

LOWER SNAKE RIVER COMPENSATION PLAN:
Summer Steelhead Creel Surveys on the
Grande Ronde, Wallowa, and Imnaha
Rivers for the 2008-09 Run Year

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



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LOWER SNAKE RIVER
COMPENSATION PLAN

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Front cover photo of Andy VanSickle angling for summer steelhead on the Wallowa River in February 2011. Photo by Bob Swingle.

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PREFACE

This report is for the funding period 1 October 2008 to 30 September 2009. The sampling period was from 1 September 2008 to 15 April 2009. 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 2008-2009 run year were primarily from the 2005 and 2006 brood years. Results of creel surveys conducted prior to fall 2008 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, and 2010), many of which are available at:

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 2008 to 15 April 2009 in the Grande Ronde and Imnaha river basins.

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CONTENTS

	Page
PREFACE	i
ACKNOWLEDGMENTS	ii
LIST OF FIGURES	iv
LIST OF TABLES	vi
LIST OF APPENDICES	vii
SUMMARY	1
INTRODUCTION	1
STUDY AREA	2
METHODS	4
ACCOMPLISHMENTS AND FINDINGS	6
MANAGEMENT IMPLICATIONS AND RECOMMENDATIONS	15
REFERENCES	21
APPENDICES	24

LIST OF FIGURES

<u>Number</u>		<u>Page</u>
1.	Map of northeastern Oregon showing where summer steelhead creel surveys were conducted in the Grande Ronde and Imnaha river basins during the 2008-09 run year.....	3
2.	Estimated total catch of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2008-09 run year	8
3.	Estimated total harvest of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2008-09 run year	8
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 2008-09 run year	9
5.	Estimated number of angler days for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2008-09 run year.....	10
6.	Estimated number of angler hours for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2008-09 run year.....	10
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 2008-09 run year that were marked.	11
8.	Angler effort for summer steelhead (vertical bars show 95% confidence intervals) in spring fishery areas (upper Grande Ronde River, Wallowa River, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2008-09 run years	17
9.	Number of hatchery summer steelhead harvested (vertical bars show 95% confidence intervals) by recreational anglers in spring fishery areas (upper Grande Ronde River, Wallowa River, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2008-09 run years.	17

LIST OF FIGURES (continued)

<u>Number</u>		<u>Page</u>
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 2007-08 run years	20
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 2008 for the lower Grande Ronde, and 1986-1996, 1999-2008 for the Imnaha fishery areas).....	20

LIST OF TABLES

<u>Number</u>		<u>Page</u>
1.	Percent age composition and mean fork length ($\pm 95\%$ confidence intervals) of hatchery summer steelhead sampled in creel surveys in the Grande Ronde and Imnaha river basins during the 2008-09 run year	12
2.	Residence of summer steelhead anglers interviewed during creel surveys in the Grande Ronde and Imnaha river basins during the 2008-09 run year	12
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 2008-09 run year	13
4.	Estimated total catch (harvested and released) of hatchery and wild summer steelhead from statistical angler surveys on the lower Grande Ronde from 1 September to 15 April, and Imnaha River from 1 February to 15 April for the 1985-86 to 2008-09 run years	18
5.	Catch rate index (hours/fish $\pm 95\%$ confidence intervals) in summer steelhead creel survey areas in the Grande Ronde and Imnaha river basins for the 1985-86 to 2008-09 run years	19

LIST OF APPENDICES

<u>Number</u>		<u>Page</u>
A-1.	Fishery statistics for summer steelhead on the lower Grande Ronde River during the 2008-09 run year	25
A-2.	Catch rate ($\pm 95\%$ confidence intervals) for summer steelhead at Rondowa during the 2008-09 run year	26
A-3.	Catch rate ($\pm 95\%$ confidence intervals) for summer steelhead on the Wallowa River during the 2008-09 run year.....	26
A-4.	Fishery statistics for summer steelhead in Section 1 (Fence Creek to town of Imnaha) of the Imnaha River during the 2008-09 run year.....	27
A-5.	Fishery statistics for summer steelhead in Section 2 (mouth to Fence Creek) of the Imnaha River during the 2008-09 run year.....	27
B.	Percent of marked hatchery summer steelhead caught during each survey month in the Grande Ronde and Imnaha river basins during the 2008-09 run year	28
C-1.	Estimated harvest of summer steelhead, and observed and expanded harvest of AdLV+CWT marked steelhead in spring fisheries in the Grande Ronde basin for the 2007-08 run year	30
C-2.	Estimated catch of summer steelhead in spring fisheries in the Grande Ronde basin for the 2007-08 run year	32
C-3.	Estimated angler effort (hours) for summer steelhead in spring fisheries in the Grande Ronde basin for the 2007-08 run year.....	33
D.	Summary of adult steelhead recycled back to the Wallowa River fishery from the Big Canyon Facility for the 2008-09 run year.....	35

SUMMARY

In the recreational summer steelhead fisheries during the 2008-09 run year, angler effort was similar to the previous year on the lower Grande Ronde River and declined on the Imnaha River, and both were higher than the overall average since surveys began in 1985. Angler effort and harvest in the spring fishery areas (upper Grande Ronde River, Wallowa River, Catherine Creek, and Rondowa) is not yet available for this report; however, this data became available for the 2007-08 run year, and it showed that effort was the second highest on record. Compared to the prior year, harvest declined on both the lower Grande Ronde and Imnaha rivers and total catch increased on the lower Grande Ronde and decreased on the Imnaha, although both were higher than the overall average on each stream. Compared to the prior year, catch and release of wild steelhead on the lower Grande Ronde increased, as did the percent of wild fish released. On the Imnaha River the number of wild steelhead caught and released is unknown due to unmarked hatchery returns in recent years; however, both the number and percent of unmarked steelhead (both wild and hatchery fish) in the total catch declined from the previous year. Catch rates were similar to the previous year on the lower Grande Ronde, Wallowa, and Imnaha rivers but declined at Rondowa (mouth of the Wallowa River), although all were higher than the overall average of 10-13 hours per fish. Hatchery fish dominated the catch during the late fall and winter months on the lower Grande Ronde River and during the spring months on the Wallowa River and at Rondowa, and hatchery fish contributed substantially to the Imnaha River fishery, although many hatchery fish were not clipped and thus were indistinguishable from wild fish. Anglers harvested more one-ocean than two-ocean hatchery steelhead in the lower Grande Ronde and Imnaha river fisheries, more two-ocean than one-ocean hatchery steelhead on the Wallowa, more males on the lower Grande Ronde, and more females on the Wallowa, Rondowa, and Imnaha fisheries. As in prior years, local residents were the greatest percentage of anglers in Grande Ronde and Imnaha basin steelhead fisheries. At Rondowa, the percentage of non-local anglers from Oregon, Washington, and other states was higher than the percentage of local resident anglers. We sampled adipose and left ventral and right ventral fin-clipped and coded-wire-tagged (AdLV+CWT and AdRV+CWT) summer steelhead in both the Grande Ronde and Imnaha basin fisheries. Expanded estimates for the Wallowa and Rondowa fisheries will not be determined until statewide angler harvest tag summaries become available, but harvest, catch, and angler effort for the 2007-08 run year are reported in the appendices. One hundred-eight adult steelhead were recycled back into the Wallowa River fishery from the Big Canyon Facility during the spring 2009 and they provided some additional harvest and catch and release opportunities for anglers.

INTRODUCTION

Summer steelhead (*Oncorhynchus mykiss*) fisheries in the Grande Ronde and Imnaha river basins were closed in 1974. This closure was prompted by declining adult returns, as indicated by adult counts at Ice Harbor Dam on the Snake River (USACOE 1996), and low steelhead redd counts on index streams in the Grande Ronde and Imnaha river basins (Oregon Department of Fish and Wildlife District Annual Reports

1949-1974). The Lower Snake River Compensation Plan (LSRCP), initiated by Congress in 1976, was developed to compensate for losses of anadromous salmonids in the Snake River basin from construction of the four lower Snake River dams built between 1962 and 1976. Thus, the focus of the LSRCP is the Snake River above Lower Granite Dam (Rkm 173), the uppermost of these four dams. One of the primary objectives of the LSRCP in Oregon is to restore historic recreational and tribal fisheries for summer steelhead in the Grande Ronde and Imnaha river basins (Carmichael 1989). Approximately 1.68 million steelhead smolts were targeted for release in Oregon each year during April and May in the Grande Ronde and Imnaha river basins between 1984 and 1999. In 2000, we reduced releases to approximately 1.2 million smolts in response to the National Marine Fisheries Service's recommendation to help reduce straying of Wallowa hatchery stock steelhead, primarily into the Deschutes River (mid-Columbia tributary). In 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, and 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. These fish provide hatchery adult returns that contribute to recreational fisheries and may supplement natural spawning populations in northeast Oregon. Consumptive recreational fisheries for summer steelhead re-opened in 1986, in part as a result of increases in hatchery adult returns.

We began creel surveys for summer steelhead during the fall of 1985 in both the Grande Ronde and Imnaha river basins. The goal of these surveys is to provide annual harvest information needed to assess LSRCP goals (Carmichael and Wagner 1983). In general, the number of summer steelhead in the recreational fishery has been restored to historic values, but the fishery is concentrated at different times and places (Flesher et al. 1994). This report summarizes results of creel surveys conducted during the fall of 2008 and the spring of 2009 in the Grande Ronde and Imnaha river basins. In addition, this report contains estimates of total effort, catch, and harvest for all fisheries in the Grande Ronde river basin not reported in the previous annual report for the 2007-08 run year. The Grande Ronde and Imnaha river basins encompass the major steelhead fisheries that occur in Oregon tributaries to the Snake River upstream of Lower Granite Dam. As in recent years, the 2008-09 steelhead angling season in the Grande Ronde and Imnaha river basins was open from 1 September 2008 to 15 April 2009.

