LOWER SNAKE RIVER COMPENSATION PLAN:
Summer Steelhead Creel Surveys on the Grande Ronde, Wallowa, and Imnaha Rivers for the 2014-15 Run Year

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OREGON
Fish & Wildlife

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COMPENSATION PLAN

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

Front cover photo: An angler and a river otter (top of picture on the ice flow) fishing for summer steelhead on the lower Grande Ronde River at Slide Hole near Troy, Oregon, in January 2015. Photo by Celeste Cole.

ANNUAL PROGRESS REPORT

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PREFACE

This report is for the funding period 1 October 2014 to 30 September 2015. The sampling period was from 1 September 2014 to 15 April 2015. 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 2014-2015 run year were primarily from the 2011 and 2012 brood years. Results of creel surveys conducted prior to fall 2014 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, 2013, 2014, 2015, and 2016), 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 2014 to 15 April 2015 in the Grande Ronde and Imnaha river basins.

ACKNOWLEDGMENTS

We would like to thank Mary Buckman (retired) for the statistical design of the data, Celeste Cole and Denise Griffith for their dedication in conducting the surveys, and Rod Engle for reviewing the document. We would also like to thank Joe Bumgarner and Todd Miller (Washington Department of Fish and Wildlife) for coordinating and James Snook for conducting the Lower Grande Ronde survey during spring 2015. 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

Creel survey data for the 2014-15 run year were indicative of mixed success for summer steelhead fisheries in the Grande Ronde and Imnaha River basins. Metrics for angler effort on the lower Grande Ronde River (12,128 hrs) the Imnaha River (4,507 hrs), and total catch on both rivers (Grande Ronde = 1,654 fish, Imnaha = 802 fish) were all below their respective 10-year averages. However, anglers that participated experienced average fishing success as catch rates of 7.0 hrs/fish and 6.0 hrs/fish on the lower Grande Ronde River and Imnaha rivers.Total steelhead harvest was 401 fish on the lower Grande Ronde River and 243 fish on the Imnaha River.

The total catch of wild steelhead in the lower Grande Ronde River for the current run year was 1,069 fish, below the 10-year average. However, for the fifth year in a row catch of wild steelhead in the lower Grande Ronde River fishery comprised over 50% of the total steelhead catch. We speculate that the high percentage of wild steelhead catch may be due to a decline in the returns of hatchery steelhead. Wild fish comprised 25.5% of the Wallowa River catch.

This report includes angler harvest card data (total catch, effort, and harvest) for the middle Grande Ronde River, the Wallowa River and Rondowa survey areas for the 2013-14 run year, summarized in the appendices. Based on creel and harvest card data, combined total catch in those areas was 1,650 fish, total harvest was 904 fish, and total effort was 43,657 hours. For the second year in a row, catch and harvest were substantially lower than the prior run year and below their respective 10-year averages. Effort was substantially higher than the prior run year.

Sixty-five percent of anglers participating in Imnaha basin fisheries were local residents whereas that number was 51 – 54% in Grande Ronde basin locations. Out-of-state persons comprised 7 to 24% of the anglers, depending on location.

For the sixth consecutive year our creel surveyors have electronically scanned all harvested steelhead to detect wire tags. This procedure aids in identifying adipose-only clipped hatchery steelhead that may be tagged; these fish would typically be an out-of-basin stray hatchery steelhead. However, no harvested stray steelhead have been sampled in either the Grande Ronde or Imnaha basin recreational fisheries, suggesting low straying of hatchery fish into these two basins.

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 increased smolt-to-adult survival (Clarke et al. 2014), 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 2014 and the spring of 2015 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 2013-14 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 2014-15 steelhead angling season in the Grande Ronde and Imnaha river basins was open from 1 September 2014 to 15 April 2015.

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

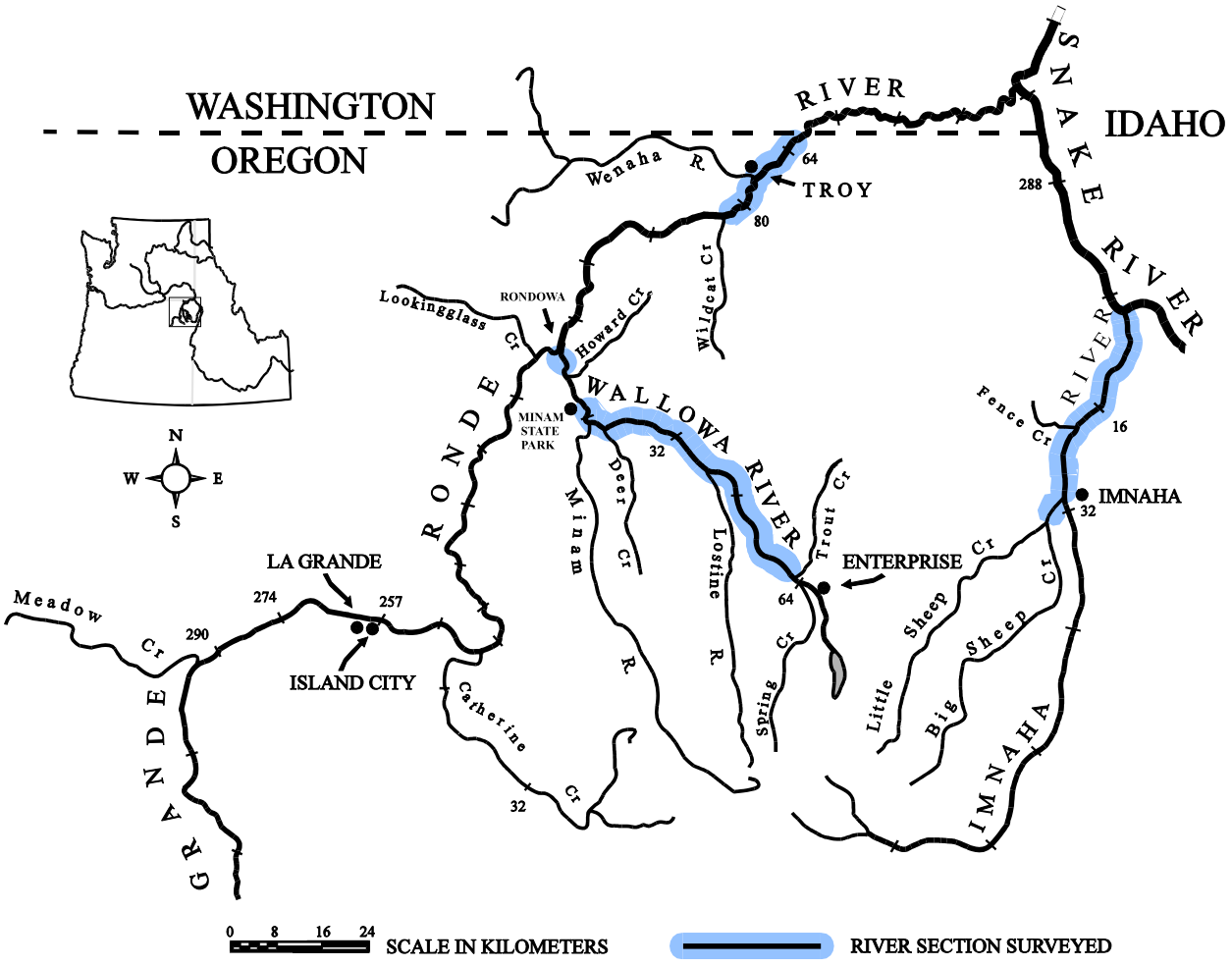

Figure 1. Map of northeastern Oregon showing where summer steelhead creel surveys were conducted in the Grande Ronde and Imnaha river basins during the 2014-15 run year.

on the Grande Ronde River, and on Smith Mountain Road at the Handcock Forest Management 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). Starting in 2013, the survey on the lower Grande Ronde River was conducted from 1 September 2014 to 31 March 2015, rather than through 15 April. Although the fishing season is through 15 April, the April creel was eliminated because prior years of data showed consistently low angler effort in early April. During the creel 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 2015. 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 2015. We surveyed the Wallowa River area each sample day and surveyed the Rondowa area every other sample day. Beginning in 2012, we also surveyed the Rondowa area every weekend sample day to increase the number of interviews. 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, 2015, 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 28 February, we surveyed five days each week (Sunday – Saturday) from 0900-1800 hours. From 1 March to 15 April, we surveyed four days each week from 0800-1900 hours.

