Summer Steelhead Releases into the Grande Ronde River

Wallowa Stock - Hatchery Program Review 1982-2012

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INTRODUCTION and BACKGROUND

This paper provides background information, program development history, and an assessment of program performance for the Washington Department of Fish and Wildlife's (WDFW) Wallowa stock summer steelhead (*Oncorhynchus mykiss)* hatchery program. The coverage period is from program initiation in 1982 to the present (spring of 2012).

A precipitous decline in numbers of Snake River steelhead (Fig. 1) and other anadromous fish between 1962 and the mid 1970s alarmed management agencies such as WDFW. The rapid decline in steelhead and a commensurate loss of recreational opportunity for Washington's residents spurred Washington to partner with other State and Federal management agencies. They negotiated with federal agencies such as the Corps of Engineers (COE) to mitigate for adult fish losses to anadromous populations and lost resident fishing opportunity caused by construction of the four lower Snake River power dams.

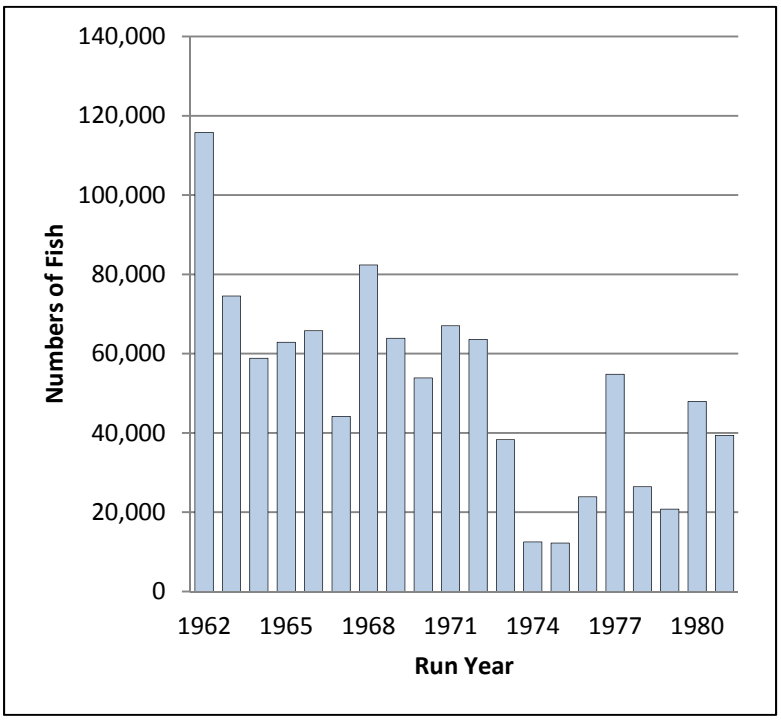

Figure 1. Counts of summer steelhead at Ice Harbor Dam, 1962-1981 Run Years.

As a result of the negotiations, the Lower Snake River Compensation Plan (LSRCP) was proposed by the COE in 1975. Hatchery production would be the means to replace lost resources and recreational opportunity. In Washington, Lyons Ferry Hatchery (LFH) on the Snake River was constructed as the core of the mitigation program and an existing state facility, the Tucannon Hatchery was renovated. Three acclimation ponds for steelhead were also constructed: Curl Lake on the Tucannon River; Cottonwood Pond on the Grande Ronde River; and Dayton Pond on the Touchet River (Figure 2).

The Cottonwood Acclimation Pond is located at river kilometer 46 on the mainstem of the Grande Ronde River (Figure 2). The acclimation site is operated as a satellite of Lyons Ferry Hatchery, which serves as the incubation and rearing facility for WDFW's Wallowa stock summer steelhead program. In 1992, an adult trap was constructed on Cottonwood Creek (acclimation pond water supply source) to allow WDFW to trap/spawn the Wallowa stock steelhead returning to Cottonwood Creek. Prior to that time, eyed eggs for the program were provided by Oregon Department of Fish and Wildlife (ODFW).