STUDY AREA

Creel surveys on the Grande Ronde River were conducted on a lower 24 km section from the Oregon-Washington state line (Rkm 62) upstream to Wildcat Creek (Rkm 86,

Figure 1). Surveys on the Wallowa River were conducted on a 6 km section from its confluence with the Grande Ronde River at Rondowa (mouth of the Wallowa River) upstream to Howard Creek (Rkm 6) and a 50 km section from Minam State Park (Rkm 13) upstream to the mouth of Trout Creek (Rkm 63) near Enterprise. Anglers who parked their vehicles at Minam State Park to fish just below the park were included in the Wallowa survey. Because vehicle access into Rondowa was limited, anglers parked their vehicles at Palmer Junction, located 5.6 km upstream of Rondowa on the

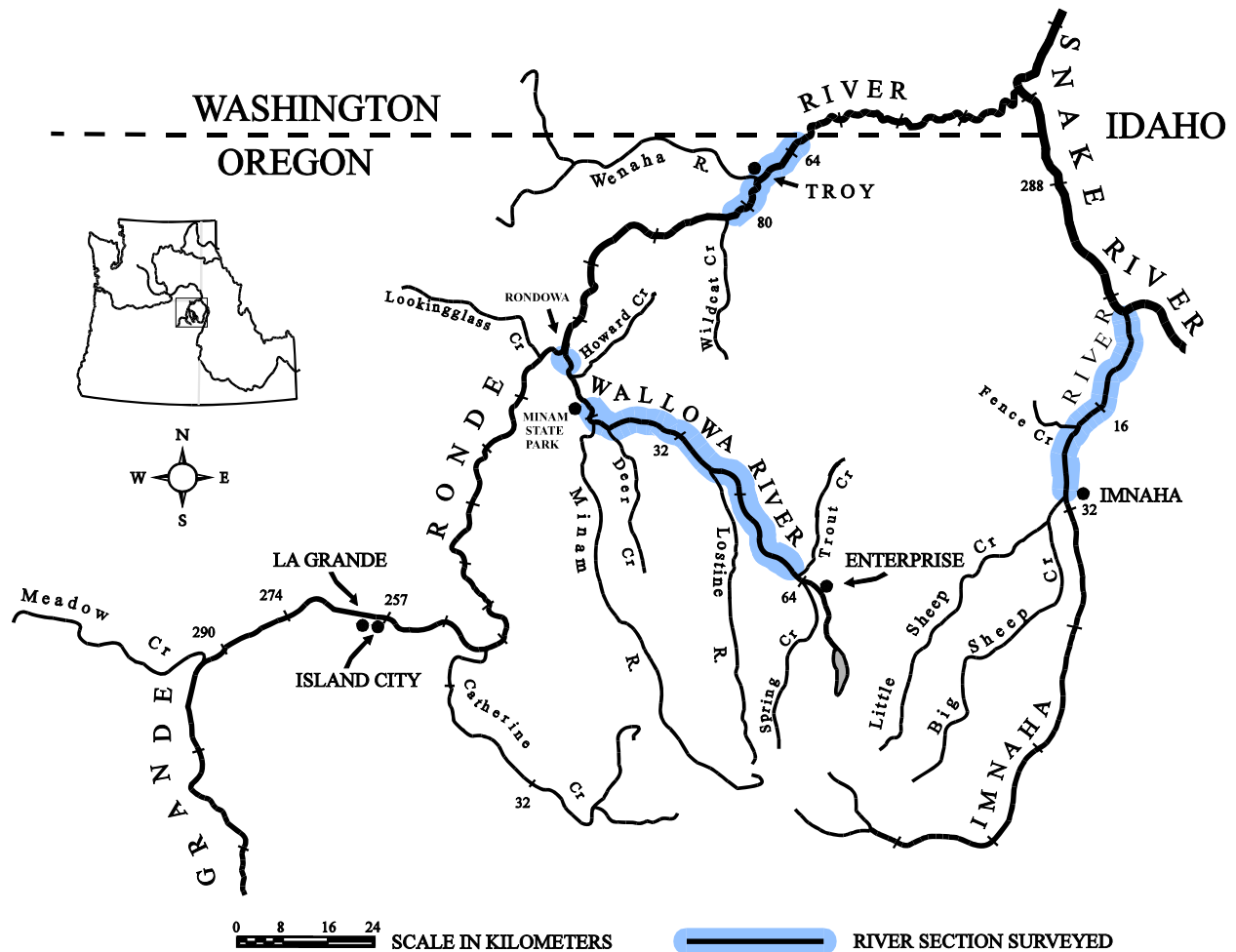


Figure 1. Map of northeastern Oregon showing where summer steelhead creel surveys were conducted in the Grande Ronde and Imnaha river basins during the 2008-09 run year.

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 at Palmer Junction and at the gate on Smith Mountain Road when they were encountered. The survey on the Imnaha River was conducted on the lower 32 km from its confluence with the Snake River (Rkm 0) upstream to the mouth of Big Sheep Creek (Rkm 32) near the town of Imnaha (Figure 1).

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 16 December 2008 and from 29 December 2008 to 11 April 2009. The survey was not conducted from 17-28 December 2008 and 12-15 April 2009 because there was no angling effort due to the river freezing over (in December) and flooding (in April) within the survey area. Our goal was to sample 50% of the weekends (Saturday and Sunday) and holidays and 30% of the weekdays (Monday through Friday) during each month of each survey. Sample days were chosen randomly in two-day blocks, representing two strata (weekend days and holidays, and weekdays). On each sample day, beginning at a randomly selected start time, the creel surveyor conducted a pressure count by tallying all anglers and vehicles every three hours while driving a vehicle along the entire survey route. Between pressure counts, the surveyor interviewed anglers by recording a description of each angler, what species of fish they were angling for, what type of angling gear they were using, their residence, the number of hours they had fished, and the number and species of fish caught. The surveyor also sampled all harvested fish by recording fork length (mm), gender, fin clips, and any external tags. If the fish was coded-wire-tagged (CWT), as indicated by adipose and either left or right ventral fin-clips (AdLV or AdRV), the surveyor asked permission from the angler to collect the snout, then excised the snout behind the eye and placed it with an identification number in a plastic bag for later processing.

Surveys on the Imnaha River were conducted from 1 February through 15 April 2009. For the Imnaha River survey, we used a check station for the area below Fence Creek (Rkm 23) and a roving survey in the area above Fence Creek. We selected sample days using the same methodology described for the lower Grande Ronde River survey. Our goal was to survey 50% of the weekends and 30% of the weekdays during each month of each survey. For the check station, we used the methodology described by Carmichael et al. (1988). The check station was designed so that anglers leaving the lower river area during a sample day would stop voluntarily and the surveyor would interview each angler and sample all harvested fish. At the end of the second sample day, the surveyor would drive to Cow Creek (Rkm 7) and interview all anglers encountered that fished during the two-day period and did not exit through the check station. For the roving survey, we followed the same procedures as on the lower Grande Ronde River survey except that the surveyor interviewed anglers during pressure counts. For each pressure count, the surveyor closed the check station,

interviewed and enumerated all anglers from Fence Creek to the town of Imnaha, and returned. Time spent away from the check station was recorded, and catch and harvest data was expanded to account for the unsampled time.

For the Wallowa River and Rondowa survey areas, one surveyor conducted angler interviews from 1 February to 15 April 2009. We surveyed the Wallowa River area each sample day and surveyed both the Wallowa and Rondowa survey areas every other sample day. For the Wallowa River survey, the surveyor drove the survey route from Trout Creek downstream to Minam State Park, stopped to interview anglers, then waited at the park for approximately one hour and interviewed returning anglers that had hiked below the park to fish, and then repeated this sequence. On alternate sample days, the surveyor drove the survey route from Minam State Park upstream to Trout Creek, stopping to interview anglers along the way, then drove to the Smith Mountain parking area that anglers use to access Rondowa and interviewed anglers returning from Rondowa for approximately one hour, and then repeated the sequence. For the month of February, 2009 the Smith Mountain road closed to reduce vehicle disturbance of wildlife. Anglers also accessed Rondowa from the community of Palmer Junction on the Grande Ronde River, so our surveyor drove there to interview anglers returning from Rondowa. During the rest of the season, the surveyor would occasionally drive to Palmer Junction 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 creel surveys, we estimated angler effort in hours and days, total catch, harvest, catch rate, percent hatchery fish in the catch, and the number of AdLV+CWT and AdRV+CWT marked fish harvested (see Carmichael et al. 1988). Similar statistics were estimated for the Imnaha River surveys, except the percent of marked fish was substituted for percent of hatchery fish, since unmarked hatchery steelhead were not distinguishable from wild adults. For the Wallowa and Rondowa survey areas, we estimated catch rate and percent hatchery fish in the catch. In addition, we determined age and gender composition and mean fork length of harvested fish in all survey areas. Catch rate was expressed as an index, hours per fish, in which lower values indicate better angling success and higher values indicate poorer angling success.

We estimated total harvest by month during spring fisheries in the Grande Ronde basin (including the Wenaha River and Catherine Creek) for the previous year (2007-08 run year) that do not have a statistical creel survey in place, by using the angler harvest card estimates of harvest and a regression between angler harvest card harvest and creel survey harvest for specific reaches within the Grande Ronde and Imnaha basins for previous years. The regression is updated annually with lower Grande Ronde and Imnaha fishery harvest estimates from angler harvest tag returns and from the statistical surveys that were conducted. However, there is usually a one or two-year delay in obtaining final angler harvest tag estimates of total harvest. To estimate total catch, we multiplied total harvest estimates by the ratio of sampled catch to sampled harvest from

creel surveys. To estimate total angler effort in hours, we used total catch divided by the sample catch rate (fish per hour) reported in the previous years' annual report (Flesher et al. 2009).

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

In spring 2009, we recycled hatchery adult returns from the Big Canyon Facility back into the Wallowa River fishery, using methodology described by Flesher et al. (2007). Between 3 March and 10 April, 108 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. The creel surveyor checked for opercle punches on all harvested fish that were sampled after the recycled group was released.

ACCOMPLISHMENTS AND FINDINGS

On the lower Grande Ronde River from 1 September 2008 to 16 December 2008, and from 29 December 2008 to 11 April 2009, we sampled 53.8% of the weekends and holidays (35 days) and 31.3% of the weekdays (46 days) for a total of 81 sample days. On the Wallowa River from 1 February to 15 April 2009, we sampled 95.5% of the weekends and holidays (21 days) and 42.3% of the weekdays (22 days) for a total of 43 sample days. During the same time period at Rondowa, we sampled 59.1% of the weekends and holidays (13 days) and 7.7% of the weekdays (4 days) for a total of 17 sample days. On the Imnaha River from 1 February to 15 April 2009, we sampled 50.0% of the weekends and holidays (11 days) and 34.6% of the weekdays (18 days) for a total of 29 sample days.

We estimate that 3,159 anglers fished for 16,208 hours on the lower Grande Ronde River during the 2008-09 season. They caught and released 937 wild and 336 hatchery steelhead, and harvested 795 hatchery steelhead for an average catch rate index of 8 hours per fish (Figures 2-6, Appendix Table A-1). The percent of steelhead caught that were hatchery origin ranged from 11% in March 2009 to 64% in December 2008 (Figure 7, Appendix Table B). Fifty-eight percent of harvested hatchery steelhead spent one year in freshwater and one year in saltwater (hereafter designated 1:1), 40% spent one year in freshwater and two years in saltwater (designated 1:2); 1% spent two years in freshwater and one year in saltwater (hereafter designated 2:1), and 1% spent one year in freshwater and three years in saltwater (designated 1:3, Table 1). Mean fork length ($\pm 95\%$ confidence interval) of harvested hatchery steelhead was 601 (± 6) mm for age 1:1, 713 (± 10) mm for age 1:2, 604 mm for age 2:1, and 810 mm for age 1:3 (Table 1).

Gender composition was 54% male and 46% female (Table 1). Eighty-four percent of the anglers on the lower Grande Ronde River were Oregon resident anglers (both local and non-local), 3% were Washington State residents and 13% resided outside the states of Oregon and Washington, including anglers from both Germany and Scotland (Table 2). On the lower Grande Ronde River, anglers harvested an estimated 238 AdLV+CWT and AdRV+CWT marked steelhead from our hatchery releases and an estimated 2 AdLV+CWT marked steelhead from Washington Department of Fish and Wildlife releases on the Walla Walla River at river mile 35 in Washington (Table 3).