For the lower Grande Ronde River and Imnaha River creel surveys, we estimated angler effort in hours and days, total catch, harvest, catch rate, percent hatchery fish in the catch, and the number of AdLV+CWT, AdRV+CWT, AdRV-only, and Ad+CWT marked fish harvested (see Carmichael et al. 1988). 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 2013-2014. 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).

ACCOMPLISHMENTS AND FINDINGS

On the lower Grande Ronde River from 1 September 2014 to 31 March 2015, we sampled 53.7% of the weekends and holidays (36 days) and 30.3% of the weekdays (44 days) for a total of 80 sample days. On the Wallowa River from 1 February to 15 April 2015, we sampled 63.6% of the weekends and holidays (14 days) and 46.2% of the weekdays (24 days) for a total of 38 sample days. During the same time period at Rondowa, we sampled 54.5% of the weekends and holidays (12 days) and 34.6% of the weekdays (18 days) for a total of 30 sample days. On the Imnaha River and Big Sheep Creek from 1 February to 15 April 2015, we sampled 54.5% of the weekends and holidays (12 days) and 30.8% of the weekdays (16 days) for a total of 28 sample days. Tables in Appendix A provide more details on sampling effort by fishing location.

We estimate that 2,442 anglers fished for 12,128 hours on the lower Grande Ronde River during the 2014-15 season. Anglers caught and released 1,069 wild and 184 hatchery steelhead, and harvested 401 hatchery steelhead for an average catch rate index of 7 hours per fish (Figures 2-6, Appendix Table A-1). The percent of steelhead caught that were hatchery origin ranged from 24% in September 2014 to 58% in February 2015 (Figure 7, Appendix Table B). Forty-nine percent of harvested hatchery steelhead spent one year in freshwater and one year in saltwater (hereafter designated 1:1), 50% spent one year in freshwater and two years in saltwater (designated 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 574 (±9) mm for age 1:1, 692 (±12) mm for age 1:2, and 580 mm for age 2:1 (Table 1). Gender composition was 38% male and 62% female (Table 1). Fifty-three percent of the anglers on the lower Grande Ronde River were local Oregon residents, 23% were non-local Oregon residents, 5% were Washington State residents and 19% resided outside the states of Oregon and Washington (Table 2). On the lower Grande Ronde River, anglers harvested an estimated 86 AdLV+CWT and AdRV+CWT marked steelhead from our hatchery releases (Table 3).

At Rondowa, the catch rate index averaged 5 hours per fish (Figure 4, Appendix Table A-2). The percent of steelhead caught that were hatchery origin ranged from 60% in March to 80% in February (Figure 7, Appendix Table B). Age composition of

harvested hatchery steelhead was 37% 1:1 and 63% 1:2 (Table 1). Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 568 (±11) mm for age 1:1 and 710 (±19) mm for age 1:2 (Table 1). Gender composition was 39% male and 61% female (Table 1). Fifty-four percent of the anglers at Rondowa were local Oregon resident anglers, 39% were non-local Oregon resident anglers, 2% were Washington State residents and 5% resided outside the states of Oregon and Washington (Table 2). At Rondowa, anglers harvested 17 AdLV+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 Wallowa River, the catch rate index averaged 5 hours per fish (Figure 4, Appendix Table A-3). The percent of steelhead caught that were hatchery origin ranged from 61% in April to 88% in February (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 42% 1:1, 57% 1:2, and 1% 2:1 (Table 1). Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 577 (±4) mm for age 1:1, 699 (±6) mm for age 1:2, and 580 mm for age 2:1 (Table 1). Gender composition was 44% male and 56% female (Table 1). Fifty percent of the anglers on the Wallowa River were local Oregon residents, 42% were non-local Oregon residents, 3% were Washington State residents and 5% resided outside the states of Oregon and Washington (Table 2). On the Wallowa River, anglers harvested 64 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 1,269 anglers fished for 4,604 hours. They caught and released 442 wild and 134 hatchery steelhead, and harvested 249 hatchery steelhead for an average catch rate index of 6 hours per fish on the Imnaha and 4 hours per fish on Big Sheep Creek (Figures 2-6, Appendix Tables A-4, A-5, and A-6). The percent of steelhead caught that were hatchery origin ranged from 36% in April in Section 2 (Mouth to Fence Creek) to 75% in April on Big Sheep Creek (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 70% 1:1 and 30% 1:2 (Table 1). Mean fork length (±95% confidence interval) of harvested hatchery steelhead was 559 (±12) mm for age 1:1 and 674 (±19) mm for age 1:2 (Table 1). Gender was 67% male and 33% female (Table 1). Sixty-five percent of the anglers on the Imnaha River were local Oregon residents, 24% were non-local Oregon residents and 11% resided outside the states of Oregon and Washington (Table 2). On Big Sheep Creek, 81% of the anglers were local Oregon residents and 19% were non-local Oregon residents (Table 2).

Angler effort and harvest on the lower Grande Ronde were similar to last year and both were the lowest estimated in the last 14 years, while on the Imnaha both effort and harvest were the highest estimates in the last three years (Figures 8 and 9). Total catch (harvested and released) on the lower Grande Ronde and Imnaha were higher than last year but both were only about one-half of the ten-year average (Table 4). However, catch and release of wild steelhead this year and over the last four years

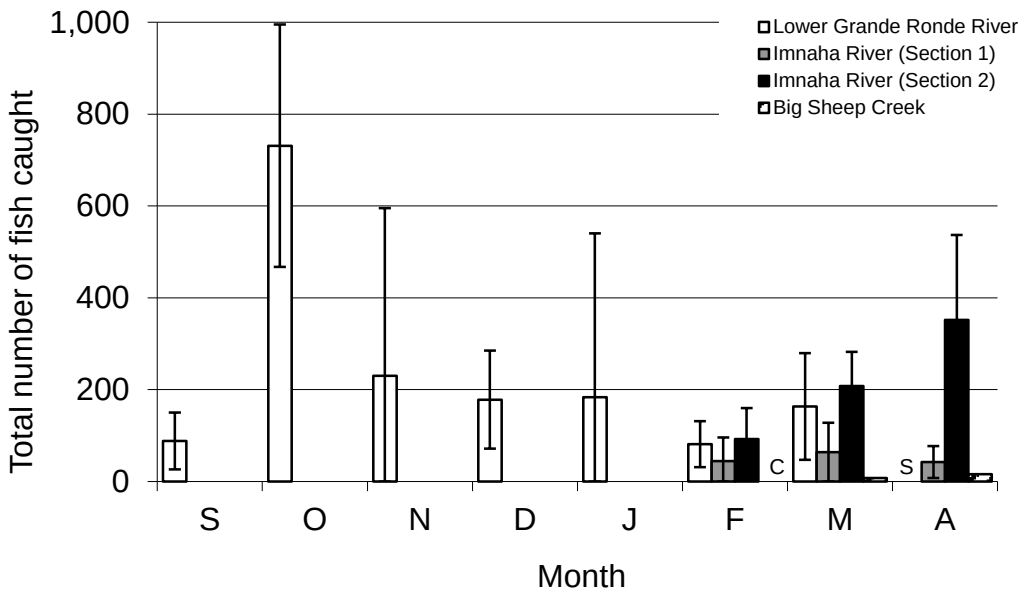

Figure 2. Estimated total catch of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, two sections of the Imnaha River, and Big Sheep Creek during the 2014-15 run year. "C" indicates no catch and "S" indicates no survey. Surveys were conducted from 1 September 2014 to 31 March 2015 on the lower Grande Ronde River, and from 1 February to 15 April 2015 on the Imnaha River and Big Sheep Creek.