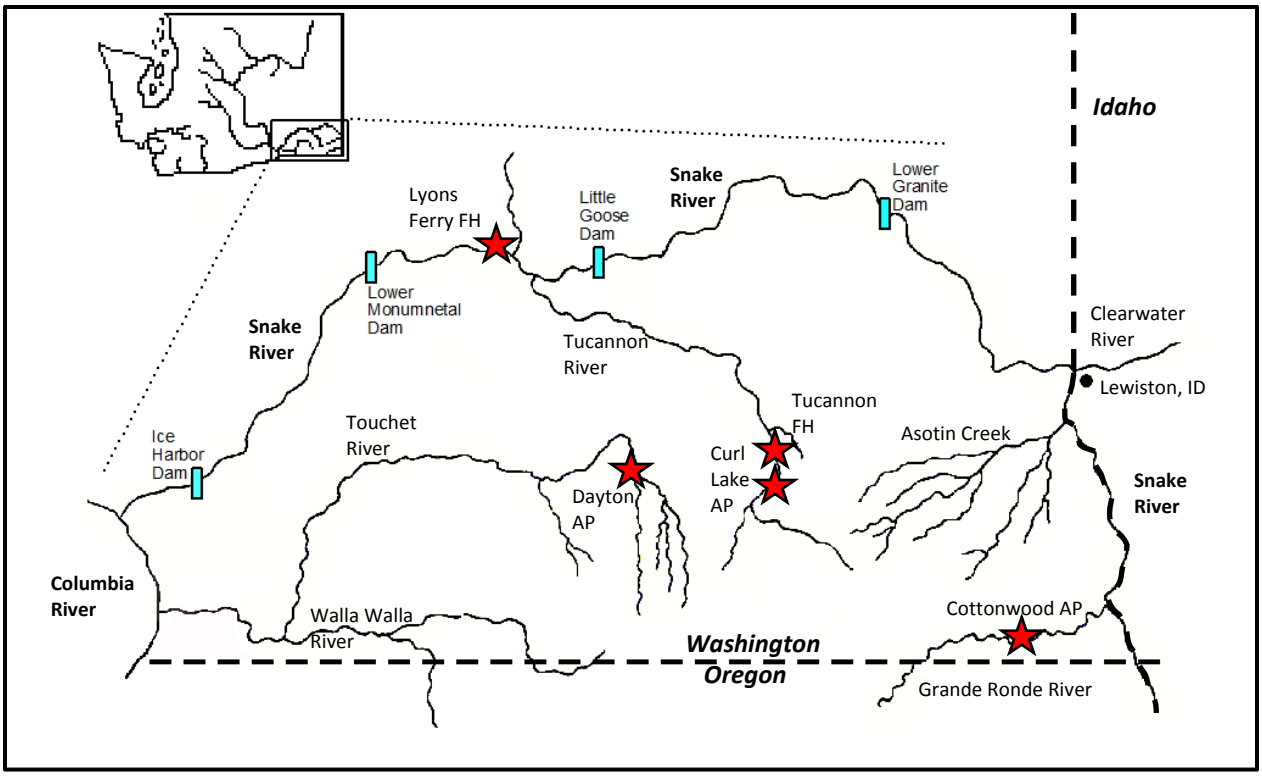

Figure 2. WDFW LSRCP hatchery facilities (hatcheries and acclimation ponds) in SE Washington.

Under the LSRCP, Washington's entire steelhead program would mitigate for 4,656 summer steelhead to the project area at various locations within SE Washington (Table 1). The project area for the WDFW steelhead program is defined by all areas above Ice Harbor Dam. In the Grande Ronde River, the summer steelhead program was to be accomplished by annual production of 300,000 steelhead smolts @ 8 fish/lb, with the goal to return 1,500 adults (0.5% survival) to the project area, or 4,500 adults (1.5% survival) to the Columbia River Basin, based on an assumed downriver catch to escapement ratio of two-to-one that existed prior to construction of the dams.

Table 1. WDFW LSRCP summer steelhead smolt releases and mitigation goals.

Location	Original Smolt Goals	Current Smolt Goals	Adult Goal to Project Area	Total Adult Goal
Snake R.	126,000	160,000	630	1,890
Tucannon R.	175,000	0	876	2,628
Walla Walla R.	180,000	100,000	900	2,700
Touchet R.	150,000	85,000	750	2,250
Grande Ronde R.	300,000	200,000	1,500	4,500
TOTALS	**931,000**	**545,000**	**4,656**	**13,968**

The survival rates of 0.5% and 1.5%, were not goals, but used as a guideline for managers to determine the size of hatchery facilities needed, and should be considered as "design criteria survival goals". Over time, changes in the smolt production have occurred and the current goal is 200,000 smolts @ 4.5 fish/lb to meet the original adult goals. Current smolt-to-adult survival (SAS) and smolt-to-adult returns (SAR) expectations needed to meet the adult goals for the program are 2.25% and 0.75%, respectively.