At Rondowa, the catch rate index averaged 12 hours per fish (Figure 4, Appendix Table A-2). The percent of steelhead caught that were hatchery origin ranged from 62% in March to 81% in February (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 48% 1:1 and 52% 1:2 (Table 1). Mean fork length ($\pm 95\%$ confidence interval) of harvested hatchery steelhead was 598 (± 19) mm for age 1:1 and 719 (± 18) mm for age 1:2 (Table 1). Gender composition was 48% male and 52% female (Table 1). Eight percent of the anglers at Rondowa were local Oregon resident anglers, 47% were non-local Oregon resident anglers, 17% were Washington State residents and 28% resided outside the states of Oregon and Washington (Table 2). At Rondowa, anglers harvested 8 AdLV+CWT and AdRV+CWT marked steelhead from our hatchery releases, however expanded estimates for the entire fishery will not be determined until state angler harvest tag data become available, as reported in Table 3.

On the Wallowa River, the catch rate index averaged 8 hours per fish (Figure 4, Appendix Table A-3). The percent of steelhead caught that were hatchery origin ranged from 83% in March to 86% in February (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 42% 1:1, and 58% 1:2, and less than 1% each for age 2:1 and 1:3 (Table 1). Mean fork length ($\pm 95\%$ confidence interval) of harvested hatchery steelhead was 604 (± 4) mm for age 1:1, 717 (± 5) mm for age 1:2, 595 mm for age 2:1, and 785 (± 445) mm for age 1:3 (Table 1). Gender composition was 42% male and 58% female (Table 1). Fifty-seven percent of the anglers on the Wallowa River were local Oregon residents, 35% 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 110 AdLV+CWT and AdRV+CWT marked steelhead from our hatchery releases, however expanded estimates for the entire fishery, as reported on in Table 3, will not be determined until state angler harvest tag data become available.

On the Imnaha River, we estimate that 1,510 anglers fished for 5,248 hours. They caught and released 638 unmarked (wild and hatchery) and 108 hatchery steelhead,

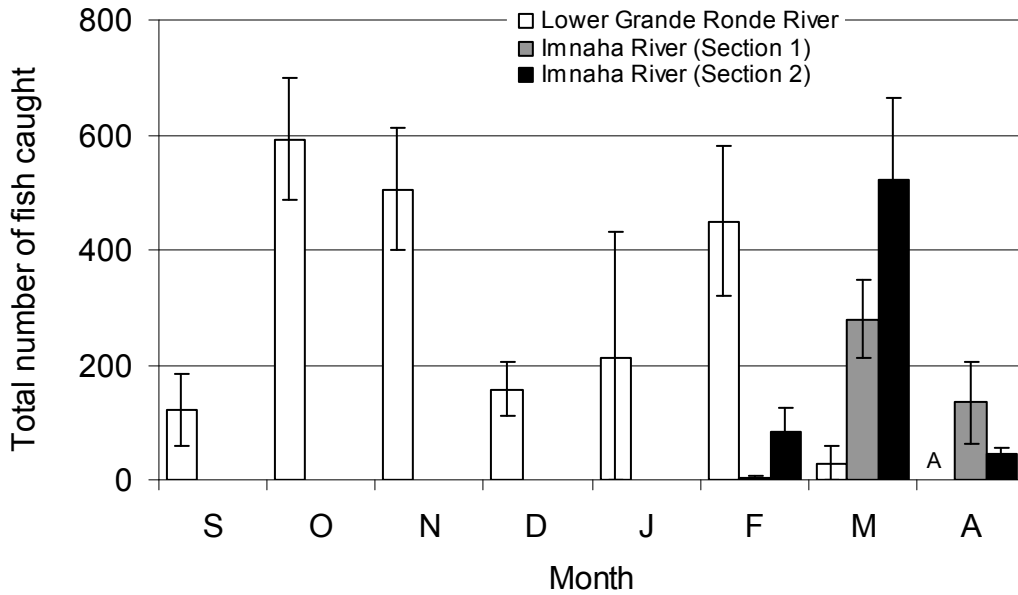


Figure 2. Estimated total catch of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2007-08 run year. “A” indicates no anglers. Surveys were conducted from 1 September 2008 to 15 April 2009 on the lower Grande Ronde River, and from 1 February to 15 April 2009 on the Imnaha River.

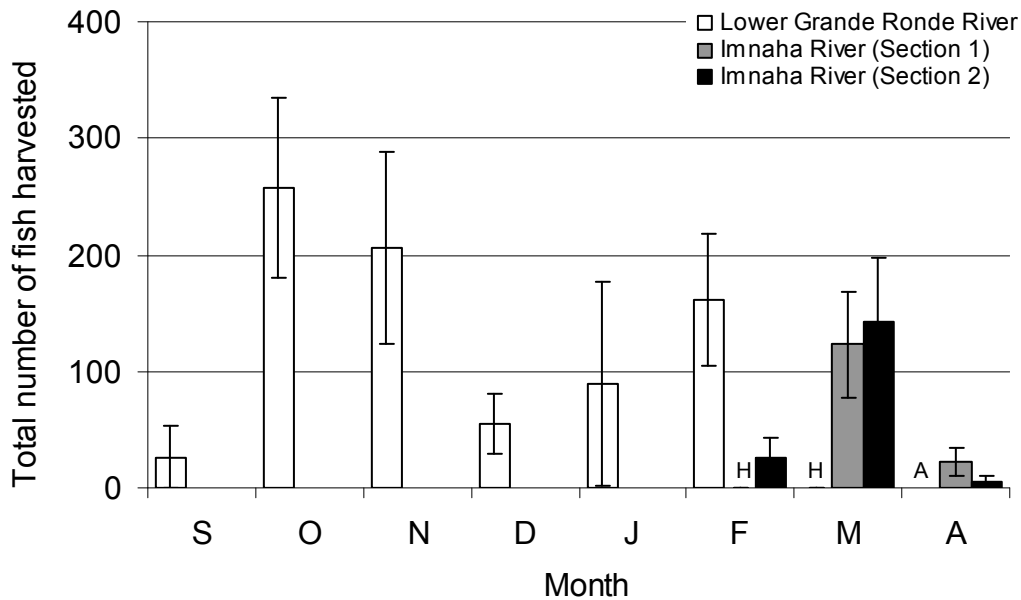


Figure 3. Estimated total harvest of summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2008-09 run year. “H” indicates no harvest and “A” indicates no anglers. Surveys were conducted from 1 September 2008 to 15 April 2009 on the lower Grande Ronde River, and from 1 February to 15 April 2009 on the Imnaha River.

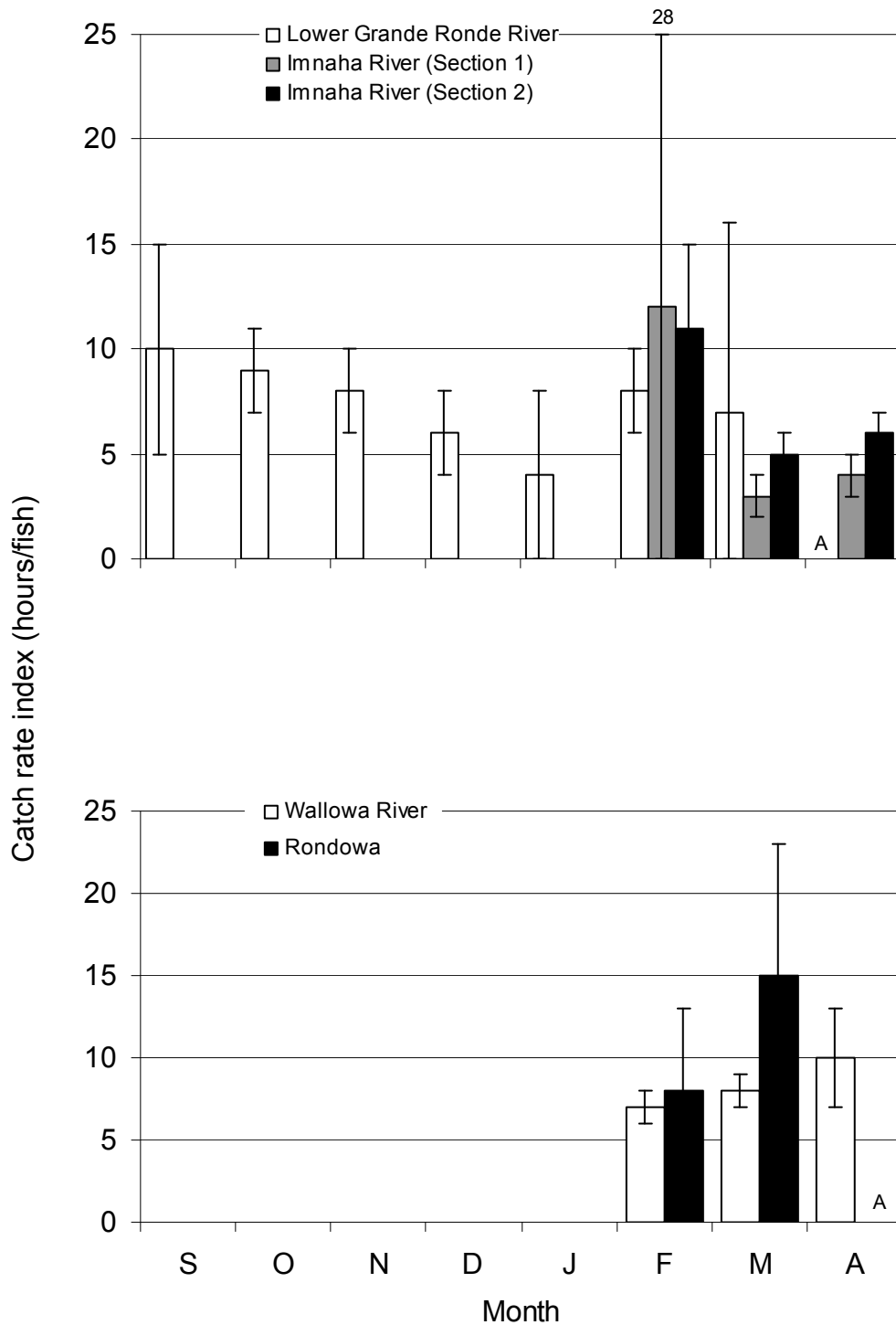


Figure 4. Estimated catch rate index (hours/fish) for summer steelhead (vertical bars show 95% confidence intervals) in the Grande Ronde and Imnaha river basins during the 2008-09 run year. "A" indicates no anglers. Survey areas and times include the lower Grande Ronde River (1 September 2008 – 15 April 2009), and Rondowa, Wallowa River, and two sections of the Imnaha River (1 February – 15 April 2009). Note: A lower catch rate index implies better angling success.