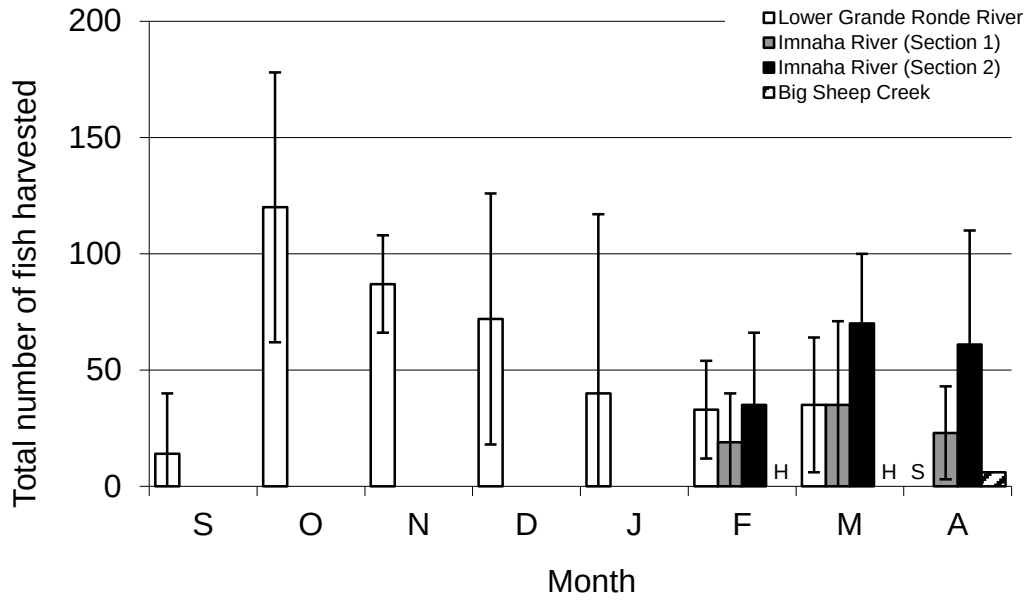

Figure 3. Estimated total harvest of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, two sections of the Imnaha River, and Big Sheep Creek during the 2014-15 run year. "H" indicates no harvest and "S" indicates no survey. Surveys were conducted from 1 September 2014 to 31 March 2015 on the lower Grande Ronde River, and from 1 February to 15 April 2015 on the Imnaha River and Big Sheep Creek.

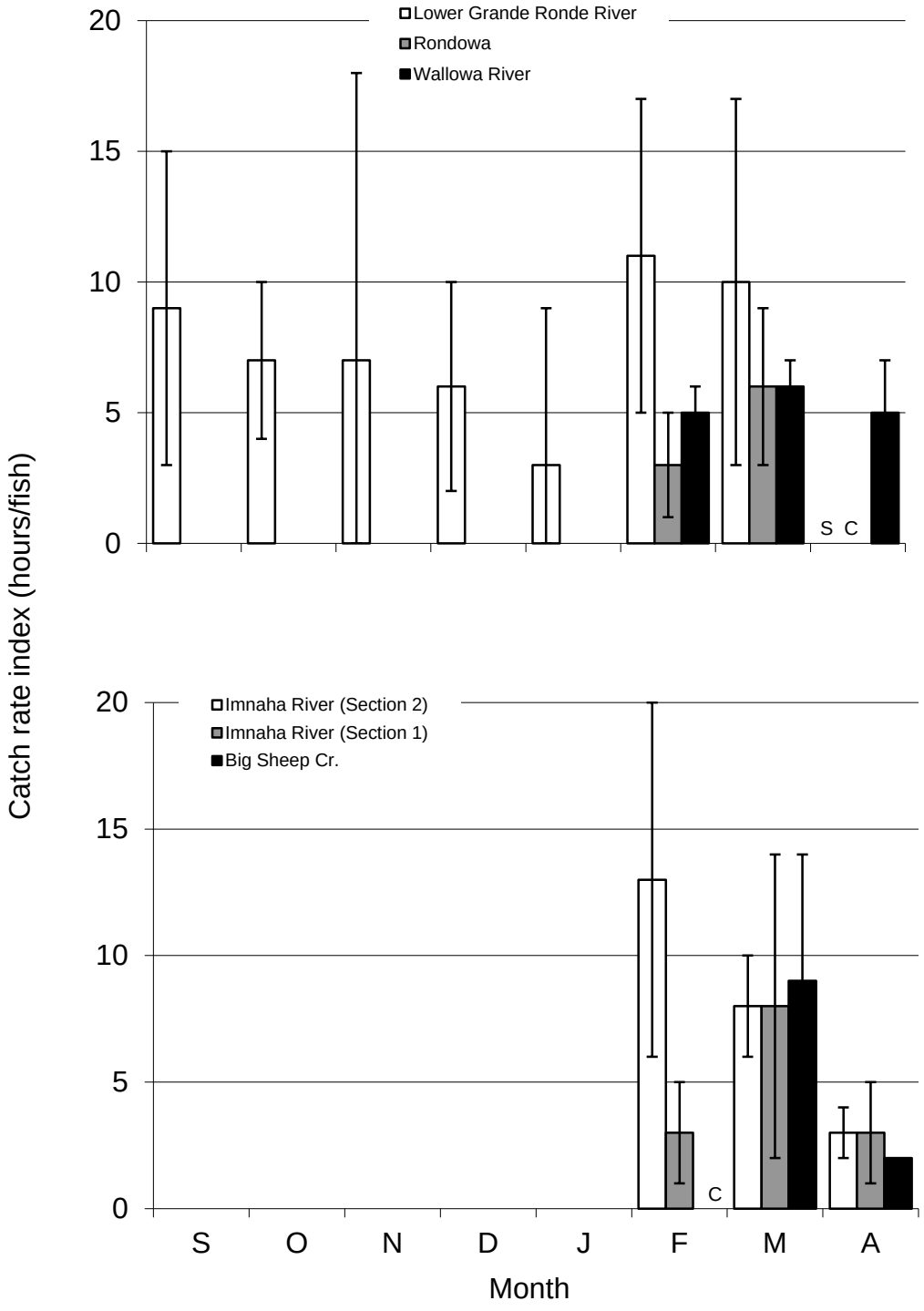

Figure 4. Estimated catch rate index (hours/fish) for summer steelhead (vertical bars show 95% confidence intervals) in the Grande Ronde and Imnaha river basins during the 2014-15 run year. "S" indicates no survey and "C" indicates no catch. Survey areas and times include the lower Grande Ronde River (1 September 2014 - 31 March 2015), and Rondowa, Wallowa River, two sections of the Imnaha River, and Big Sheep Creek (1 February - 15 April 2015). Note: A lower catch rate index implies better angling success.

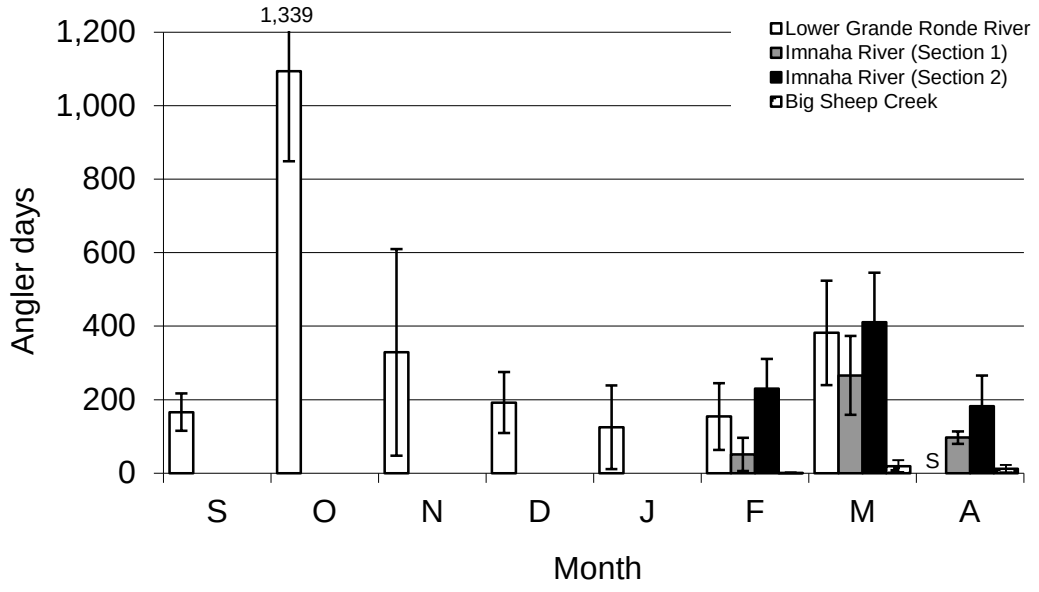

Figure 5. Estimated number of angler days for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, two sections of the Imnaha River, and Big Sheep Creek during the 2014-15 run year. "S" indicates no survey. Surveys were conducted from 1 September 2014 to 31 March 2015 on the lower Grande Ronde River, and from 1 February to 15 April 2015 on the Imnaha River and Big Sheep Creek.

