755	-	-	-	-
98-99	244	119	213	576	67	39	44	150
99-00	380	120	474	974	98	50	190	338
00-01	1,417	619	1,240	3,276	97	86	309	492
01-02	2,132	1,059	1,968	5,159	242	210	273	725
02-03	898	330	1,181	2,409	239	134	552	925
03-04	1,172	756	1,052	2,980	228	120	921	1,269
04-05	2,381	1,468	2,627	6,476	278	154	1,050	1,482
05-06	1,462	1,008	1,692	4,162	412	330	1,120	1,862
06-07	999	641	814	2,454	225	70	465	760
07-08	910	287	567	1,764	443	338	1,572	2,353
08-09	795	336	937	2,068	319	108	638	1,065
09-10	2,262	1,024	2,121	5,407	736	519	4,481	5,736
10-11	1,000	434	1,780	3,214	466	188	1,500	2,154
11-12	1,427	398	2,460	4,285	126	71	238	435
Average	823	422	890	2,135	185	111	597	893

[a] *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.*

[b] *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. Estimated total catch (harvested and released) of hatchery and wild summer steelhead from angler surveys conducted on the Wallowa River and at Rondowa from 1 February to 15 April for the 1985-86 to 2010-11 run years. Estimates for run years 1985-86 to 1995-96 are based on a statistical angler survey and estimates for run years 1996-97 to present are based on a regression between angler harvest card data and creel survey harvest data. Angling regulations were not consistent among years and river sections, which may have affected the number of harvested hatchery fish. "-" indicates that an angler survey was not conducted.

	Wallowa River				Rondowa			
		Released		Total		Released		Total
Run year	Harvest	Hatchery	Natural[a]	catch	Harvest	Hatchery	Natural[a]	Catch
85-86	2	0	1,331	1,333	-	-	-	-
86-87	641	0	1,880	2,521	-	-	-	-
87-88[b]	447	0	1,517	1,964	70	0	273	343
88-89[b]	294	21	152	467	-	-	-	-
89-90[b]	798	376	239	1,413	38	0	20	58
90-91[b]	0	924	146	1,070	-	-	-	-
91-92	1,514	821	333	2,668	832	537	229	1,598
92-93[b]	1,083	732	305	2,120	-	-	-	-
93-94[b]	481	75	285	841	143	38	47	228
94-95[b]	565	245	300	1,110	61	17	44	122
95-96	495	214	167	876	-	-	-	-
96-97	679	380	151	1,210	434	255	82	771
97-98	1,139	525	132	1,796	733	90	154	977
98-99	468	150	121	739	282	94	73	449
99-00	300	88	135	523	238	450	136	824
00-01	925	491	379	1,795	465	229	126	820
01-02	1,492	793	398	2,683	874	145	330	1,349
02-03	861	524	282	1,667	687	955	2,077	3,719
03-04	948	574	281	1,803	754	607	934	2,295
04-05	809	879	241	1,929	1,125	565	662	2,352
05-06	1,638	1,006	329	2,973	1,667	2,441	695	4,803
06-07	720	470	216	1,406	881	448	362	1,691
07-08	1,399	1,000	251	2,650	2,050	1,903	649	4,602
08-09	1,467	766	437	2,670	1,166	511	691	2,368
09-10	2,231	1,328	659	4,218	3,725	2,514	1,812	8,051
10-11	1,526	880	521	2,927	1,577	847	862	3,286
Average	882	510	430	1,822	890	632	513	2,035

[a] *Includes unmarked hatchery fish for run years 85-86 to 88-89.*

[b] *Angler surveys were conducted only during selected dates (in parentheses) on the Wallowa River during run years 88-89 and 92-93 (1 Feb-30 Apr), and 90-91 (16 Feb-15 Apr), and at Rondowa during run years 87-88 and 94-95 (1Mar-15Apr), 89-90 (17 Mar-31 Mar), and 93-94 (16 Mar-15 Apr).*