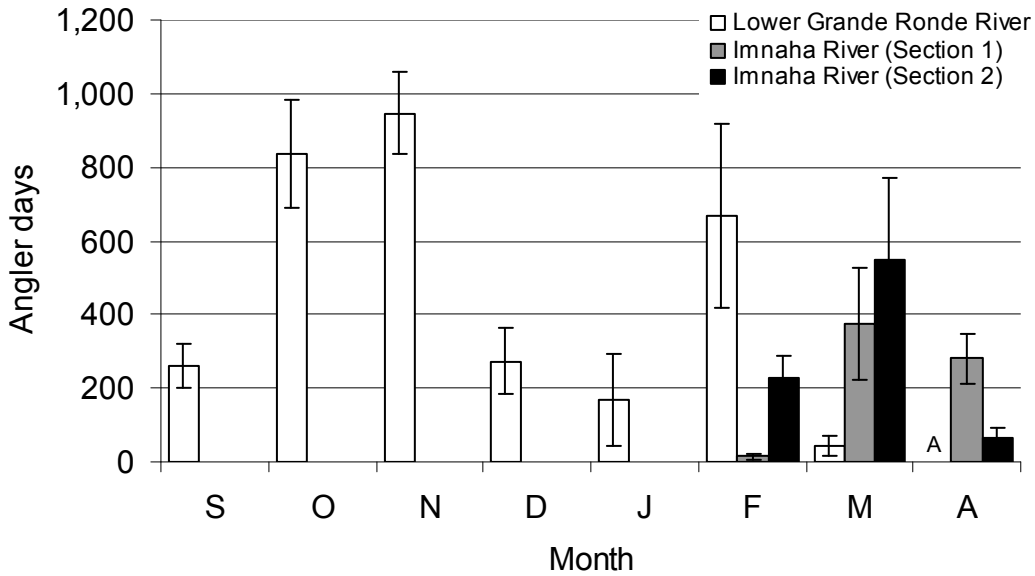


Figure 5. Estimated number of angler days for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2008-09 run year. "A" indicates no anglers. Surveys were conducted from 1 September 2008 to 15 April 2009 on the lower Grande Ronde River, and from 1 February to 15 April 2009 on the Imnaha River.

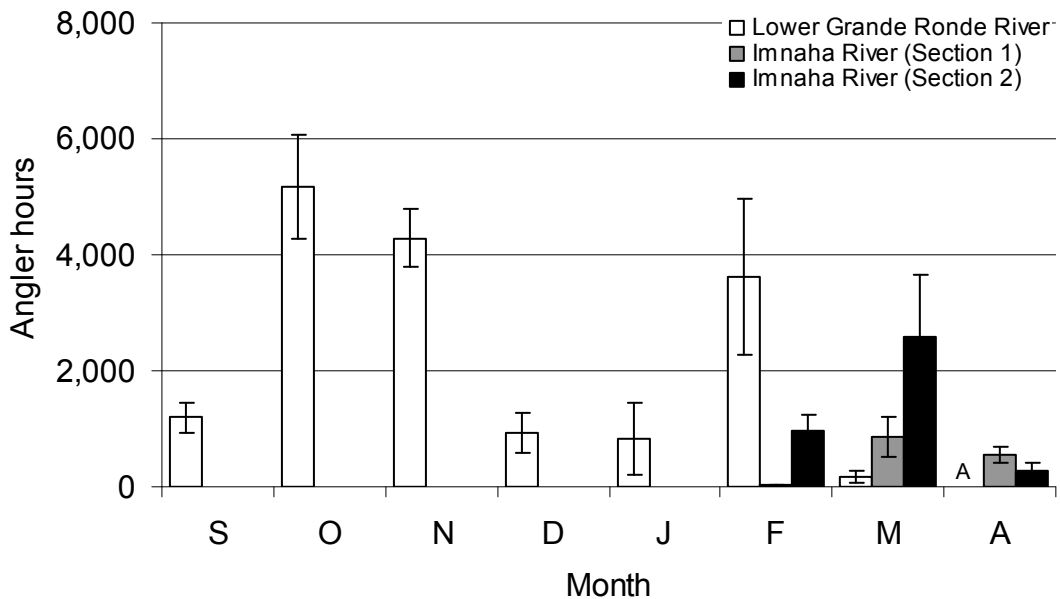


Figure 6. Estimated number of angler hours for summer steelhead (vertical bars show 95% confidence intervals) on the lower Grande Ronde River, and two sections of the Imnaha River during the 2008-09 run year. "A" indicates no anglers. Surveys were conducted from 1 September 2008 to 15 April 2009 on the lower Grande Ronde River, and from 1 February to 15 April 2009 on the Imnaha River.

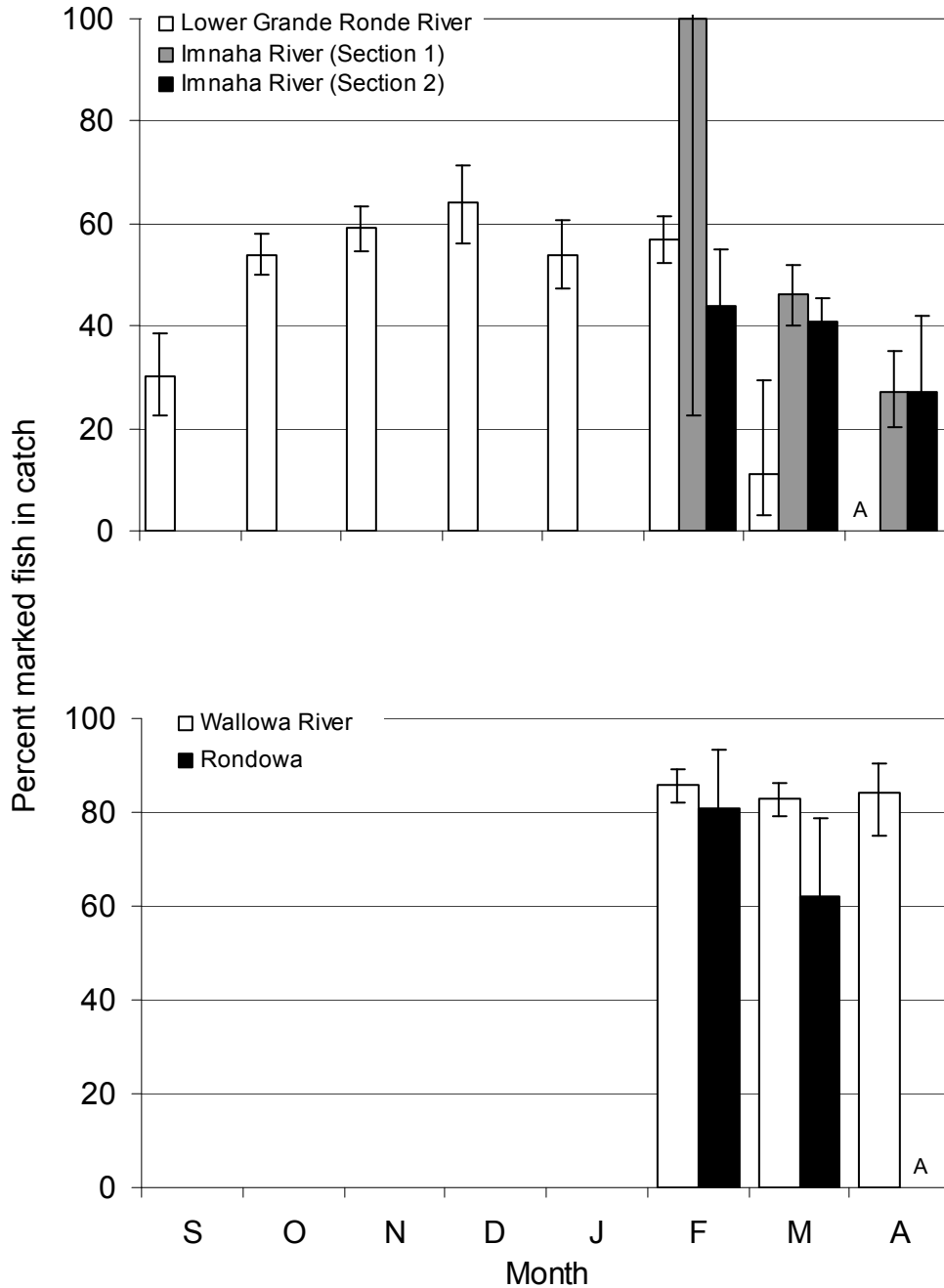


Figure 7. Estimated percent of summer steelhead caught (vertical bars show 95% confidence intervals; using a binomial distribution) in the Grande Ronde and Imnaha river basins during the 2008-09 run year that were marked. "A" indicates no anglers. In the Grande Ronde basin all unmarked fish were wild, 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 2008 – 15 April 2009), and Rondowa, Wallowa River, and two sections of the Imnaha River (1 February - 15 April 2009).

Table 1. Percent age composition and mean fork length (\pm 95% confidence intervals) of hatchery summer steelhead sampled in creel surveys in the Grande Ronde and Imnaha river basins during the 2008-09 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 2009 and Little Sheep Creek Facility (for the Imnaha River survey area) in 2008 and 2009. 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 area, gender	Age composition (%)					Mean fork length (mm)							
	N	1:1	1:2	2:1	1:3	N	1:1	N	1:2	N	2:1	N	1:3
Lower GR R.													
Males	112	67	29	1	3	67	608 \pm 7	30	723 \pm 16	1	604	2	810 \pm 0
Females	95	48	52	0	0	43	589 \pm 8	46	706 \pm 12	0	-	0	-
Total	207	58	40	1	1	110	601 \pm 6	76	713 \pm 10	1	604	2	810 \pm 0
Rondowa													
Males	11	64	36	0	0	6	604 \pm 25	4	705 \pm 56	0	-	0	-
Females	12	33	67	0	0	3	586 \pm 62	7	728 \pm 15	0	-	0	-
Total	23	48	52	0	0	9	598 \pm 19	11	719 \pm 18	0	-	0	-
Wallowa R.													
Males	208	60	39	1	0	119	608 \pm 5	78	728 \pm 9	1	595	1	820
Females	289	29	71	0	0	79	598 \pm 5	198	713 \pm 5	0	-	1	750
Total	497	42	58	0	0	198	604 \pm 4	276	717 \pm 5	1	595	2	785 \pm 445
Imnaha R.													
Males	42	79	21	0	0	28	593 \pm 13	8	743 \pm 50	0	-	0	-
Females	48	35	65	0	0	16	578 \pm 11	28	726 \pm 15	0	-	0	-
Total	90	56	44	0	0	44	588 \pm 9	36	730 \pm 15	0	-	0	-

Table 2. Residence of summer steelhead anglers interviewed during creel surveys in the Grande Ronde and Imnaha river basins during the 2008-09 run year. Local Oregon resident anglers were from Union and Wallowa counties.

Creel survey area	Number of anglers	Percent			
		Local Oregon resident anglers	Non-local Oregon resident anglers	Washington resident anglers	Other out-of-state anglers ^a
Lower GR River	1,121	<i>b</i>	<i>b</i>	3	13
Rondowa	85	8	47	17	28
Wallowa River	1,788	57	35	3	5
Imnaha River	472	75	19	2	4

^a Out-of-state anglers on the Lower Grande Ronde River include an angler from Germany and one from Scotland, and on the Wallowa River, an exchange student angler from the Czech Republic.