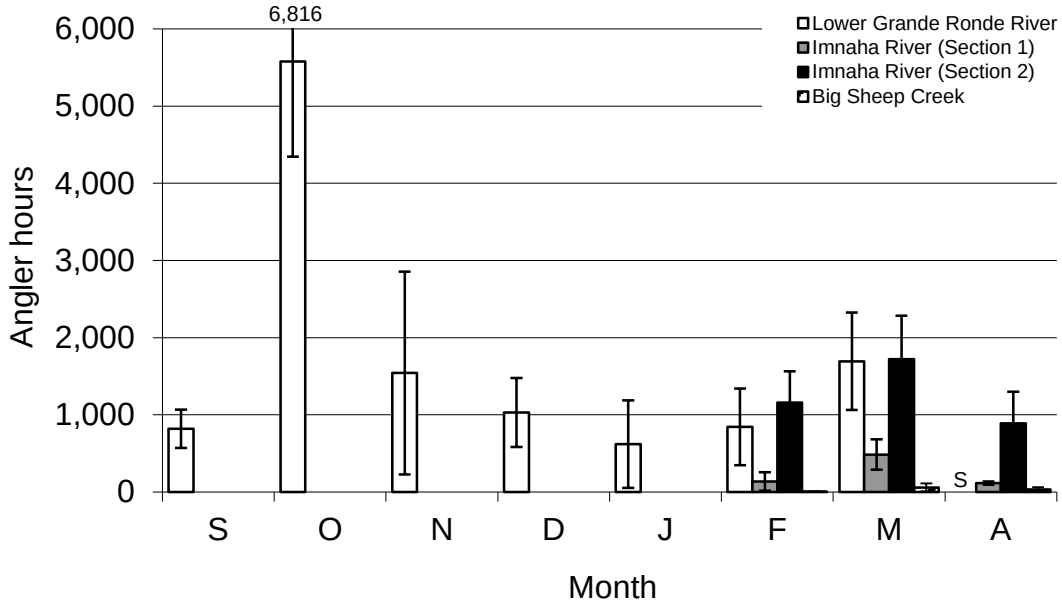

Figure 6. Estimated number of angler hours for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, two sections of the Imnaha River, and Big Sheep Creek during the 2014-15 run year. "S" indicates no survey. Surveys were conducted from 1 September 2014 to 31 March 2015 on the lower Grande Ronde River, and from 1 February to 15 April 2015 on the Imnaha River and Big Sheep Creek.

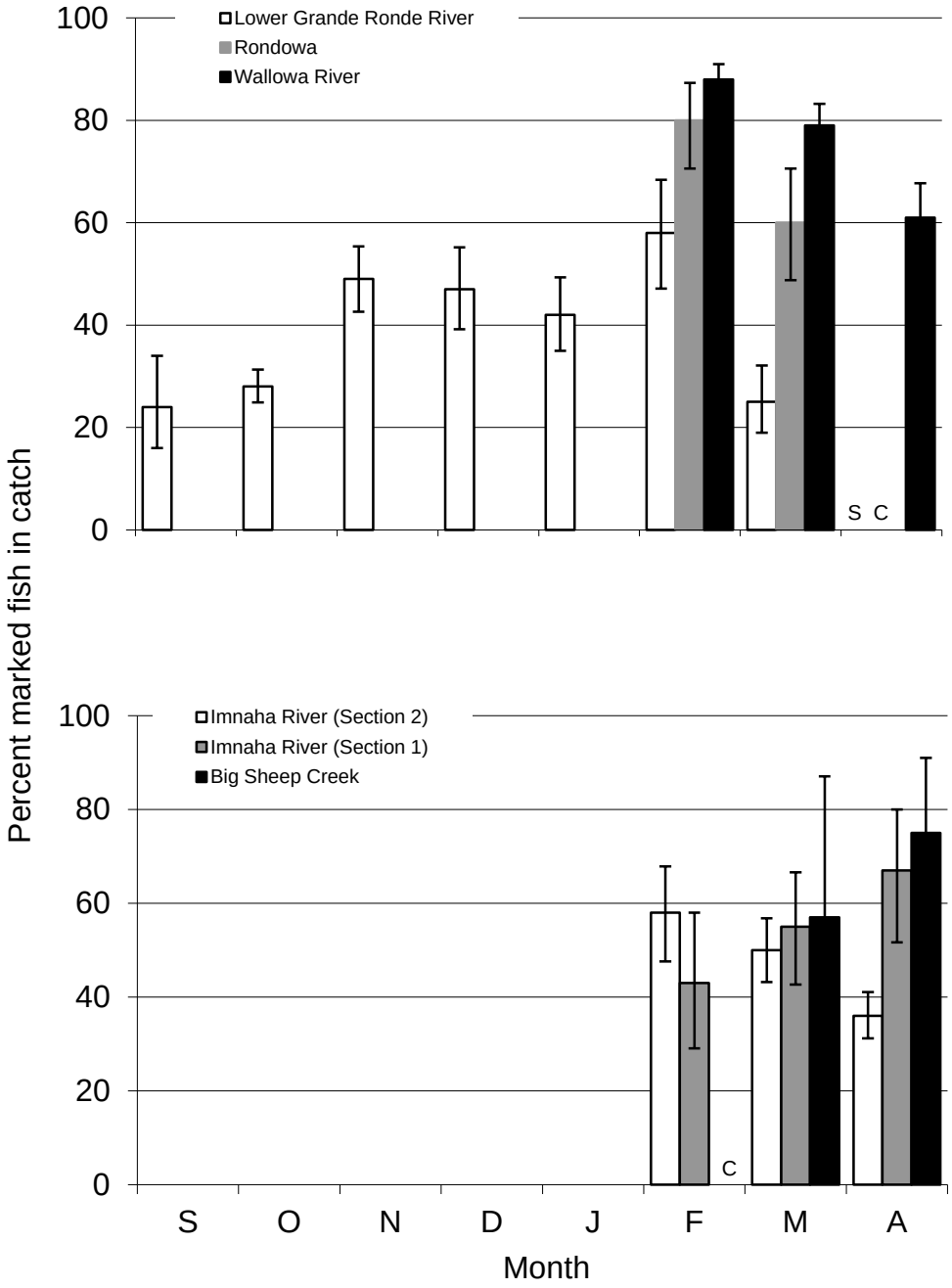

Figure 7. Estimated percent of summer steelhead caught (vertical bars show 95% confidence intervals; using a binomial distribution) in the Grande Ronde and Imnaha river basins during the 2014-15 run year that were marked. "S" indicates no survey and "C" indicates no catch. All unmarked fish were considered to be wild. Survey areas and times include the lower Grande Ronde River (1 September 2014 - 31 March 2015), and Rondowa, Wallowa River, two sections of the Imnaha River, and Big Sheep Creek (1 February - 15 April 2015).

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 2014-15 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 2015 and Little Sheep Creek Facility (for the Imnaha River basin including the Imnaha River and Big Sheep Creek) in 2014 and 2015. 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.