Washington established short term goals by which they hoped to achieve the long term mitigation goals set in the LSRCP program. Those goals were: 1) Establish steelhead broodstock(s) capable of meeting egg needs, 2) Maintain and enhance natural populations of steelhead and other native salmonids, 3) Return adult steelhead to the LSRCP area which meets goal, 4) Improve or re-establish sport fisheries, and 5) Coordinate actions with other basin managers. These goals have directed actions taken by WDFW to ensure the success of the LSRCP program, and have played a key role in guiding our monitoring and evaluations efforts for the program as needed. In addition to the original goals, as summer steelhead became listed within the Snake River basin, WDFW added additional goals that were more focused on wild steelhead protection: 1) Monitor the status and trends of natural steelhead populations where LSRCP fish might have effects, and 2) Ensure the program is compliant to the greatest extent possible with ESA (HGMP's, FMEP's) and WDFW Policies to protect and recover wild populations. Currently, the WDFW LSRCP program gathers information that is provided and used by LSRCP, US v Oregon Management and ESA, and plays a critical role in the management of the steelhead in SE Washington.

PROGRAM ASSESSMENT

The Wallowa stock of steelhead was developed by ODFW in the late 1970s (Snake River origin fish trapped at Lower Snake dams were used to start the stock) for use in the Wallowa River LSRCP program [Refer to ODFW Wallowa stock summary for more details]. WDFW and ODFW identified the Wallowa stock as the stock of choice for harvest mitigation in the Grand Ronde River, and aided ODFW in building returns of fish for each program. Currently, WDFW requires about 60 full-spawned females to meet program needs, though 1/2 –spawned females are also used to increase/maintain genetic diversity within the stock. Crosses with males are generally 1:1. Run timing of adults to the trap in Cottonwood Creek varies annually depending on how much water is available during the spring (Figure 3A). In low water years nearly all the water is siphoned off from Cottonwood Creek for the acclimation pond, which limits the ability of adults to swim up Cottonwood Creek and enter the trap. Since 1992, there have been two years where eggs had to be provided by ODFW due a lack of returning adults to the trap. Spawning of broodstock generally occurs from the third week in March to the second week in April. The number of adults returning to Cottonwood Creek varies annually, and very few natural origin adults are observed (Figure 3B).