^b Local and non-local Oregon residents were not separated during the Lower Grande Ronde angler survey and averaged 84%.

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 2008-09 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	07 41 32	Spring Cr.	Prod./April	2005	2	9
	07 41 33	Spring Cr.	Prod./April	2005	1	6
	07 41 34	Deer Cr.	Prod./April	2005	3	13
	07 41 35	Spring Cr.	Fall Brood/April	2005	4	14
	09-26-08	Spring Cr.	Fall Brood/April	2005	2	12
	09-26-44	Spring Cr.	Fall Brood/April	2005	1	3
	09-26-45	Spring Cr.	Fall Brood/April	2005	6	14
	09 43 01	Spring Cr.	Fall Brood/May	2005	1	3
	09 43 02	Deer Cr.	Volitional/May	2005	1	5
	09 43 03	Spring Cr.	Volitional/May	2005	1	7
	09 43 05	Spring Cr.	Prod./April	2006	3	15
	09 44 01	Spring Cr.	Prod./April	2006	6	21
	09 44 02	Spring Cr.	Prod./April	2006	5	26
	09 44 03	Spring Cr.	Fall Brood/April	2006	6	24
	09 44 04	Spring Cr.	Fall Brood/April	2006	3	12
	09 44 05	Spring Cr.	Fall Brood/April	2006	6	20
	09 44 06	Spring Cr.	Fall Brood/May	2006	4	18
	09 44 07	Deer Cr.	Prod./April	2006	3	11
	09 44 08	Deer Cr.	Volitional/May	2006	2	5
	63-36-66	-	-	WDFW ^c	2006	1
Wallowa River	07 41 31	Spring Cr.	Prod./April	2005	2	ND
	07 41 32	Spring Cr.	Prod./April	2005	3	ND
	07 41 33	Spring Cr.	Prod./April	2005	5	ND
	07 41 34	Deer Cr.	Prod./April	2005	21	ND
	07 41 35	Spring Cr.	Fall Brood/April	2005	1	ND
	09 26 44	Spring Cr.	Fall Brood/April	2005	4	ND
	09 26 45	Spring Cr.	Fall Brood/April	2005	4	ND
	09 43 01	Spring Cr.	Fall Brood/May	2005	3	ND
	09 43 02	Deer Cr.	Volitional/May	2005	8	ND
	09 43 03	Spring Cr.	Volitional/May	2005	3	ND
	09 43 05	Spring Cr.	Prod./April	2006	3	ND
	09 43 63	Spring Cr.	Volitional/May	2006	3	ND
	09 44 01	Spring Cr.	Prod./April	2006	1	ND
	09 44 02	Spring Cr.	Prod./April	2006	8	ND
	09 44 03	Spring Cr.	Fall Brood/April	2006	4	ND
	09 44 04	Spring Cr.	Fall Brood/April	2006	7	ND
	09 44 05	Spring Cr.	Fall Brood/April	2006	7	ND
	09 44 06	Spring Cr.	Fall Brood/May	2006	3	ND
	09 44 07	Deer Cr.	Prod./April	2006	17	ND
	09 44 08	Deer Cr.	Volitional/May	2006	3	ND
Rondowa	07 41 35	Spring Cr.	Fall Brood/April	2005	1	ND
	09 26 44	Spring Cr.	Fall Brood/April	2005	1	ND
	09 44 01	Spring Cr.	Prod./April	2006	1	ND
	09 44 02	Spring Cr.	Prod./April	2006	1	ND
	09 44 04	Spring Cr.	Fall Brood/April	2006	1	ND
	09 44 06	Spring Cr.	Fall Brood/May	2006	1	ND
	09 44 07	Deer Cr.	Prod./April	2006	2	ND

Table 3. Continued.

Creel survey area	Tag code	Release site	Experimental group ^a	Brood Year	Number recovered	
					Observed	Expanded ^b
Imnaha River	07 41 30	L. Sheep Cr.	Volitional/April	2005	2	7
	09 43 04	L. Sheep Cr.	Volitional/April	2006	5	15

^a *Prod.* indicates production releases and Fall Brood releases are forced-released over a 24-hour period. The volitional 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 36 66 were Lyons Ferry Hatchery stock that were direct stream released by Washington Department of Fish and Wildlife (WDFW) in the Walla Walla River at river mile 35, Washington, on 17 April 2007.

and harvested 319 hatchery steelhead for an average catch rate index of 5 hours per fish (Figures 2-6, Appendix Tables A-4 and A-5). The percent of steelhead caught that were known hatchery origin ranged from 27% in April in both Section 1 (Fence Creek upstream to Big Sheep Creek) and Section 2 (mouth upstream to Fence Creek) to 100% in February in Section 1 (Figure 7, Appendix Table B). Age composition of harvested hatchery steelhead was 56% 1:1 and 44% 1:2 (Table 1). Mean fork length ($\pm 95\%$ confidence interval) of harvested hatchery steelhead was 588 (± 9) mm for age 1:1 and 730 (± 15) mm for age 1:2 (Table 1). Gender composition was 47% male and 53% female (Table 1). Seventy-five percent of the anglers on the Imnaha River were local Oregon residents, 19% were non-local Oregon residents, 2% were Washington State residents and 4% resided outside the states of Oregon and Washington (Table 2). On the Imnaha River, anglers harvested an estimated 22 AdLV+CWT marked steelhead from our hatchery releases (Table 3).

Angler effort was similar on the lower Grande Ronde River and it declined on the Imnaha River, when compared to last year; however, both were higher than the average since surveys began during the 1985-86 run year (Figure 8). Harvest on both the lower Grande Ronde and Imnaha rivers declined from last year but was higher than the overall average, with the Imnaha almost double the average (Figure 9). Total catch (harvested and released) increased from the previous year on the Lower Grande Ronde, primarily due to the increased number of natural fish caught and released, and was higher than the overall average, while catch on the Imnaha was lower than last year's record catch but was higher than the average since surveys began (Table 4). Compared to the prior year, catch and release of wild steelhead on the lower Grande Ronde increased and the percent of wild fish in the total catch increased. On the Imnaha, the number of unmarked hatchery and wild fish declined and the percent of unmarked fish in the total catch also declined from the previous year. Catch rates were similar to last year on the lower Grande Ronde, Wallowa, and Imnaha rivers, except they declined at Rondowa (mouth of the Wallowa River); however, all were higher than the average catch rates of 10 to 13 hours per fish (Table 5). Compared to the previous year, the percent of local resident anglers participating in summer steelhead fisheries was similar on the Lower Grande Ronde River, Wallowa, and Imnaha rivers, and declined at Rondowa (Table 2). Similar to the last two years, the Imnaha fishery had

the highest percent of local resident anglers (75%), and the fishery at Rondowa had the highest percent of both non-local Oregon resident anglers (47%) and of out-of-state anglers (45%). 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 (Figure 10). This trend is due to an increase in the number of non-local and out-of-state anglers.

We found a statistically significant linear relationship ($P < 0.001$) between angler harvest tag harvest estimates and creel harvest estimates for summer steelhead fisheries in the Grande Ronde and Imnaha river basins (Figure 11). Total harvest estimates for spring steelhead fisheries in the previous run year (2007-08) were 35 fish in the upper Grande Ronde River, 2,050 fish at Rondowa, 1,399 fish in the Wallowa River, 25 fish in the Wenaha River, and 133 fish in the middle Grande Ronde River, for a total harvest estimate of 3,642 fish in the Grande Ronde basin, excluding the lower Grande Ronde River (Figure 9, Appendix Table C-1). We estimated 6 coded-wire-tagged fish were harvested at Rondowa, and 302 coded-wire-tagged fish were harvested in the Wallowa River in the 2007-08 run year. Total catch estimates for spring steelhead fisheries in the 2007-08 run year were 65 fish in the upper Grande Ronde River, 4,602 fish at Rondowa, 2,650 fish in the Wallowa River, 47 fish in the Wenaha River, and 243 fish in the middle Grande Ronde River, for a total catch estimate of 7,607 fish in the Grande Ronde basin, excluding the lower Grande Ronde River (Appendix Table C-2). Angler effort for the 2007-08 run year was estimated to be 471 hours in the upper Grande Ronde River, 36,154 hours at Rondowa, 18,524 hours in the Wallowa River, 586 hours in the Wenaha River, and 1,794 hours in the middle Grande Ronde River, for a total effort estimate of 57,529 hours in the Grande Ronde basin, excluding the lower Grande Ronde River (Appendix Table C-3).

We recycled 108 summer steelhead to the Wallowa River fishery in 2009. Sixty recycled fish were recaptured at the Big Canyon Facility and an estimated 28 recycled fish were harvested in the fishery for a total estimated recovery of 88 recycled fish (Appendix Table D).

MANAGEMENT IMPLICATIONS AND RECOMMENDATIONS

Angler effort was similar on the lower Grande Ronde River and lower on the Imnaha River compared to last year and both were higher than the overall average since surveys began in 1985. Harvest was lower on both the lower Grande Ronde and Imnaha rivers while total catch was higher on the lower Grande Ronde and lower on the Imnaha but were both higher than the overall average on both streams since surveys began with the 1985-86 run year. Catch and release of wild steelhead on the lower Grande Ronde was higher as was the percent of wild fish in the total catch compared to the previous year. In the Imnaha River fishery it is unknown whether a trend exists for wild steelhead caught and released because of returning unmarked hatchery fish. Catch rates were similar on the lower Grande Ronde, Wallowa, and Imnaha rivers and lower at Rondowa (mouth of the Wallowa) when compared to last year, and all were

higher than the overall average of 10-13 hours per fish. Hatchery fish dominated the catch during the late fall and winter months on the lower Grande Ronde River and in the spring months on the Wallowa River and at Rondowa. On the Imnaha River unmarked hatchery fish, which are indistinguishable from natural fish, and marked hatchery fish contributed substantially to the fishery from February through mid-April. These fishery statistics continue to illustrate the importance of current hatchery programs to the success of recreational summer steelhead fisheries in both the Grande Ronde and Imnaha river basins. Statistics for the Wallowa and Rondowa fisheries for the 2008-09 run year will be reported in the 2009-10 annual report.

Recycling adult steelhead returning to the Big Canyon Facility back into the Wallowa River for the recreational fishery in 2009 provided additional harvest and catch and release opportunities for anglers, and reduced the number of surplus adults at the facility, and therefore should continue. We estimate that 81% of the fish were accounted for either by returning to the Big Canyon Facility or in the harvest.