Creel survey	Age composition (%)					Mean fork length (mm)							
area, gender	N	1:1	1:2	2:1	1:3	N	1:1	N	1:2	N	2:1	N	1:3
Lower GR R.													
Males	30	60	40	0	0	16	582±14	11	707±24	0	-	0	-
Females	48	42	56	2	0	18	567±13	24	685±14	1	580	0	
Total	78	49	50	1	0	34	574±9	35	692±12	1	580	0	
Rondowa.													
Males	27	59	41	0	0	15	561±17	10	736±35	0	-	0	-
Females	43	23	77	0	0	9	580±9	30	701±23	0	-	0	-
Total	70	37	63	0	0	24	568±11	40	710±19	0	-	0	-
Wallowa R.													
Males	177	57	42	1	0	96	582±5	72	718±11	1	580	0	-
Females	229	30	69	0.5	0.5	66	569±7	152	690±6	1	580	1	740
Total	406	42	57	1	0	152	577±4	224	699±6	2	580	1	740
Imnaha R. basin													
Males	56	77	23	0	0	29	554±15	9	684±14	0	-	0	-
Females	28	57	43	0	0	10	573±21	8	664±42	0	-	0	-
Total	84	70	30	0	0	39	559±12	17	674±19	0	-	0	-

Table 2. Residence of summer steelhead anglers interviewed during creel surveys in the Grande Ronde and Imnaha river basins during the 2014-15 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
Lower GR River	565	53	23	5	19
Rondowa	131	54	39	2	5
Wallowa River	1,247	50	42	3	5
Imnaha River	426	65	24	0	11
Big Sheep Creek	21	81	19	0	0

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 2014-15 run year. No coded-wire tags were recovered in the Imnaha River basin. 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 04 22	Spring Cr.	Fall Brood/April	2011	1	7
	09 04 23	Spring Cr.	Fall B/Vol/May	2011	1	7
	09 04 25	Spring Cr.	Production/April	2011	1	8
	09 04 26	Spring Cr.	Production/April	2011	4	16
	09 04 29	Deer Cr.	Production/April	2011	1	8
	09 04 30	Deer Cr.	Volitional/May	2011	1	4
	09 05 54	Spring Cr.	Fall B/Vol/May	2012	1	7
	09 05 55	Spring Cr.	Fall Brood/April	2012	1	4
	09 05 57	Spring Cr.	Fall Brood/April	2012	2	6
	09 05 58	Spring Cr.	Production/April	2012	1	4
	09 05 59	Spring Cr.	Production/April	2012	1	4
	09 05 62	Spring Cr.	Prod/Vol/May	2012	1	7
	63 60 84	-	WDFW [c]	2011	1	4
Wallowa River	09 04 21	Spring Cr.	Fall Brood/April	2011	2	ND
	09 04 22	Spring Cr.	Fall Brood/April	2011	1	ND
	09 04 24	Spring Cr.	Fall Brood/April	2011	2	ND
	09 04 25	Spring Cr.	Production/April	2011	5	ND
	09 04 26	Spring Cr.	Production/April	2011	3	ND
	09 04 27	Spring Cr.	Production/April	2011	3	ND
	09 04 28	Spring Cr.	Prod/Vol/May	2011	2	ND
	09 04 29	Deer Cr.	Production/April	2011	7	ND
	09 04 30	Deer Cr.	Volitional/May	2011	8	ND
	09 05 55	Spring Cr.	Fall Brood/April	2012	1	ND
	09 05 56	Spring Cr.	Fall Brood/April	2012	1	ND
	09 05 57	Spring Cr.	Fall Brood/April	2012	4	ND
	09 05 58	Spring Cr.	Production/April	2012	3	ND
	09 05 59	Spring Cr.	Production/April	2012	2	ND
	09 05 60	Spring Cr.	Production/April	2012	2	ND
	09 05 61	Deer Cr.	Production/April	2012	12	ND
	09 05 63	Deer Cr.	Volitional/May	2012	6	ND
Rondowa	09 04 25	Spring Cr.	Production/April	2011	1	ND
	09 04 26	Spring Cr.	Production/April	2011	2	ND
	09 04 27	Spring Cr.	Production/April	2011	2	ND
	09 04 29	Deer Cr.	Production/April	2011	3	ND
	09 04 30	Deer Cr.	Volitional/May	2011	2	ND
	09 05 58	Spring Cr.	Production/April	2012	3	ND
	09 05 59	Spring Cr.	Production/April	2012	3	ND
	09 05 60	Spring Cr.	Production/April	2012	1	ND

[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 60 84 were Wallowa stock released by WDFW in 2012 in the lower Grande Ronde River at the Cottonwood Conditioning Pond, Washington.*

has been over 50% of the total catch on the lower Grande Ronde. Similarly, wild fish were over 50% of the total catch on the Imnaha River. However, it is difficult to know whether catch of wild fish is trending upward on the Imnaha because there were unmarked hatchery fish in the returns from years 2003-2012, so anglers could not distinguish these hatchery fish from wild fish.

Total catch for the 2013-14 run year on the Wallowa, as determined by angler harvest card data that is accessible to us on a one-year delay, was the lowest estimated in over ten years, and the lowest in almost 20 years at Rondowa, and 48% of the ten year average on the Wallowa and only 12% for Rondowa (Table 5). Harvest on the Wallowa and at Rondowa was the lowest estimated in over ten years. Similarly, catch and release of wild fish was the lowest observed in the last five years on the Wallowa and the lowest observed in over ten years at Rondowa. However, the percent of wild fish in the catch was the second highest observed on the Wallowa (26%, last year was 30%) in over ten years, and the highest observed at Rondowa (33%) in almost ten years. By comparison, fishing success on the lower Grande Ronde River for the same time period— reported on in the 2013-14 Annual Creel Report (Flesher et al. 2016)—was also much poorer than average.

Catch rates in 2014-15 were higher in all Grande Ronde and Imnaha basin steelhead fisheries compared to the previous year and also higher than the overall average (Table 6). The percent of local resident anglers participating in summer steelhead fisheries was lowest on the Wallowa and highest on Big Sheep Creek (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 run year 2013-14 were 280 fish at Rondowa, 558 fish in the Wallowa River, 8 fish in the Wenaha River and 58 fish in the middle Grande Ronde River, for a total harvest estimate of 904 fish in the Grande Ronde basin, excluding the lower Grande Ronde River (Figure 9, Appendix Table C-1). We estimated 80 coded-wire-tagged fish were harvested in the Wallowa River in run year 2013-14. Total catch estimates for spring steelhead fisheries in run year 2013-14 were 421 fish at Rondowa, 1,099 fish in the Wallowa River, 15 fish in the Wenaha River, and 115 fish in the middle Grande Ronde River, for a total catch estimate of 1,650 fish in the Grande Ronde basin, excluding the lower Grande Ronde River (Appendix Table C-2). Angler effort for run year 2013-14 was estimated to be 30,769 hours at Rondowa, 11,365 hours in the Wallowa River, 259 hours in the Wenaha River, and 1,264 hours in the middle Grande Ronde River, for a total effort estimate of 43,657 hours in the Grande Ronde basin, excluding the lower Grande Ronde River (Appendix Table C-3).

MANAGEMENT IMPLICATIONS AND RECOMMENDATIONS

The 2014-15 adult Wallowa stock steelhead return to the Lower Snake River Compensation Plan Area (9,300 adults, reported in the 2015 Annual Progress Report) was lower than the 10-year average of 12,531. Our fisheries data indicate that the below-average run may have led to a decline in angler participation, as angler effort, harvest and total catch were below average in fisheries on the Grande Ronde River. Conversely, the Imnaha stock steelhead return was 4,017 adults, above the 10-year average run of 3,704 adults, yet angler effort, harvest and total catch were also below average.

In 2015, the final adults returned from the second generation (brood years 2008-2011) of the Wallowa stock fall broodstock experiment--a study that was initiated to improve the autumn steelhead harvest in the Grande Ronde River by creating an early returning (fallbrood) line of Wallowa stock. Adult return data from the first generation of the fallbrood experiment became complete in fiscal year 2014, with results showing that the fallbrood had an earlier return timing to the Grande Ronde River and was harvested at a higher rate (9.4 adults harvested per 1,000 smolts released compared to 8.0 for the standard production). A paper that reports on first generation results of this experiment is in the journal *Fisheries Management and Ecology* (Clarke et al. 2017). Although we are still tabulating data from the second generation of the experiment, preliminary results suggest that adult run timing was more similar between the fallbrood and standard production lines, as were harvest rates.