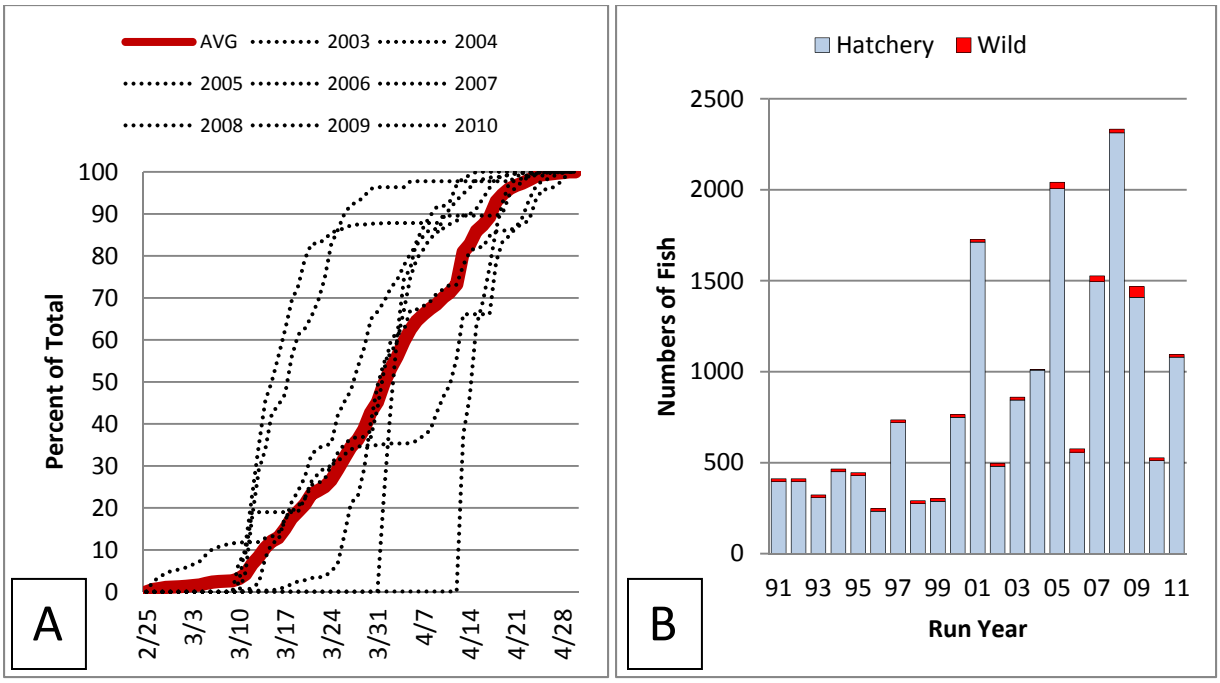

Figure 3. Run timing of Wallowa stock summer steelhead into Cottonwood Creek, 2003-2010 (A), and the number of hatchery and wild origin summer steelhead captured at the Cottonwood Creek adult trap from 1991-2011 run years (B).

Between 1994 and 2008, management of hatchery origin adults in Cottonwood Creek was as follows: 19% were spawned, 15% were killed out-right for data (coded-wire tags, etc...), 2% were pre-spawn mortalities, and the remaining 64% were passed upstream for natural spawning in Cottonwood Creek. In 2009, management of adults was changed (IHNV concerns to juveniles and broodstock adults) and is as follows: 14% spawned, 70% killed out-right for data (coded-wire tags, etc...) or euthanized to prevent straying and spawning, 6% pre-spawn mortalities, and 10% provided to food banks. Pre-spawn mortality has increased slightly, but this is likely due to holding of fish which become over-ripe and die – in the past these fish would have been passed upstream. Of the coded-wire tags recovered in Cottonwood Creek since 1992, 99.8% have been WDFW Wallowa stock releases; no ODFW Wallowa stock steelhead have ever been recovered in Cottonwood Creek.

For each steelhead program at Lyons Ferry Hatchery, counts or estimates of production are made at various life stages. Over the years, the number of green eggs and eyed-eggs have been estimated through either volumetric or weight sampling methods, or mechanical egg counters. Eyed egg-to-smolt survival has been consistent for the entire program, and green egg-to-smolt survival has increased in recent years due to a change in green egg handling at Cottonwood (Figure 4A). Disease incidence in the Wallowa stock at Lyons Ferry has been low, with no outbreaks of INHV and although bacterial coldwater disease is sometimes present, it has not affected overall smolt production. Production of Wallowa stock steelhead since 1983 has achieved or closely approached the goal of number of fish to be released (Figure 4B). Each release group is currently 100% adipose fin clipped for selective harvest fisheries, and coded-wire tagged (20,000) and PIT tagged (4,000) for estimating adult

returns and assessing straying. During adipose fin clip marking, a complete count of the stock is provided, with any mortality subtracted from that point forward to estimate total smolt release numbers. Adjustments are made as necessary to account for predation loss at the hatchery while the fish are in the large rearing lakes. At release, a minimum of 200 smolts are sampled (length/weight) and multiple pound-counts from each steelhead release group produced at Lyons Ferry (either from Acclimation Ponds or raceways at the hatchery) to estimate smolt size (length, weight, CV, fish/lb, and K-factors). Smolt survival to Lower Granite Dam has generally been high (>60%), and is comparable to survivals seen from ODFW and IDFG releases of steelhead from the Grande Ronde, Imnaha, and Salmon river basins.