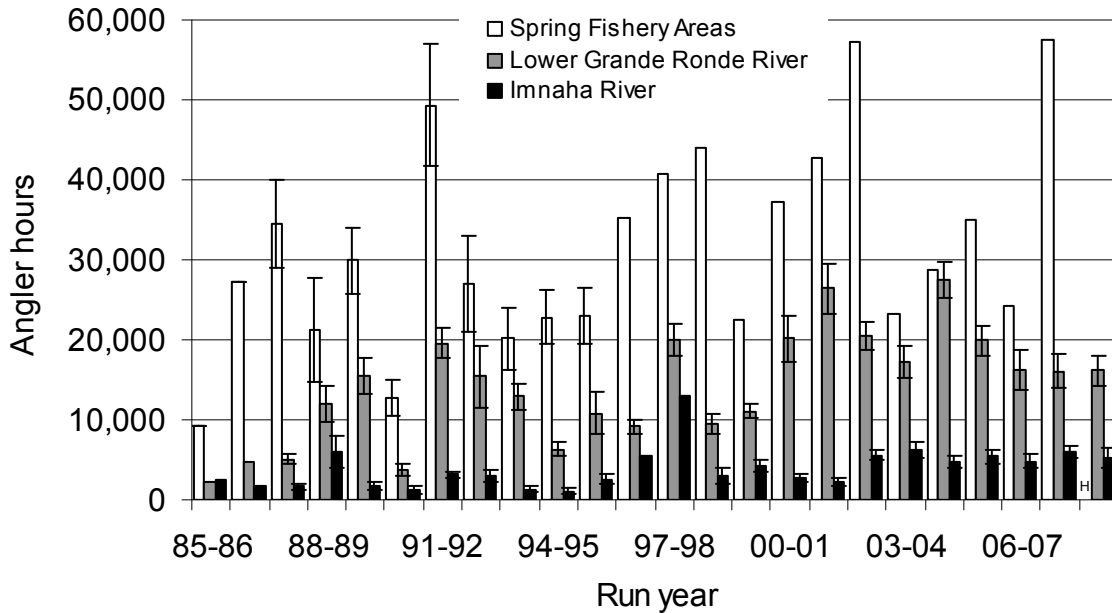


Figure 8. Angler effort (in hours) for summer steelhead (vertical bars show 95% confidence intervals) in spring fishery areas (upper Grande Ronde River, Wallowa River, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2008-09 run years. “H” indicates this value must be estimated from harvest tag data, which was not available when this report was submitted. Confidence intervals are not available for the 85-86 and 86-87 run years, the Imnaha fishery for the 96-97 and 97-98 run years, and for spring fishery areas beginning with the 96-97 run year.

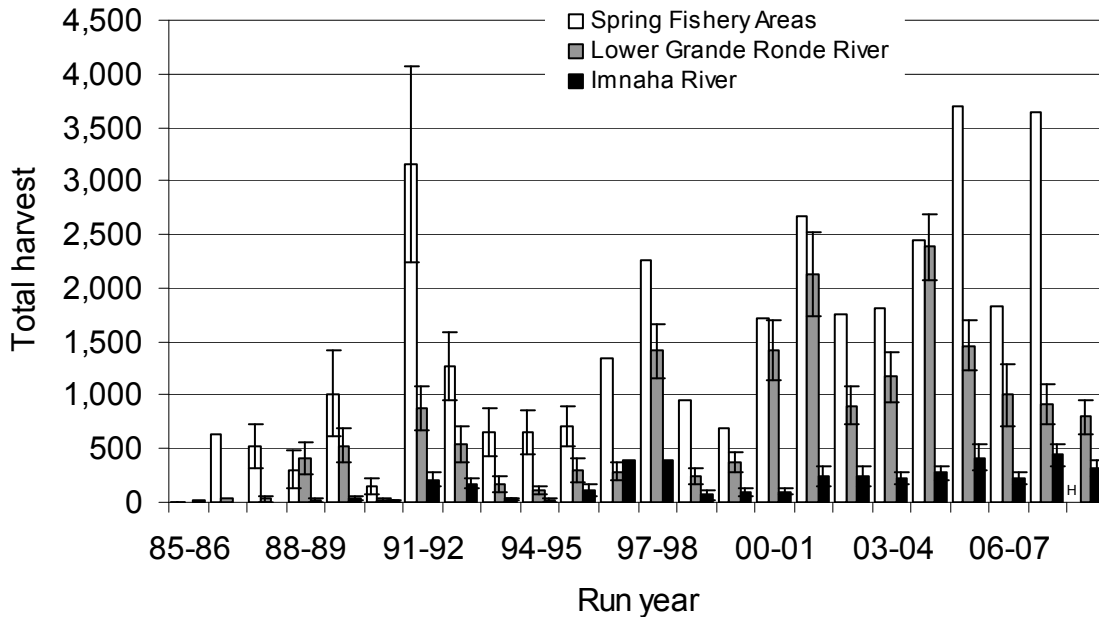


Figure 9. Number of hatchery summer steelhead harvested (vertical bars show 95% confidence intervals) by recreational anglers in spring fishery areas (upper Grande Ronde River, Wallowa River, Catherine Creek, and Rondowa), the lower Grande Ronde River, and the Imnaha River for the 1985-86 to 2008-09 run years. H indicates this value must be estimated using harvest tag data, which was not yet available. Confidence intervals are not available for the 85-86 and 86-87 run years, the Imnaha fishery for the 96-97 and 97-98 run years, and for spring fishery areas beginning with the 96-97 run year.

Table 4. 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 Imnaha River from 1 February to 15 April for the 1985-86 to 2008-09 run years. Fishing regulations were not consistent among years and river sections, which probably affected the number of harvested hatchery fish. “-“ indicates a statistical angler survey was not conducted.

Run year	Lower Grande Ronde River			Imnaha River			Total Catch	
	Harvest	Released		Harvest	Released			
		Hatchery	Natural ^a		Hatchery	Natural ^a		
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
Average	730	397	736	1,863	150	91	396	637

^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. Catch rate index (hours/fish \pm 95% confidence intervals) in summer steelhead creel survey areas in the Grande Ronde and Imnaha river basins for the 1985-86 to 2008-09 run years. Note that a lower catch rate index implies greater angling success. "-" indicates not sampled or undefined.

Run year	Catch rate index (hours/fish)					
	Lower GR River	Upper GR River	Catherine Creek	Rondowa	Wallowa River	Imnaha River
85-86	8 \pm 7	-	-	-	7 \pm 7	15 \pm 7
86-87	9 \pm 3	-	-	-	11 \pm 3	9 \pm 8
87-88	10 \pm 4	-	-	11 \pm 9	16 \pm 3	24 \pm 9
88-89	14 \pm 4	40 \pm 55	-	-	43 \pm 21	18 \pm 11
89-90	14 \pm 4	14 \pm 8	-	34 \pm 27	17 \pm 5	20 \pm 8
90-91	19 \pm 8	24 \pm 11	-	-	6 \pm 2	13 \pm 6
91-92	11 \pm 3	10 \pm 3	3 \pm 3	6 \pm 1	10 \pm 2	4 \pm 1
92-93	9 \pm 2	14 \pm 4	49 \pm 49	-	11 \pm 2	8 \pm 1
93-94	18 \pm 5	31 \pm 17	-	12 \pm 4	17 \pm 3	13 \pm 3
94-95	21 \pm 6	25 \pm 13	-	15 \pm 5	17 \pm 3	17 \pm 8
95-96	11 \pm 2	15 \pm 4	-	-	21 \pm 4	7 \pm 2
96-97	14 \pm 4	18 \pm 9	33 \pm 69	-	13 \pm 3	6 \pm 2
97-98	7 \pm 1	13 \pm 9	7 \pm 10	11 \pm 6	10 \pm 1	18 \pm 9
98-99	17 \pm 4	19 \pm 9	14 \pm 20	-	18 \pm 4	20 \pm 7
99-00	11 \pm 2	25 \pm 19	-	8 \pm 7	17 \pm 4	12 \pm 3
00-01	6 \pm 1	18 \pm 17	-	6 \pm 4	11 \pm 2	6 \pm 1
01-02	5 \pm 1	11 \pm 17	-	7 \pm 4	7 \pm 1	3 \pm 1
02-03	8 \pm 1	-	-	8 \pm 6	12 \pm 2	6 \pm 2
03-04	6 \pm 1	-	-	3 \pm 2	7 \pm 1	5 \pm 1
04-05	4 \pm 0	-	-	5 \pm 1	5 \pm 1	4 \pm 1
05-06	5 \pm 1	-	-	2 \pm 1	7 \pm 1	3 \pm 1
06-07	8 \pm 1	-	-	6 \pm 2	7 \pm 1	6 \pm 1
07-08	9 \pm 1	-	-	7 \pm 2	7 \pm 1	3 \pm 0
08-09	8 \pm 1	-	-	12 \pm 4	8 \pm 1	5 \pm 1
Average	11 \pm 2	20 \pm 5	21 \pm 24	10 \pm 4	13 \pm 3	10 \pm 3

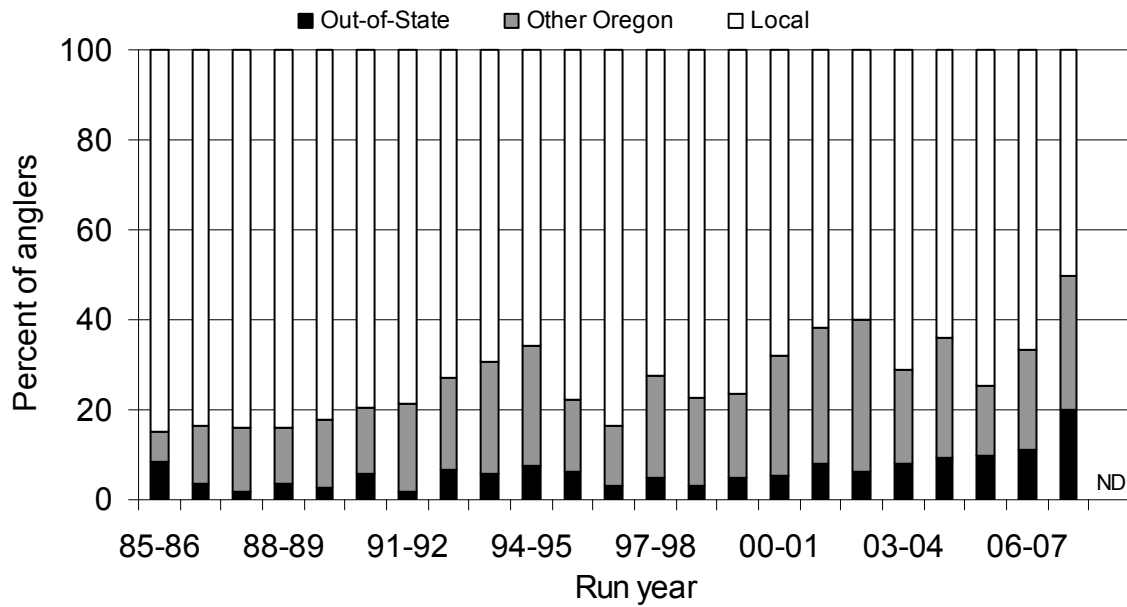


Figure 10. Percent of local resident anglers (Union or Wallowa county residents), non-local Oregon resident anglers, and out-of-state anglers that fished in summer steelhead fisheries in the Grande Ronde and Imnaha river basins for the 1985-86 to 2007-08 run years. ND indicates not determined until statewide annual harvest card data become available.