The 2014-15 run was the sixth year in which our creel surveyors electronically scanned all harvested hatchery fish for coded-wire tags, which allows us to detect wire tags 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 could assist with identifying stray hatchery steelhead. However, 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; this information suggests that straying of hatchery fish into these two basins may be low. Importantly, reductions in the rate of coded-wire tagging by other Snake River basin steelhead hatchery programs have reduced our ability to detect strays from out-of-basin stocks using this method.

The total catch of wild steelhead in the lower Grande Ronde River for the current run year was 1,069 fish, which was below the 10-year average of 1332 fish. However, for the fifth year in a row (since 2010-11) catch of wild steelhead in the lower Grande Ronde River fishery comprised over 50% of the total steelhead catch. In the 22 fishing seasons prior to the 2010-11 season there were only five years in which the wild steelhead catch approached or exceeded 50% of the total catch. Our data for upriver Grande Ronde basin fisheries (e.g., Rondowa and Wallowa River) does not indicate an obvious trend towards higher catch of wild steelhead. The high catch rates of wild fish could be explained by a changed ratio of wild fish to hatchery fish in the lower Grande

Ronde River, potentially driven by better than average annual returns of wild fish. However, population estimates based on redd surveys do not suggest an increasing trend in wild fish abundance, although confidence intervals on those annual estimates were always ≥ 30% (Jonasson et al. 2015). A declining run of hatchery fish and a stable run of wild fish would also change the ratio of wild to hatchery fish, potentially resulting in higher wild fish catch rates. This may be the best explanation for the observed pattern. Other factors that affect catch rates are the timing of fish entry into the lower Grande Ronde River and the amount and characteristics of the fishing pressure. We recommend continued monitoring of the wild steelhead catch to determine whether this short term trend persists into the future.

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 2014-15 run year will be reported in the 2015-16 annual creel report.

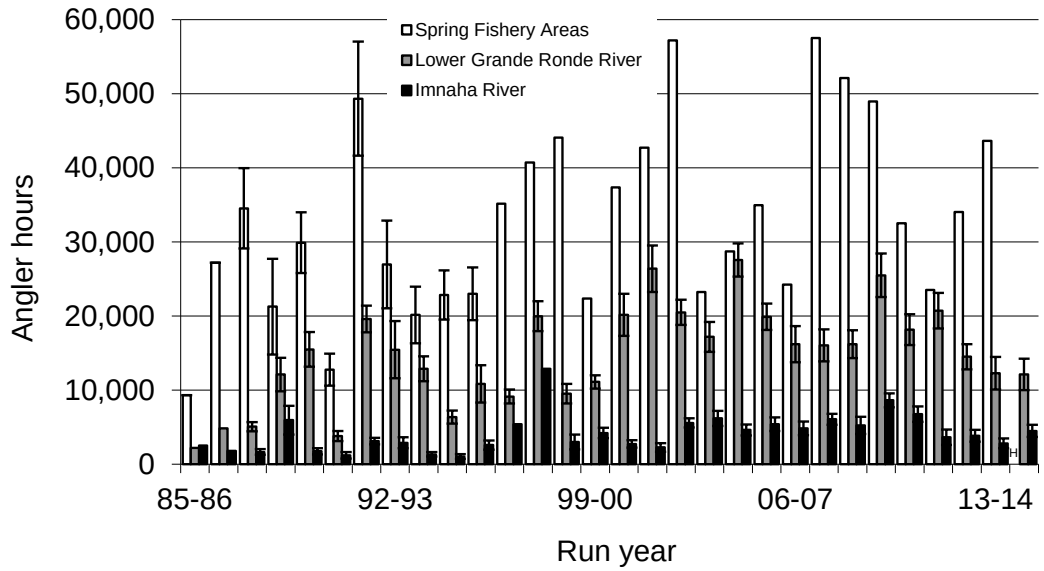

Figure 8. Angler effort (in hours) for summer steelhead in spring fishery areas (upper Grande Ronde and Wallowa rivers, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2014-15 run years. Not shown are 266, 61, 82, 57, 62 and 97 angler hours on Big Sheep Creek (Imnaha basin) for the 09-10 through 14-15 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.

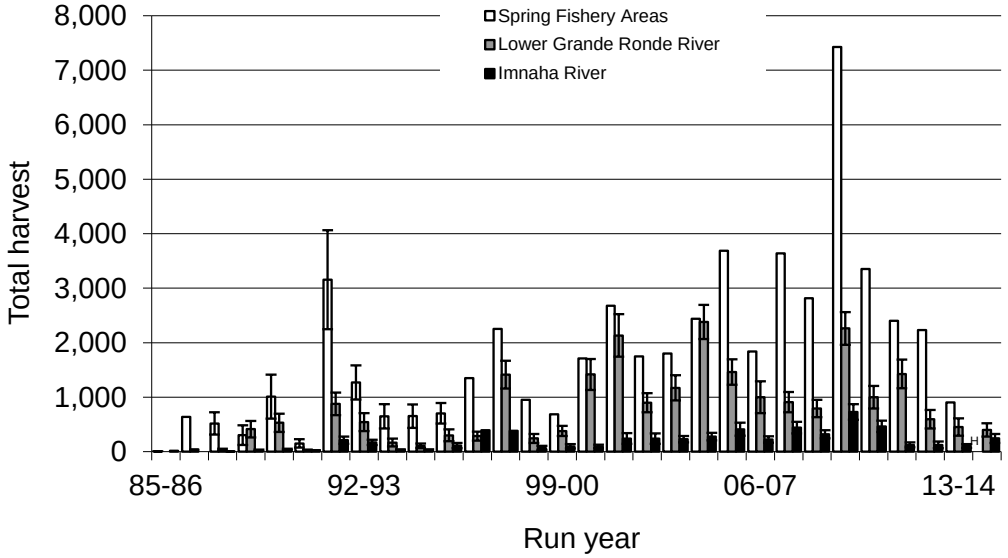

Figure 9. Number of hatchery summer steelhead harvested by recreational anglers in spring fishery areas (upper Grande Ronde and Wallowa rivers, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2014-15 run years. Not shown are 8, 0, 0, 0, 0 and 6 hatchery fish harvested on Big Sheep Creek (Imnaha basin) for the 09-10 through 14-15 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 2014-15 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
12-13	594	302	1,090	1,986	126	4	206	336
13-14	454	154	786	1,394	106	23	279	408
14-15	401	184	1,069	1,654	249	134	442	825
Average	789	401	899	2,089	182	105	567	854

[a] *Includes unmarked hatchery fish for run years 85-86 to 88-89 on the lower Grande Ronde River, and for run years 02-03 to 11-12 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 2013-14 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
11-12	957	503	369	1,829	1,208	1,053	689	2,950
12-13	773	182	404	1,359	1,178	273	317	1,768
13-14	558	261	280	1,099	280	2	139	421
Average	869	490	422	1,781	890	608	496	1,993

[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 2014-15 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	-
12-13	7±1	-	-	9±2	10±1	11±3	24±25
13-14	9±2	-	-	65±93	10±2	7±2	-
14-15	7±3	-	-	5±1	5±1	6±1	4±1
Average	10±2	20±5	21±24	11±6	11±3	9±2	9±17