Table 6. Catch rate index (hours/fish ±95% confidence intervals) in summer steelhead creel survey areas in the Grande Ronde and Imnaha river basins for the 1985-86 to 2011-12 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	Big Sheep Creek
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	-
99-00	11±2	25±19	-	8±7	17±4	12±3	-
00-01	6±1	18±17	-	6±4	11±2	6±1	-
01-02	5±1	11±17	-	7±4	7±1	3±1	-
02-03	8±1	-	-	8±6	12±2	6±2	-
03-04	6±1	-	-	3±2	7±1	5±1	-
04-05	4±0	-	-	5±1	5±1	4±1	-
05-06	5±1	-	-	2±1	7±1	3±1	-
06-07	8±1	-	-	6±2	7±1	6±1	-
07-08	9±1	-	-	7±2	7±1	3±0	-
08-09	8±1			12±4	8±1	5±1	-
09-10	5±0			3±1	4±0	2±0	0.8±0.3
10-11	6±1			4±2	4±0	3±0	6±1
11-12	5±1			3±1	6±1	8±2	-
Average[a]	10±2	20±5	21±24	9±3	12±3	10±3	3±33

[a] *The average catch rate index for Big Sheep Creek excludes run year 11-12 since no fish were caught.*

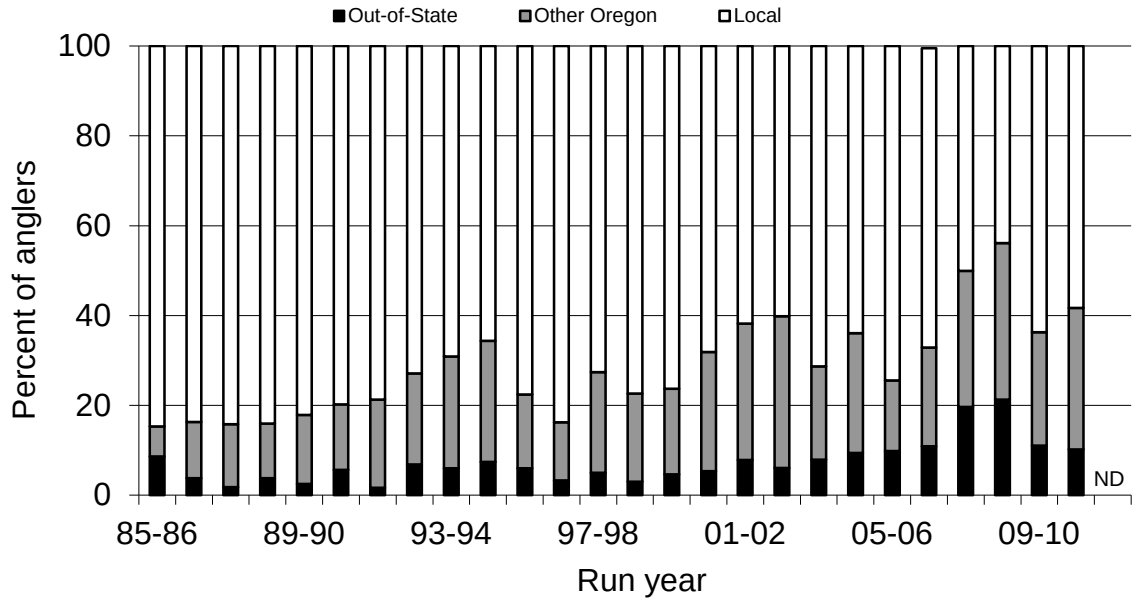

Figure 10. Percent of local resident anglers (Union or Wallowa county residents), non-local Oregon resident anglers, and out-of-state anglers that fished in summer steelhead fisheries in the Grande Ronde and Imnaha river basins for the 1985-86 to 2010-11 run years. ND indicates not determined until statewide annual harvest card data become available.