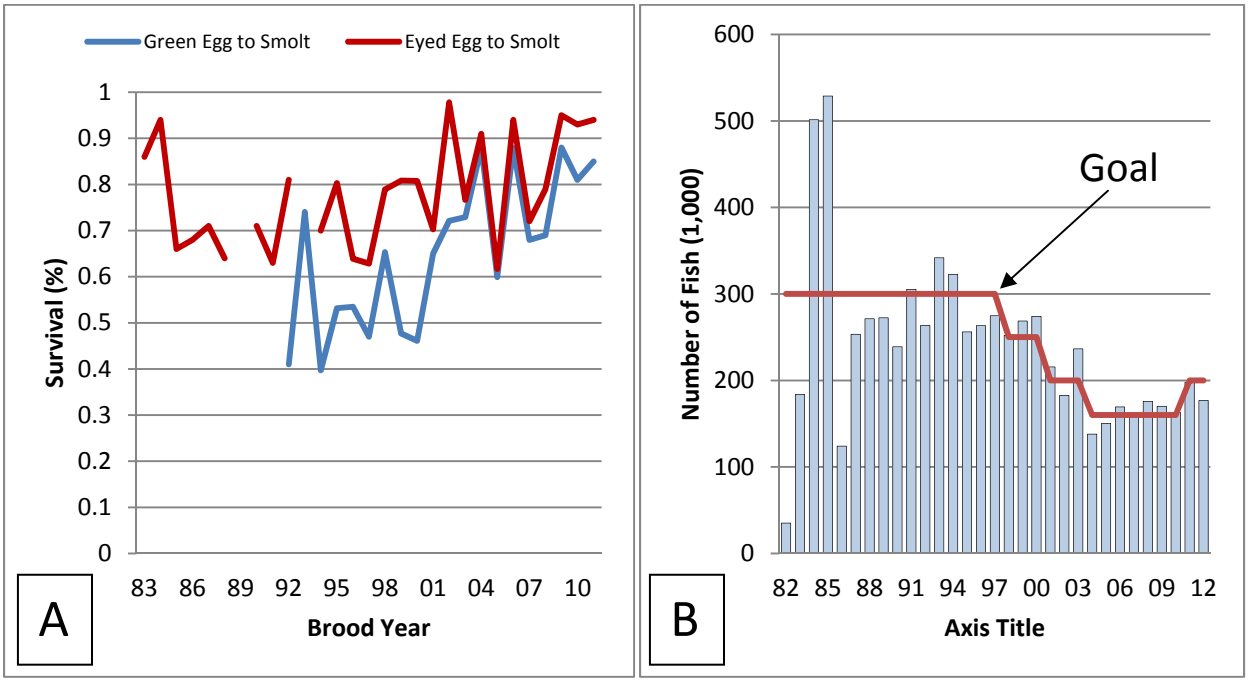

Figure 4. Green-egg and eyed-egg to smolt survival of Wallowa stock fish reared at Lyons Ferry Hatchery (A), and smolt production of Wallowa stock steelhead released into the Grande Ronde Basin by WDFW (B).

The primary function of the Wallowa stock steelhead program has been to return fish for harvest, and broodstock needs. Run timing of Wallowa stock adults to the Columbia and Snake rivers coincide well with established sport, commercial and tribal fisheries in the basins (Figure 5). Washington's Wallowa stock steelhead program has been highly successful in returning adults to the project area above Ice Harbor Dam (1,500 adult goal has been met or exceeded every year) (Figure 6A), and has met the downriver adult goal about 50% of the time (Figure 6B). The SAS and SAR survivals have also met expectations (Figure 7). Progeny:Parent ratios for the Wallowa stock program since trapping/spawning has occurred at Cottonwood Creek (1992) has average 30, another indicator of the program's success.