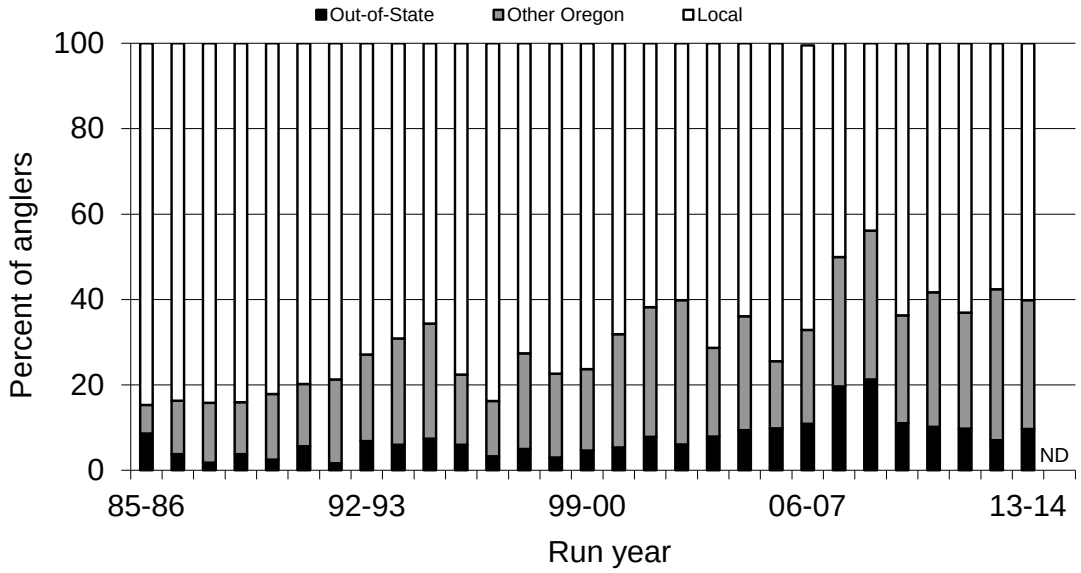

Figure 10. Percent of local resident anglers (Union or Wallowa county residents), non-local Oregon resident anglers, and out-of-state anglers that fished in summer steelhead fisheries in the Grande Ronde and Imnaha river basins for the 1985-86 to 2013-14 run years. ND indicates not determined until statewide annual harvest card data become available.

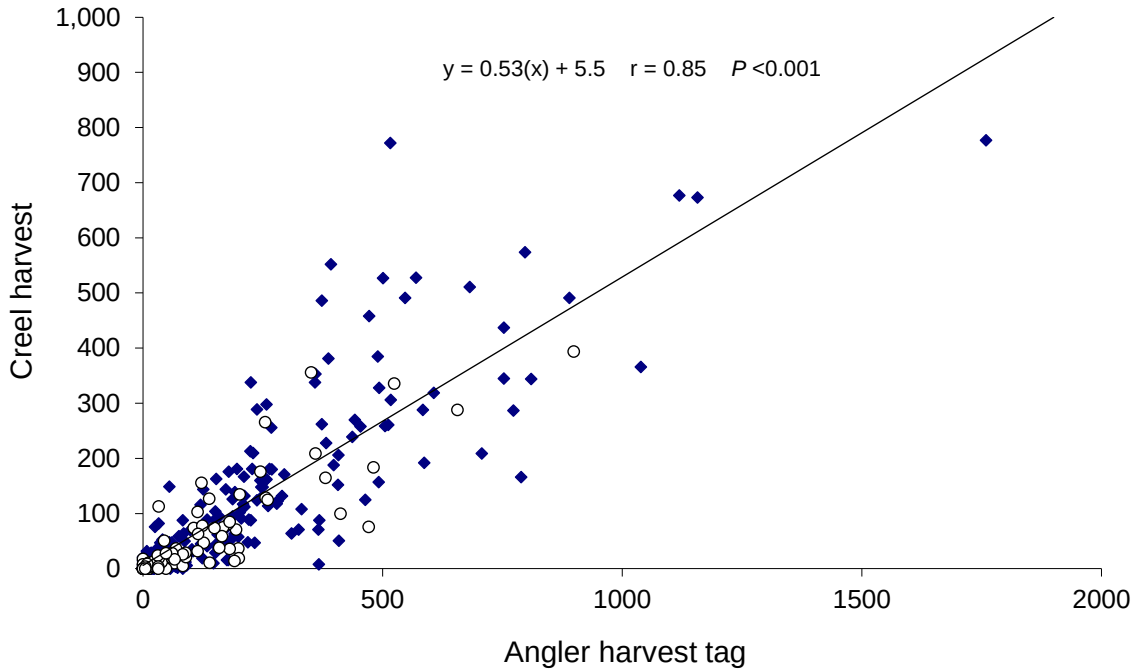

Figure 11. Relation between angler harvest tag (punch card) and creel survey harvest for summer steelhead fisheries in the Grande Ronde (♦) and Imnaha (○) river basins for years when harvest estimates for specific reaches were available (1993-1996 for the upper Grande Ronde and Wallowa, 1994-1995 for Rondowa, 1992-1993 for Catherine Creek, 1993-spring 2014 for the lower Grande Ronde, and 1986-1996, 1999-2014 for the Imnaha fishery areas).

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APPENDIX A

Fishery Statistics for the 2014-15 run year

Appendix Table A-1. Fishery statistics for summer steelhead on the lower Grande Ronde River during the 2014-15 run year. Statistics include mean estimates ±95% confidence intervals. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour. Note: This is the third year that 1-15 April was not surveyed due to low angler effort.

Month,	Sample size		Total	Total	Total	Catch rate		Angler
day type	Days	Anglers	Hours	Catch	harvest	fish/h	h/fish	days
September:								
Weekday	6	25	553±220	55±32	0	0.100±0.057	10±6	127±51
Weekend	5	28	266±117	33±54	14±26	0.122±0.202	8±13	39±17
Total	11	53	819±249	88±62	14±26	0.107±0.076	9±6	166±50
October:								
Weekday	7	127	3,627±1,138	603±261	88±53	0.166±0.072	6±3	707±222
Weekend	4	72	1,953±483	128±38	32±24	0.065±0.020	15±5	387±96
Total	11	199	5,580±1,236	731±264	120±58	0.131±0.047	7±3	1,094±242
November:								
Weekday	5	22	700±1,181	146±362	54	0.209±0.517	5±12	155±262
Weekend	6	52	842±580	84±44	33±21	0.100±0.052	10±5	174±120
Total	11	74	1,542±1,315	230±365	87±21	0.149±0.237	7±11	329±281
December:								
Weekday	7	38	736±430	141±102	69±54	0.191±0.139	5±4	121±71
Weekend	5	32	293±122	37±33	3±5	0.125±0.112	8±7	71±30
Total	12	70	1,029±447	178±107	72±54	0.173±0.104	6±4	192±83
January:								
Weekday	6	20	447±551	154±356	34±77	0.342±0.797	3±7	75±92
Weekend	6	19	173±129	29±33	6±7	0.166±0.187	6±7	50±37
Total	12	39	620±566	183±357	40±77	0.293±0.576	3±6	125±114
February:								
Weekday	6	37	754±494	69±36	29±21	0.090±0.048	11±6	126±83
Weekend	5	7	90±52	12±34	4	0.127±0.243	8±15	28±16
Total	11	44	844±496	81±50	33±21	0.094±0.050	11±6	154±91
March:								
Weekday	7	46	974±386	81±107	6±12	0.084±0.105	12±15	158±63
Weekend	5	40	720±500	82±45	29±26	0.114±0.060	9±5	224±156
Total	12	86	1,694±631	163±116	35±29	0.097±0.065	10±7	382±142
Grand total	80	565	12,128±2,118	1,654±601	401±121	0.136±0.049	7±3	2,442±426

Appendix Table A-2. Catch rate (±95% confidence intervals) for summer steelhead at Rondowa during the 2014-15 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	8	18	0.303±0.323	3±4
Weekend	4	24	0.294±0.109	3±1
Total	12	42	0.297±0.133	3±2
March:				
Weekday	7	33	0.229±0.147	4±3
Weekend	7	56	0.111±0.047	9±4
Total	14	89	0.157±0.065	6±3
April:				
Weekday	3	0	-	-
Weekend	1	0	-	-
Total	4	0	-	-
Grand total	30	131	0.212±0.067	5±2