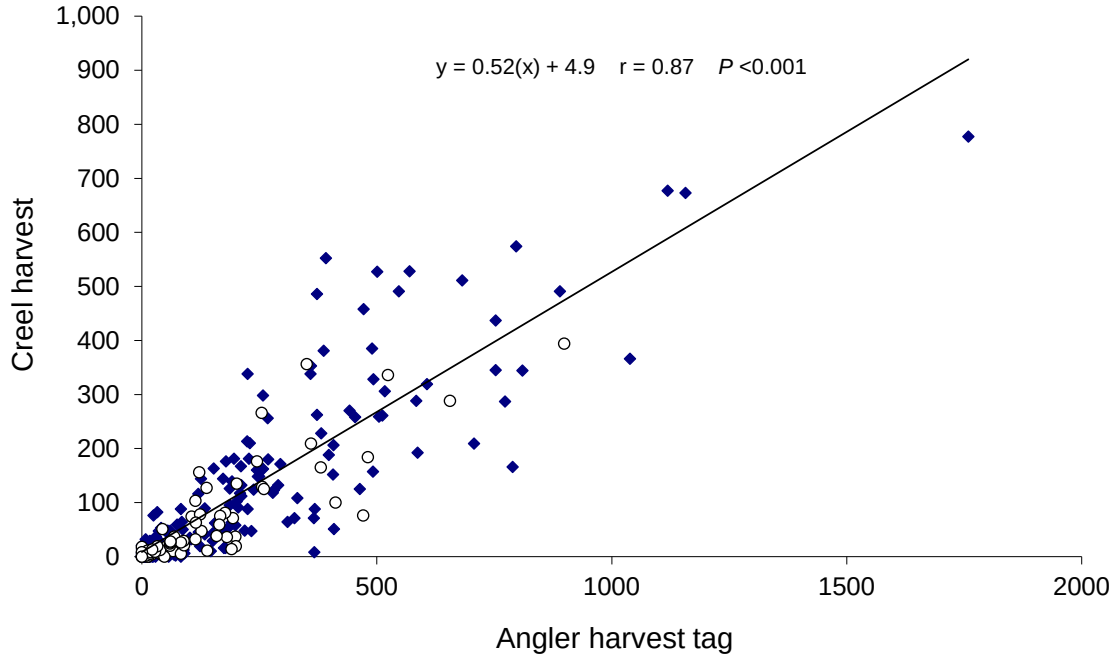

Figure 11. Relation between angler harvest tag (punch card) and creel survey harvest for summer steelhead fisheries in the Grande Ronde (♦) and Imnaha (○) river basins for years when harvest estimates for specific reaches were available (1993-1996 for the upper Grande Ronde and Wallowa, 1994-1995 for Rondowa, 1992-1993 for Catherine Creek, 1993-spring 2011 for the lower Grande Ronde, and 1986-1996, 1999-2011 for the Imnaha fishery areas).

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APPENDIX A

Fishery Statistics for the 2011-12 run year

Appendix Table A-1. Fishery statistics for summer steelhead on the lower Grande Ronde River during the 2011-12 run year. Statistics include mean estimates ±95% confidence intervals. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour.

Month,	Sample size		Total	Total	Total	Catch rate		Angler
day type	Days	Anglers	Hours	Catch	harvest	fish/h	h/fish	days
September:								
Weekday	6	45	1,319±1,017	190±122	25±37	0.144±0.092	7±4	354±273
Weekend	5	32	322±102	53±21	8±8	0.166±0.065	6±2	76±24
Total	11	77	1,641±1,022	243±124	33±38	0.148±0.075	7±4	430±268
October:								
Weekday	6	167	6,493±1,374	1,696±240	613±189	0.261±0.037	4±1	1,246±264
Weekend	5	124	3,697±669	464±91	159±48	0.126±0.025	8±2	615±111
Total	11	291	10,190±1,528	2,160±256	772±195	0.212±0.025	5±1	1,861±279
November:								
Weekday	6	90	2,751±868	662±211	220±119	0.241±0.077	4±1	597±188
Weekend	6	115	1,371±315	166±76	69±38	0.121±0.055	8±4	273±63
Total	12	205	4,122±923	828±224	289±125	0.201±0.054	5±1	870±195
December:								
Weekday	5	33	907±767	321±157	132±78	0.354±0.173	3±1	241±204
Weekend	3	39	511±299	77±37	17±18	0.152±0.072	7±3	123±72
Total	8	72	1,418±823	398±161	149±80	0.281±0.114	4±2	364±211
January:								
Weekday	6	29	536±531	138±213	38±59	0.258±0.397	4±6	104±103
Weekend	6	80	829±293	171±55	57±30	0.206±0.067	5±2	163±58
Total	12	109	1,365±606	309±220	95±66	0.226±0.161	4±3	267±119
February:								
Weekday	6	24	590±168	111±71	33±37	0.187±0.121	5±3	116±33
Weekend	5	51	1,005±551	173±87	56±32	0.171±0.086	6±3	189±104
Total	11	75	1,595±576	284±113	89±49	0.177±0.070	6±2	305±110
March:								
Weekday	7	11	309±292	63±153	0	0.205±0.486	5±12	61±58
Weekend	5	8	84±84	0	0	-	-	16±16
Total	12	19	393±304	63±153	0	0.161±0.382	6±14	77±60
April:								
Weekday	3	0	-	-	-	-	-	0
Weekend	3	0	-	-	-	-	-	0
Total	6	0	-	-	-	-	-	0
Grand total	83	848	20,724±2,388	4,285±491	1,427±261	0.207±0.024	5±1	4,174±481