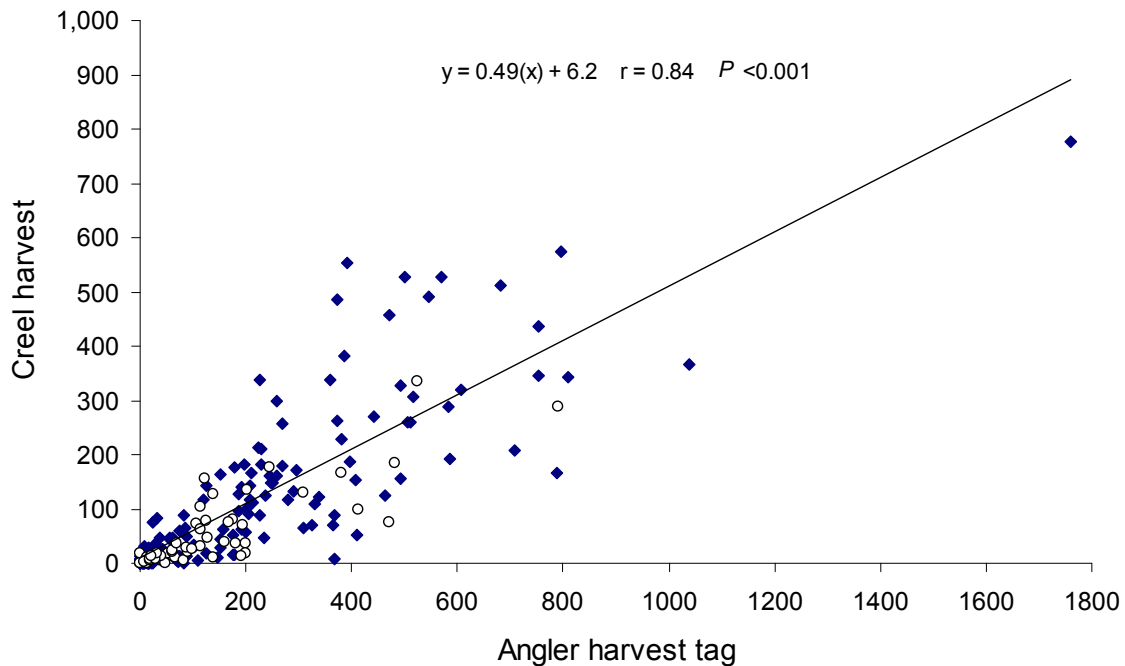


Figure 11. Relation between angler harvest tag (punch card) and creel survey harvest for summer steelhead fisheries in the Grande Ronde (◆) and Imnaha (○) river basins for years when harvest estimates for specific reaches were available (1993-1996 for the upper Grande Ronde and Wallowa, 1994-1995 for Rondowa, 1992-1993 for Catherine Creek, 1993-spring 2008 for the lower Grande Ronde, and 1986-1996, 1999-2008 for the Imnaha fishery areas).

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APPENDIX A

Fishery Statistics for the 2008-09 run year

Appendix Table A-1. Fishery statistics for summer steelhead on the lower Grande Ronde River during the 2008-09 run year. Statistics include mean estimates \pm 95% confidence intervals. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour.

Month, day type	Sample size		Total Hours	Total Catch	Total harvest	Catch rate		Angler days
	Days	Anglers				fish/h	h/fish	
September:								
Weekday	7	29	610 \pm 159	88 \pm 41	13 \pm 20	0.144 \pm 0.067	7 \pm 3	152 \pm 40
Weekend	5	66	584 \pm 215	35 \pm 47	13 \pm 18	0.061 \pm 0.081	16 \pm 21	108 \pm 40
Total	12	95	1,194 \pm 268	123 \pm 63	26 \pm 27	0.103 \pm 0.053	10 \pm 5	260 \pm 58
October:								
Weekday	7	174	3,512 \pm 876	431 \pm 92	199 \pm 73	0.123 \pm 0.026	8 \pm 2	553 \pm 138
Weekend	4	150	1,660 \pm 228	161 \pm 52	59 \pm 26	0.097 \pm 0.031	10 \pm 3	282 \pm 39
Total	11	324	5,172 \pm 905	592 \pm 106	258 \pm 77	0.115 \pm 0.020	9 \pm 2	835 \pm 146
November:								
Weekday	6	93	2,154 \pm 355	325 \pm 95	121 \pm 77	0.151 \pm 0.044	7 \pm 2	549 \pm 91
Weekend	6	208	2,128 \pm 356	181 \pm 47	85 \pm 32	0.085 \pm 0.022	12 \pm 3	398 \pm 67
Total	12	301	4,282 \pm 503	506 \pm 106	206 \pm 83	0.118 \pm 0.025	8 \pm 2	947 \pm 111
December:								
Weekday	5	71	853 \pm 348	145 \pm 38	50 \pm 25	0.170 \pm 0.044	6 \pm 2	222 \pm 91
Weekend	3	12	80 \pm 75	13 \pm 28	5	0.167 \pm 0.355	6 \pm 13	15 \pm 14
Total	8	83	933 \pm 356	158 \pm 47	55 \pm 25	0.170 \pm 0.051	6 \pm 2	237 \pm 90
January:								
Weekday	5	19	485 \pm 607	176 \pm 218	70 \pm 87	0.362 \pm 0.450	3 \pm 4	78 \pm 98
Weekend	6	59	347 \pm 153	35 \pm 23	19 \pm 14	0.100 \pm 0.065	10 \pm 7	88 \pm 39
Total	11	78	832 \pm 626	211 \pm 220	89 \pm 88	0.253 \pm 0.264	4 \pm 4	166 \pm 125
February:								
Weekday	6	91	2,165 \pm 1,266	355 \pm 125	116 \pm 53	0.164 \pm 0.058	6 \pm 2	434 \pm 254
Weekend	5	129	1,447 \pm 460	95 \pm 35	45 \pm 21	0.066 \pm 0.024	15 \pm 5	235 \pm 75
Total	11	220	3,612 \pm 1,347	450 \pm 130	161 \pm 57	0.125 \pm 0.036	8 \pm 2	669 \pm 249
March:								
Weekday	7	14	142 \pm 106	16 \pm 25	0	0.115 \pm 0.174	9 \pm 14	36 \pm 27
Weekend	5	5	41 \pm 31	11 \pm 22	0	0.261 \pm 0.540	4 \pm 8	9 \pm 7
Total	12	19	183 \pm 110	27 \pm 33	0	0.148 \pm 0.181	7 \pm 9	45 \pm 27
April:								
Weekday	3	0	0	-	-	-	-	-
Weekend	1	0	0	-	-	-	-	-
Total	4	0	0	-	-	-	-	-
Grand total	81	1,120	16,208 \pm 1,868	2,068 \pm 308	795 \pm 159	0.128 \pm 0.019	8 \pm 1	3,159 \pm 364

Appendix Table A-2. Catch rate ($\pm 95\%$ confidence intervals) for summer steelhead at Rondowa during the 2008-09 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	0	0	-	-
Weekend	3	30	0.126 \pm 0.072	8 \pm 5
Total	3	30	0.126 \pm 0.072	8 \pm 5
March:				
Weekday	2	0	-	-
Weekend	8	55	0.066 \pm 0.034	15 \pm 8
Total	10	55	0.066 \pm 0.034	15 \pm 8
April:				
Weekday	2	0	-	-
Weekend	2	0	-	-
Total	4	0	-	-
Grand total	17	85	0.084 \pm 0.031	12 \pm 4

Appendix Table A-3. Catch rate ($\pm 95\%$ confidence intervals) for summer steelhead on the Wallowa River during the 2008-09 run year. Only adipose fin-clipped fish were harvested. "h" indicates hour.

Month, day type	Sample size		Catch rate	
	Days	Anglers	fish/h	(h/fish)
February:				
Weekday	11	299	0.165 \pm 0.035	6 \pm 1
Weekend	8	362	0.133 \pm 0.031	8 \pm 2
Total	19	661	0.147 \pm 0.023	7 \pm 1
March:				
Weekday	7	329	0.148 \pm 0.034	7 \pm 2
Weekend	9	567	0.109 \pm 0.020	9 \pm 2
Total	16	896	0.123 \pm 0.017	8 \pm 1
April:				
Weekday	4	87	0.119 \pm 0.044	8 \pm 3
Weekend	4	144	0.086 \pm 0.029	12 \pm 4
Total	8	231	0.097 \pm 0.024	10 \pm 3
Grand total	43	1,788	0.128 \pm 0.013	8 \pm 1

Appendix Table A-4. Fishery statistics for summer steelhead in Section 1 (Fence Creek to town of Imnaha) of the Imnaha River during the 2008-09 run year. Statistics include mean estimates $\pm 95\%$ confidence intervals. Only adipose fin-clipped fish were harvested. "-" indicates not sampled or undefined. "h" indicates hour.

Month, day type	Sample size		Total Hours	Total catch	Total harvest	Catch rate		Angler days
	Days	Anglers				fish/h	h/fish	
February:								
Weekday	7	4	7 \pm 6	0	-	-	-	3 \pm 3
Weekend	5	10	17 \pm 8	2 \pm 4	0	0.114 \pm 0.151	9 \pm 12	11 \pm 5
Total	12	14	24 \pm 10	2 \pm 4	0	0.082 \pm 0.109	12 \pm 16	14 \pm 6
March:								
Weekday	6	49	642 \pm 289	251 \pm 66	115 \pm 44	0.391 \pm 0.087	3 \pm 1	254 \pm 114
Weekend	3	25	209 \pm 186	28 \pm 19	8 \pm 14	0.135 \pm 0.075	7 \pm 4	120 \pm 107
Total	9	74	851 \pm 344	279 \pm 68	123 \pm 46	0.328 \pm 0.068	3 \pm 1	374 \pm 151
April:								
Weekday	5	35	333 \pm 119	94 \pm 66	13 \pm 10	0.282 \pm 0.145	4 \pm 2	177 \pm 63
Weekend	3	30	210 \pm 56	40 \pm 24	10 \pm 7	0.191 \pm 0.057	5 \pm 1	105 \pm 28
Total	8	65	543 \pm 131	134 \pm 70	23 \pm 12	0.247 \pm 0.092	4 \pm 1	282 \pm 68
Grand total	29	153	1,418 \pm 368	415 \pm 98	146 \pm 48	0.293 \pm 0.054	3 \pm 1	670 \pm 174

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 2008-09 run year. Statistics include mean estimates $\pm 95\%$ confidence intervals. Only adipose fin-clipped fish were harvested. "h" indicates hour.