Appendix Table A-3. Catch rate (±95% confidence intervals) for summer steelhead on the Wallowa River during the 2014-15 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	10	295	0.204±0.044	5±1
Weekend	4	185	0.179±0.058	6±2
Total	14	480	0.195±0.035	5±1
March:				
Weekday	7	237	0.189±0.044	5±1
Weekend	8	290	0.167±0.034	6±1
Total	15	527	0.177±0.027	6±1
April:				
Weekday	7	178	0.125±0.079	5±2
Weekend	2	62	0.149±0.078	7±4
Total	9	240	0.198±0.061	5±2
Grand total	38	1,247	0.188±0.022	5±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 2014-15 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	6	12	108±120	42±52	17±21	0.385±0.209	3±2	41±46
Weekend	5	7	27±13	2±3	2	0.070±0.057	14±11	10±5
Total	11	19	135±120	44±52	19±21	0.321±0.167	3±2	51±45
March:								
Weekday	7	27	264±173	38±62	21±35	0.143±0.167	7±8	191±125
Weekend	5	38	222±89	26±14	14±9	0.117±0.041	9±3	75±30
Total	12	65	486±195	64±64	35±36	0.131±0.093	8±6	266±107
April:								
Weekday	3	19	114±19	42±35	23±20	0.367±0.263	3±2	96±16
Weekend	2	1	2±3	0	0	-	-	1±2
Total	5	20	116±20	42±35	23±20	0.360±0.257	3±2	97±17
Grand total	28	104	737±230	150±90	77±46	0.202±0.080	5±2	414±129

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 2014-15 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	6	35	577±378	63±62	27±30	0.110±0.078	9±6	109±71
Weekend	5	76	581±151	29±27	8±9	0.050±0.029	20±12	121±31
Total	11	111	1,158±407	92±68	35±31	0.080±0.041	13±7	230±81
March:								
Weekday	7	56	803±535	114±67	41±27	0.141±0.069	7±3	170±113
Weekend	5	129	920±165	94±31	29±14	0.102±0.022	10±2	241±43
Total	12	185	1,723±560	208±74	70±30	0.120±0.034	8±2	411±134
April:								
Weekday	3	39	734±395	304±185	55±49	0.415±0.215	2±1	148±80
Weekend	2	17	155±106	48±7	6±1	0.310±0.029	3±0	34±23
Total	5	56	889±409	352±185	61±49	0.396±0.177	3±1	182±84
Grand total	28	352	3,770±804	652±210	166±65	0.173±0.046	6±2	823±176
Sec.1 + 2	**28**	**456**	**4,507±836**	**802±229**	**243±80**	**0.178±0.041**	**6±1**	**1,237±229**

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 2014-15 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	6	1	3±4	0	0	-	-	1±1
Weekend	5	0	-	-	-	-	-	-
Total	11	1	3±4	0	0	-	-	1±1
March:								
Weekday	7	8	47±50	3±7	0	0.066±0.062	15±14	15±16
Weekend	5	6	13±14	4±6	0	0.283±0.152	4±2	4±4
Total	12	14	60±52	7±9	0	0.112±0.059	9±5	19±16
April:								
Weekday	3	5	24±24	0	0	-	-	9±9
Weekend	2	1	10±14	16	6	1.600	0.6	3±4
Total	5	6	34±28	16	6	0.465	2	12±10
Grand total	28	21	97±59	23±9	6	0.234±0.036	4±1	32±19

APPENDIX B

Percent of Summer Steelhead That Were Marked Hatchery Fish and Caught during the 2014-15 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 2014-15 run year. 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	24(88)	28(731)	49(230)	47(178)	42(183)	58(81)	25(163)	-
Rondowa	-	-	-	-	-	80(92)	60(77)	-(0)
Wallowa River	-	-	-	-	-	88(361)	79(312)	61(184)
Imnaha River (Section 1)	-	-	-	-	-	43(44)	55(64)	67(42)
Imnaha River (Section 2)	-	-	-	-	-	58(92)	50(208)	36(352)
Big Sheep Cr.	-	-	-	-	-	-(0)	57(7)	75(16)

APPENDIX C

Fishery Statistics for Spring Fisheries for the 2013-14 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 2013-14 run year. Total harvest = 0.525 (harvest card) + 5.465. 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 120) or upper Grande Ronde (location code 233).

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
Rondowa (234)										
Angler harvest cards	0	5	24	0	21	123	235	64		
Sampled fish	0	0	0	0	0	1	1	0		
Total harvest	-	8	18	-	16	70	129	39	280	
Sample rate expansion	-	-	-	-	-	70.0	129.0	-		
Wallowa (235)										
Angler harvest cards	0	5	5	5	11	149	555	261		
Sampled fish	0	0	0	0	0	36	91	60		
Total harvest	-	8	8	8	11	84	297	142	558	
Sample rate expansion	-	-	-	-	-	2.3	3.3	2.4		
09 02 98						1	0	0	1	2
09 02 99						1	0	0	1	2
09 03 18						0	2	1	3	9
09 03 19						0	4	0	4	13
09 04 22						1	1	0	2	5
09 04 23						0	1	3	4	10
09 04 24						1	1	0	2	5
09 04 25						0	0	1	1	2
09 04 27						0	0	1	1	2
09 04 28						0	0	2	2	5
09 04 29						3	2	1	6	16
09 04 30						0	0	4	4	9
Wenaha (184)										
Angler harvest cards	0	0	0	0	0	0	5	0		
Total harvest	-	-	-	-	-	-	8	-	8	
Middle Grande Ronde (232)										
Angler harvest cards	0	19	5	14	16	5	0	0		
Total harvest	-	15	8	13	14	8	-	-	58	
Total Grande Ronde harvest (excluding lower Grande Ronde)									904	

Appendix Table C-2. Estimated catch of summer steelhead in spring fisheries in the Grande Ronde basin for the 2013-14 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	-	-	-	-	-	-	-	-	0
Total catch	-	-	-	-	-	-	-	-	0
Catherine Creek									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	-	-	-	-	-	-	-	0
Total catch	-	-	-	-	-	-	-	-	0
Rondowa									
Sampled harvest	-	-	-	-	-	1	1	0	2
Sampled catch	-	-	-	-	-	2	1	0	3
Total harvest	-	8	18	-	16	70	129	39	280
Total catch	-	12	27	-	24	105	194	59	421
Wallowa									
Sampled harvest	-	-	-	-	-	36	91	60	187
Sampled catch	-	-	-	-	-	67	171	133	371
Total harvest	-	8	8	8	11	84	297	142	558
Total catch	-	16	16	16	22	156	558	315	1,099
Wenaha									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	-	-	-	-	-	8	-	8
Total catch	-	-	-	-	-	-	15	-	15
Middle Grande Ronde									
Sampled harvest	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-
Total harvest	-	15	8	13	14	8	-	-	58
Total catch	-	30	16	26	28	15	-	-	115
Total Grande Ronde catch (excluding lower Grande Ronde)									1,650

[a] *Wallowa data were used for the upper Grande Ronde, middle Grande Ronde, and Catherine Creek; lower Grande Ronde data, in Flesher et al. 2016, 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 2013-14 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	-	-	-	-	-	-	-	-	0
Angler effort	-	-	-	-	-	-	-	-	0
Catherine Creek									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	-	-	-	-	-	-	-	0
Angler effort	-	-	-	-	-	-	-	-	0
Rondowa									
Catch rate	-	-	-	-	-	0.021	0.011	-	0.015
Total catch	-	12	27	-	24	105	194	59	421
Angler effort	-	800	1,800	-	1,600	5,000	17,636	3,933	30,769
Wallowa									
Catch rate	-	-	-	-	-	0.068	0.098	0.119	0.096
Total catch	-	16	16	16	22	156	558	315	1,099
Angler effort	-	167	167	167	229	2,294	5,694	2,647	11,365
Wenaha									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	-	-	-	-	-	15	-	15
Angler effort	-	-	-	-	-	-	259	-	259
Middle Grande Ronde									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	30	16	26	28	15	-	-	115
Angler effort	-	313	167	271	292	221	-	-	1,264
Total Grande Ronde angler effort (excluding lower Grande Ronde)									43,657

[a] *Wallowa data were used for the upper Grande Ronde, middle Grande Ronde, and Catherine Creek; lower Grande Ronde data, in Flesher et al. 2016, were used for the Wenaha.*