Appendix Table A-2. Catch rate (±95% confidence intervals) for summer steelhead at Rondowa during the 2011-12 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	7	21	0.522±0.308	2±1
Weekend	6	25	0.146±0.107	7±5
Total	13	46	0.286±0.132	4±2
March:				
Weekday	3	13	0.494±0.314	2±1
Weekend	4	10	0.204±0.146	5±4
Total	7	23	0.376±0.196	3±1
April:				
Weekday	3	0	-	-
Weekend	1	0	-	-
Total	4	0	-	-
			-	-
Grand total	24	69	0.313±0.107	3±1

Appendix Table A-3. Catch rate (±95% confidence intervals) for summer steelhead on the Wallowa River during the 2011-12 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	13	339	0.179±0.031	6±1
Weekend	8	338	0.145±0.032	7±2
Total	21	677	0.162±0.022	6±1
March:				
Weekday	7	270	0.160±0.036	6±1
Weekend	8	388	0.170±0.036	6±1
Total	15	658	0.166±0.026	6±1
April:				
Weekday	4	104	0.137±0.053	7±3
Weekend	4	93	0.129±0.061	8±4
Total	8	197	0.133±0.040	8±2
Grand total	44	1,532	0.160±0.016	6±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 2011-12 run year. Statistics include mean estimates ±95% confidence intervals. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour.

Month,	Sample size		Total	Total	Total	Catch rate		Angler
day type	Days	Anglers	Hours	catch	harvest	fish/h	h/fish	days
February:								
Weekday	7	2	12±20	0	0	-	-	12±20
Weekend	4	2	5±4	7±12	7	1.472±0.866	0.7±0.4	3±2
Total	11	4	17±21	7±12	7	0.408±0.240	2±1	15±19
March:								
Weekday	7	18	102±76	11±19	4±7	0.109±0.110	9±9	102±76
Weekend	5	27	93±68	12±16	3±5	0.127±0.117	8±7	74±54
Total	12	45	195±102	23±25	7±8	0.118±0.080	8±5	176±92
April:								
Weekday	3	8	53±63	4±12	4	0.073±0.186	14±36	55±65
Weekend	3	20	199±35	53±39	10±9	0.271±0.125	4±2	100±18
Total	6	28	252±72	57±41	14±9	0.230±0.106	4±2	155±44
Grand total	29	77	464±126	87±50	28±12	0.189±0.067	5±2	346±94

Appendix Table A-5. Fishery statistics for summer steelhead in Section 2 (mouth to Fence Creek) of the Imnaha River and overall total for Section 1 and 2 combined during the 2011-12 run year. Statistics include mean estimates ±95% confidence intervals. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour.

Month,	Sample size		Total	Total	Total	Catch rate		Angler
day type	Days	Anglers	Hours	Catch	harvest	fish/h	h/fish	Days
February:								
Weekday	7	32	346±126	24±18	6±9	0.070±0.042	14±8	96±35
Weekend	4	40	302±174	32±23	4±6	0.106±0.053	9±5	80±46
Total	11	72	648±215	56±29	10±11	0.086±0.033	12±5	176±58
March:								
Weekday	7	107	1,442±890	170±77	60±38	0.118±0.044	8±3	341±210
Weekend	5	88	606±369	47±19	18±13	0.077±0.021	13±4	166±101
Total	12	195	2,048±963	217±80	78±40	0.106±0.032	9±3	507±238
April:								
Weekday	3	13	167±249	7±2	0	0.040±0.008	25±5	43±64
Weekend	3	42	320±101	68±64	10±10	0.214±0.126	5±3	68±21
Total	6	55	487±269	75±64	10±10	0.154±0.083	6±3	111±61
Grand total	29	322	3,183±1,023	348±106	98±43	0.109±0.025	9±2	794±255
Sec.1 + 2	29	399	3,647±1,031	435±117	126±44	0.119±0.023	8±2	1,140±322

Appendix Table A-6. Fishery statistics for summer steelhead in Big Sheep Creek (mouth to Little Sheep Creek) in the Imnaha River basin during the 2011-12 run year. Statistics include mean estimates ±95% confidence intervals. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour.