Month, day type	Sample size		Total Hours	Total catch	Total harvest	Catch rate		Angler Days
	Days	Anglers				fish/h	h/fish	
February:								
Weekday	7	38	433 \pm 213	46 \pm 25	20 \pm 14	0.106 \pm 0.041	9 \pm 3	112 \pm 55
Weekend	5	73	539 \pm 145	38 \pm 34	6 \pm 9	0.071 \pm 0.038	14 \pm 7	117 \pm 31
Total	12	111	972 \pm 258	84 \pm 42	26 \pm 17	0.087 \pm 0.028	11 \pm 4	229 \pm 61
March:								
Weekday	6	71	1,260 \pm 731	264 \pm 94	73 \pm 47	0.210 \pm 0.063	5 \pm 2	261 \pm 151
Weekend	3	96	1,315 \pm 785	258 \pm 109	69 \pm 29	0.196 \pm 0.068	5 \pm 2	285 \pm 170
Total	9	167	2,575 \pm 1,072	522 \pm 144	142 \pm 55	0.203 \pm 0.046	5 \pm 1	546 \pm 227
April:								
Weekday	5	16	133 \pm 68	15 \pm 13	2 \pm 2	0.115 \pm 0.056	9 \pm 4	34 \pm 17
Weekend	3	25	150 \pm 94	29 \pm 3	3 \pm 5	0.196 \pm 0.008	5 \pm 0	31 \pm 19
Total	8	41	283 \pm 116	44 \pm 13	5 \pm 6	0.158 \pm 0.027	6 \pm 1	65 \pm 27
Grand total	29	319	3,830 \pm 1,109	650 \pm 150	173 \pm 58	0.170 \pm 0.032	6 \pm 1	840 \pm 243
Sec.1 + 2	29	472	5,248 \pm 1,168	1,065 \pm 179	319 \pm 75	0.203 \pm 0.028	5 \pm 1	1,510 \pm 336

APPENDIX B

Percent of Summer Steelhead That Were Marked Hatchery Fish and Caught in 2008-09 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 2008-09 run year. For the Imnaha River, percentages include catch of marked hatchery fish only. In parentheses are total catch for the Lower Grande Ronde and Imnaha rivers and sampled catch for the Upper Grande Ronde and Wallowa rivers and Rondowa. On the Imnaha River, Section 1 is from Fence Creek upstream to the town of Imnaha, and Section 2 is from the mouth upstream to Fence Creek. "-" indicates not sampled or undefined.

Creel survey area	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Lower GR River	30(123)	54(592)	59(506)	64(159)	54(211)	57(450)	11(27)	-
Rondowa	-	-	-	-	-	81(21)	62(26)	-
Wallowa River	-	-	-	-	-	86(357)	83(443)	84(93)
Imnaha River (Section 1)	-	-	-	-	-	100(2)	46(279)	27(134)
Imnaha River (Section 2)	-	-	-	-	-	44(84)	41(522)	27(44)

APPENDIX C

Fishery Statistics for Spring Fisheries for the 2007-08 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 2007-08 run year. Total harvest = 0.493 (harvest card) + 6.183. Sample rate expansion = total harvest/sampled fish. A sample rate expansion of 25 or greater was considered unreliable, therefore expanded equals observed. Harvest estimates made only for months when steelhead angling season was open (Sept - April) and angler harvest card data was greater than zero. Does not include the lower Grande Ronde (location code 231) fishery. "-" indicates not sampled or undefined. No harvest on Catherine Creek (location code 121).

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	
Upper Grande Ronde (233)										
Angler harvest cards	0	24	4	0	5	0	0	0		
Total harvest	-	18	8	-	9	-	-	-	35	
Rondowa (234)										
Angler harvest cards	0	8	4	102	79	1,207	2,340	333		
Sampled fish	0	0	0	0	0	3	31	0		
Total harvest	-	10	8	56	45	601	1,160	170	2,050	
Sample rate expansion	-	-	-	-	-	200.3	37.4	-		
07 41 33						0	1	0	1	1 ^a
09 26 44						0	1	0	1	1 ^a
09 41 06						0	1	0	1	2 ^a
09 41 09						1	0	0	1	1 ^a
09 41 12						0	1	0	1	1 ^a
Wallowa (235)										
Angler harvest cards	0	4	0	41	40	422	1,744	512		
Sampled fish	0	0	0	0	0	226	303	106		
Total harvest	-	8	-	26	26	214 ^b	866	259	1,399	
Sample rate expansion	-	-	-	-	-	0.9	2.9	2.4		
07 41 31						3	5	0	8	17
07 41 32						3	1	1	5	8
07 41 33						5	4	1	10	18
07 41 34						11	12	2	25	49
07 41 35						2	3	0	5	11
09 17 05						0	1	0	1	3
09 26 08						0	1	1	2	5
09 26 44						7	2	1	10	15
09 26 45						6	7	0	13	26
09 41 04						2	1	2	5	10
09 41 05						1	1	0	2	4
09 41 06						2	2	1	5	10
09 41 07						0	1	0	1	3
09 41 08						3	0	1	4	5
09 41 09						2	2	0	4	8
09 41 10						3	0	0	3	3
09 41 12						1	3	1	5	12
09 41 13						0	5	3	8	21
09 43 01						2	7	0	9	22
09 43 02						2	7	5	14	34
09 43 03						2	5	1	8	18
Wenaha (184)										
Angler harvest cards	0	20	0	0	0	0	0	5		
Total harvest	-	16	-	-	-	-	-	9	25	

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	
Middle Grande Ronde (232)										
Angler harvest cards	0	33	24	12	5	55	20	35		
Total harvest	-	22	81	12	9	33	16	23	133	
Total Grande Ronde harvest (excluding lower Grande Ronde)									3,642	

^a Because the sample rate expansion factor was > 25, observed recoveries were not expanded.

^b In this instance, estimated total harvest from the regression equation was less than the actual number of sampled fish.

Appendix Table C-2. Estimated catch of summer steelhead in spring fisheries in the Grande Ronde basin for the 2007-08 run year. Total catch = (sampled catch/sample harvest) x total harvest. For months with little or no sampling, the average proportion was used. For areas with little or no sampling, data from the survey in closest proximity was used. Does not include the lower Grande Ronde fishery. "-" indicates not sampled or undefined.

Fishery ^a , statistics	Fishery statistics by month								Total	
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr		
Upper Grande Ronde										
Sampled harvest	-	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-	-
Total harvest	-	18	8	-	9	-	-	-	-	35
Total catch	-	33	15	-	17	-	-	-	-	65
Catherine Creek										
Sampled harvest	-	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-	-
Total harvest	-	-	-	-	-	-	-	-	-	0
Total catch	-	-	-	-	-	-	-	-	-	0
Rondowa										
Sampled harvest	-	-	-	-	-	3	31	0	-	34
Sampled catch	-	-	-	-	-	9	58	7	-	74
Total harvest	-	10	8	56	45	601	1,160	170	-	2,050
Total catch	-	22	17	122	98	1,803	2,170	370	-	4,602
Wallowa										
Sampled harvest	-	-	-	-	-	226	303	106	-	635
Sampled catch	-	-	-	-	-	393	594	192	-	1,179
Total harvest	-	8	-	26	26	214	866	259	-	1,399
Total catch	-	15	-	48	48	372	1,698	469	-	2,650
Wenaha										
Sampled harvest	-	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-	-
Total harvest	-	16	-	-	-	-	-	9	-	25
Total catch	-	27	-	-	-	-	-	20	-	47
Middle Grande Ronde										
Sampled harvest	-	-	-	-	-	-	-	-	-	-
Sampled catch	-	-	-	-	-	-	-	-	-	-
Total harvest	-	22	18	12	9	33	16	23	-	133
Total catch	-	41	33	22	17	57	31	42	-	243
Total Grande Ronde catch (excluding lower Grande Ronde)									7,607	

^a Wallowa data were used for the upper Grande Ronde, middle Grande Ronde, and Catherine Creek; lower Grande Ronde data, in Flesher et al. 2009, 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 2007-08 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 ^a , statistics	Fishery statistics by month								
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
Upper Grande Ronde									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	33	15	-	-	-	-	-	65
Angler effort	-	239	109	-	-	-	-	-	471
Catherine Creek									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	-	-	-	-	-	-	-	0
Angler effort	-	-	-	-	-	-	-	-	0
Rondowa									
Catch rate	-	-	-	-	-	0.100	0.136	1.077	0.142
Total catch	-	22	17	122	98	1,803	2,170	370	4,602
Angler effort	-	155	120	859	690	18,030	15,956	344	36,154
Wallowa									
Catch rate	-	-	-	-	-	0.124	0.151	0.135	0.138
Total catch	-	15	-	48	48	372	1,698	469	2,650
Angler effort	-	109	-	348	348	3,000	11,245	3,474	18,524
Wenaha									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	27	-	-	-	-	-	20	47
Angler effort	-	273	-	-	-	-	-	313	586
Middle Grande Ronde									
Catch rate	-	-	-	-	-	-	-	-	-
Total catch	-	41	33	22	17	57	31	42	243
Angler effort	-	297	239	159	123	460	205	311	1,794
Upper Grande Ronde									
Total Grande Ronde angler effort (excluding lower Grande Ronde)									57,529

^a Wallowa data were used for the upper Grande Ronde, middle Grande Ronde, and Catherine Creek; lower Grande Ronde data, in Flesher et al. 2009, were used for the Wenaha.

APPENDIX D

Summary of Recycled Steelhead for the 2008-09 Run Year

Appendix Table D. Summary of adult steelhead recycled back to the Wallowa River fishery from the Big Canyon Facility for the 2008-09 run year. “-“ indicates not sampled or undefined.

Date of release, Percent of Of release	Location and number of fish ^a						Total	Percent of Release
	Upstream		Downstream		Subtotal			
	M	F	M	F	M	F		
Released								
3 March 2009	0	0	18	12	18	12	30	
13 March 2009	0	0	3	9	3	9	12	
20 March 2009	0	0	5	10	5	10	15	
3 April 2009	0	0	9	17	9	17	26	
10 April 2009	0	0	9	16	9	16	25	
Subtotal	0	0	44	64				
Total	0		108		44	64	108	
Recaptured at Big Canyon ^b								
3 March 2009	-	-	9	3	9	3	12	40%
13 March 2009	-	-	3	2	3	2	5	42%
20 March 2009	-	-	2	5	2	5	7	47%
3 April 2009	-	-	7	11	7	11	18	69%
10 April 2009	-	-	5	13	5	13	18	72%
Subtotal	0	0	26	34				
Total	0		60		26	34	60	56%
% of release	0%		56%		59%	53%		
Observed and estimated (in parentheses) harvest ^c								
3 March 2009	-	-	0	0	0	-	0	0%
13 March 2009	-	-	0	0	0	0	0	0%
20 March 2009	-	-	1(14)	0	1(14)	0	1(14)	93%
3 April 2009	-	-	0	1(14)	0	1(14)	1(14)	54%
10 April 2009	-	-	0	0	0	0	0	0%
Subtotal	0	0	1(14)	1(14)				
Total	0		2(28)		1(14)	1(14)	2(28)	26%
% of release	0%		26%		32%	22%		
Total recovered (Big Canyon + estimated harvest)								
3 March 2009	-	-	9	3	9	3	12	40%
13 March 2009	-	-	3	2	3	2	5	42%
20 March 2009	-	-	16	5	16	5	21	140%
3 April 2009	-	-	7	25	7	25	32	123%
10 April 2009	-	-	5	13	5	13	18	72%
Subtotal	0	0	40	48				
Total	0		88		40	48	88	81%
% of release	0%		81%		91%	75%		

^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 2008-09 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.!