Month,	Sample size		Total	Total	Total	Catch rate		Angler
day type	Days	Anglers	Hours	catch	harvest	fish/h	h/fish	Days
February								
Weekday	7	0	-	-	-	-	-	0
Weekend	4	0	-	-	-	-	-	0
Total	11	0	-	-	-	-	-	0
March:								
Weekday	7	8	45±43	0	0	-	-	20±19
Weekend	5	0	-	-	-	-	-	0
Total	12	8	45±43	0	0	-	-	20±19
April:								
Weekday	3	2	17±29	0	0	-	-	8±14
Weekend	3	4	20±6	0	0	-	-	6±2
Total	6	6	37±30	0	0	-	-	14±11
Grand total	29	14	82±52	0	0	-	-	34±22

APPENDIX B

Percent of Summer Steelhead That Were Marked Hatchery Fish and Caught during the 2011-12 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 2011-12 run year. For the Imnaha River and Big Sheep Creek, percentages include catch of marked hatchery fish only. In parentheses are total catch for the Lower Grande Ronde and Imnaha rivers and Big Sheep Creek, and sampled catch for the Wallowa River 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	28(243)	45(2,160)	42(828)	50(398)	42(309)	40(284)	0(63)	-(0)
Rondowa	-	-	-	-	-	80(87)	72(50)	-(0)
Wallowa River	-	-	-	-	-	84(368)	83(366)	47(87)
Imnaha River (Section 1)	-	-	-	-	-	100(7)	35(23)	42(57)
Imnaha River (Section 2)	-	-	-	-	-	55(56)	51(217)	23(75)
Big Sheep Cr.	-	-	-	-	-	-(0)	-(0)	-(0)

APPENDIX C

Fishery Statistics for Spring Fisheries for the 2010-11 Run Year

Appendix Table C-1. Estimated harvest of summer steelhead, and observed and expanded harvest of coded-wire tagged steelhead in spring fisheries in the Grande Ronde basin for the 2010-11 run year. Total harvest = 0.515 (harvest card) + 4.876. Sample rate expansion = total harvest/sampled fish. A sample rate expansion of 25 or greater was considered unreliable; in such cases expanded = observed. Harvest estimates are 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. No harvest on Catherine Creek (location code 121).

Fishery, location code,	Fishery statistics and number of tags recovered by month									Expanded
statistics, tagcode	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total	tags
Upper Grande Ronde (233)										
Angler harvest cards	0	19	11	0	0	0	0	0		
Total harvest	-	15	11	-	-	-	-	-	26	
Rondowa (234)										
Angler harvest cards	11	37	59	108	271	1,252	1,234	15		
Sampled fish	0	0	0	0	0	34	6	0		
Total harvest	11	24	35	60	144	650	640	13	1,577	
Sample rate expansion	-	-	-	-	-	19.1	106.7	-		
09 44 09						1	0		1	19
09 44 13						1	0		1	19
09 44 14						3	0		3	57
09 45 46						1	0		1	19
09 45 80						0	1		1	1
09 45 81						1	0		1	19
09 45 83						1	0		1	19
09 45 84						1	0		1	19
09 45 85						1	0		1	19
09 45 86						1	0		1	19
09 45 87						2	0		2	38
Wallowa (235)										
Angler harvest cards	7	15	26	56	234	805	1,618	128		
Sampled fish	0	0	0	0	0	307	377	18		
Total harvest	8	13	18	34	125	419	838	71	1,526	
Sample rate expansion	-	-	-	-	-	1.4	2.2	3.9		
09 44 01						1	0	0	1	1
09 44 09						8	4	0	12	20
09 44 10						2	2	1	5	11
09 44 11						3	4	1	8	17
09 44 12						5	4	0	9	16
09 44 13						4	20	1	25	53
09 44 14						12	12	0	24	43
09 45 44						5	2	0	7	11
09 45 45						3	1	0	4	6
09 45 46						2	0	1	3	7
09 45 47						5	1	0	6	9
09 45 80						3	1	0	4	6
09 45 81						1	3	0	4	8
09 45 82						0	6	0	6	13
09 45 83						6	2	0	8	12
09 45 84						6	1	0	7	10
09 45 85						0	1	0	1	2
09 45 86						3	2	0	5	8
09 45 87						4	3	0	7	12

Appendix Table C-1. continued.

Fishery, location code, statistics, tagcode	Fishery statistics and number of tags recovered by month									Expanded tags
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total	
09 45 88						0	1	2	3	10
09 45 89						5	11	0	16	31
Wenaha (184)										
Angler harvest cards	0	4	0	4	0	0	0	0		
Total harvest	-	7	-	7	-	-	-	-	14	
Middle Grande Ronde (232)										
Angler harvest cards	33	97	74	4	0	84	62	0		
Total harvest	22	55	43	7	-	48	37	-	212	
Total Grande Ronde harvest (excluding lower Grande Ronde)									3,355	

Appendix Table C-2. Estimated catch of summer steelhead in spring fisheries in the Grande Ronde basin for the 2010-11 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	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	15	11	-	-	-	-	-	26
Total catch	-	29	21	-	-	-	-	-	50
Catherine Creek									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	-	-	-	-	-	-	-	0
Total catch	-	-	-	-	-	-	-	-	0
Rondowa									
Sampled harvest	-	-	-	-	-	34	6	0	40
Sampled catch	-	-	-	-	-	47	18	0	65
Total harvest	11	24	35	60	144	650	640	13	1,577
Total catch	18	39	57	98	234	899	1,920	21	3,286
Wallowa									
Sampled harvest	-	-	-	-	-	307	377	18	702
Sampled catch	-	-	-	-	-	605	683	52	1,340
Total harvest	8	13	18	34	125	419	838	71	1,526
Total catch	15	25	34	65	239	826	1,518	205	2,927
Wenaha									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	7	-	7	-	-	-	-	14
Total catch	-	19	-	16	-	-	-	-	35
Middle Grande Ronde									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	22	55	43	7	-	48	37	-	212
Total catch	42	105	82	13	-	95	67	-	404
Total Grande Ronde catch (excluding lower Grande Ronde)									6,702

[a] *Wallowa data were used for the upper Grande Ronde, middle Grande Ronde, and Catherine Creek; lower Grande Ronde data, in Flesher et al. 2013, 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 2010-11 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	-	-	-	-	-	-	-	-	-
Total catch	-	29	21	-	-	-	-	-	50
Angler effort	-	123	89	-	-	-	-	-	112
Catherine Creek									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	-	-	-	-	-	-	-	0
Angler effort	-	-	-	-	-	-	-	-	0
Rondowa									
Catch rate	-	-	-	-	-	0.272	0.159	-	0.227
Total catch	18	39	57	98	234	899	1,920	21	3,286
Angler effort	79	172	251	432	1,031	3,305	12,075	93	17,438
Wallowa									
Catch rate	-	-	-	-	-	0.250	0.242	0.115	0.235
Total catch	15	25	34	65	239	826	1,518	205	2,927
Angler effort	64	106	145	277	1,017	3,304	6,273	1,783	12,969
Wenaha									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	19	-	16	-	-	-	-	35
Angler effort	-	157	-	71	-	-	-	-	228
Middle Grande Ronde									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	42	105	82	13	-	95	67	-	404
Angler effort	179	447	349	55	-	380	277	-	1,687
Upper Grande Ronde									
Total Grande Ronde angler effort (excluding lower Grande Ronde)									32,534

[a] *Wallowa data were used for the upper Grande Ronde, middle Grande Ronde, and Catherine Creek; lower Grande Ronde data, in Flesher et al. 2013, were used for the Wenaha.*

APPENDIX D

Summary of Recycled Steelhead for the 2011-12 Run Year

Appendix Table D. Summary of adult steelhead recycled back to the Wallowa River fishery from the Big Canyon Facility for the 2011-12 run year.

Date and percent of release	Number of fish[a]		
	Male	Female	Total
		Released	
9 March 2012	12	13	25
16 March 2012	15	20	35
22 March 2012	6	19	25
30 March 2012	4	6	10
Total	37	58	95
		Recaptured at Big Canyon[b]	
9 March-30 March 2012	27	29	56
% of release	73%	50%	59%
		Observed and estimated (in parentheses) harvest[c]	
9 March-30 March 2012	1(6)	3(16)	4(22)
% of release	16%	28%	23%
		Total recovered (Big Canyon + estimated harvest)	
9 March-30 March 2012	33	45	78
% of release	89%	78%	82%

[a] *Release site was 1.6 km downstream of Deer Creek (Rkm 18) on the Wallowa River.*
[b] *Recaptures of recycled fish were euthanized.*
[c] *For the 2011-12 run year, harvest of recycled fish was estimated using the regression: creel harvest = 0.394 (number released) – 14.9, r= 0.90, P = 0.014, N = 6, from data for run years 2002-03 to 2007-08.*