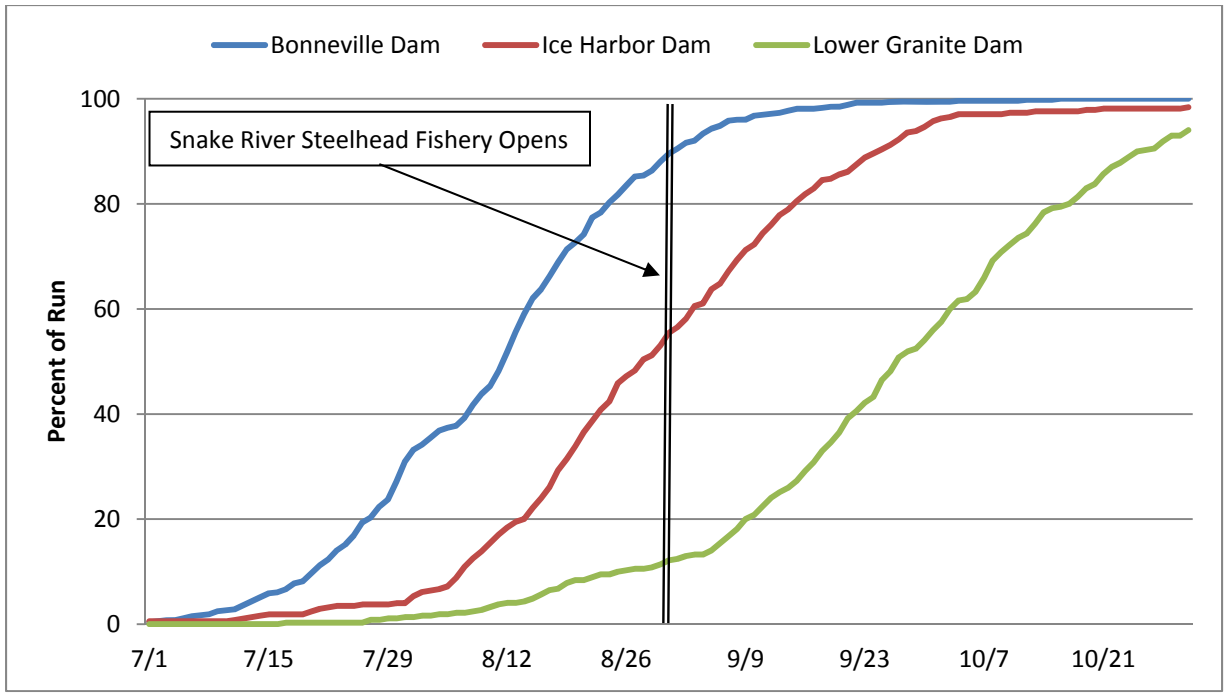

Figure 5. Run timing of Wallowa stock summer steelhead over Bonneville, Ice Harbor, and Lower Granite Dams based on PIT Tags, 2009-2011 run years.

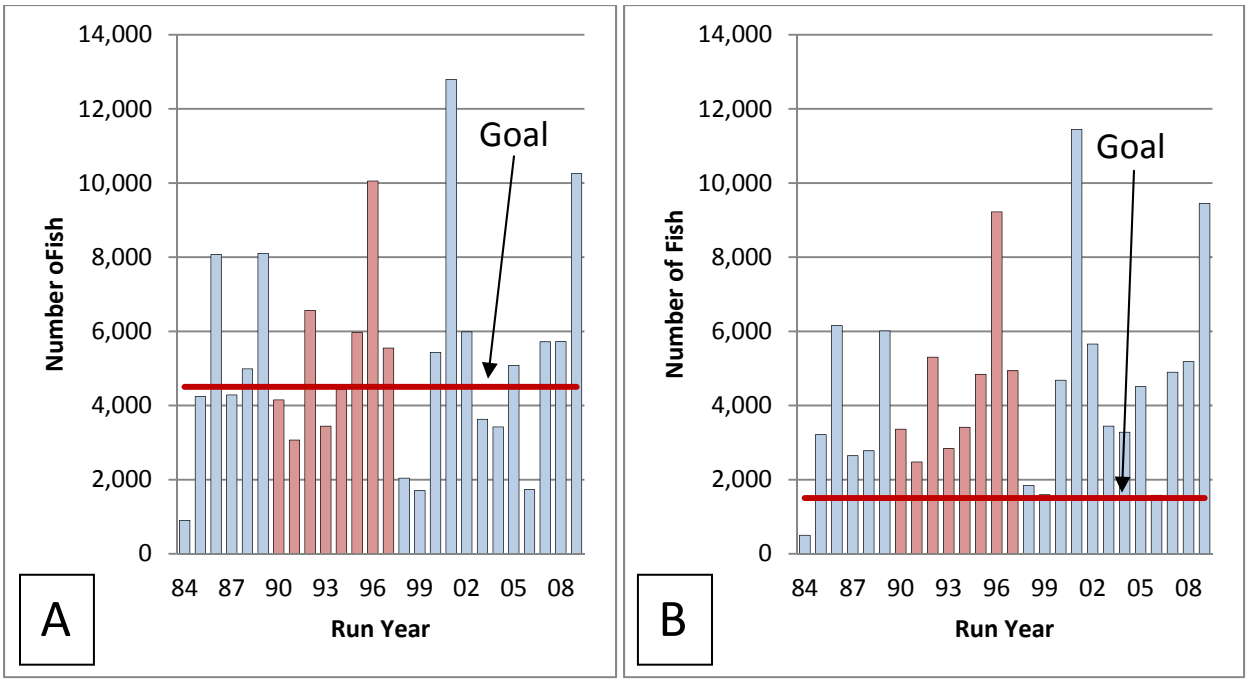

Figure 6. Adult contribution of Wallowa stock summer steelhead to the Columbia River basin (A) or back to the LSRCP project area (B), 1984-2009 run years. Note: years with different color shading during the 1990's are estimated based on Lyons Ferry stock steelhead releases.

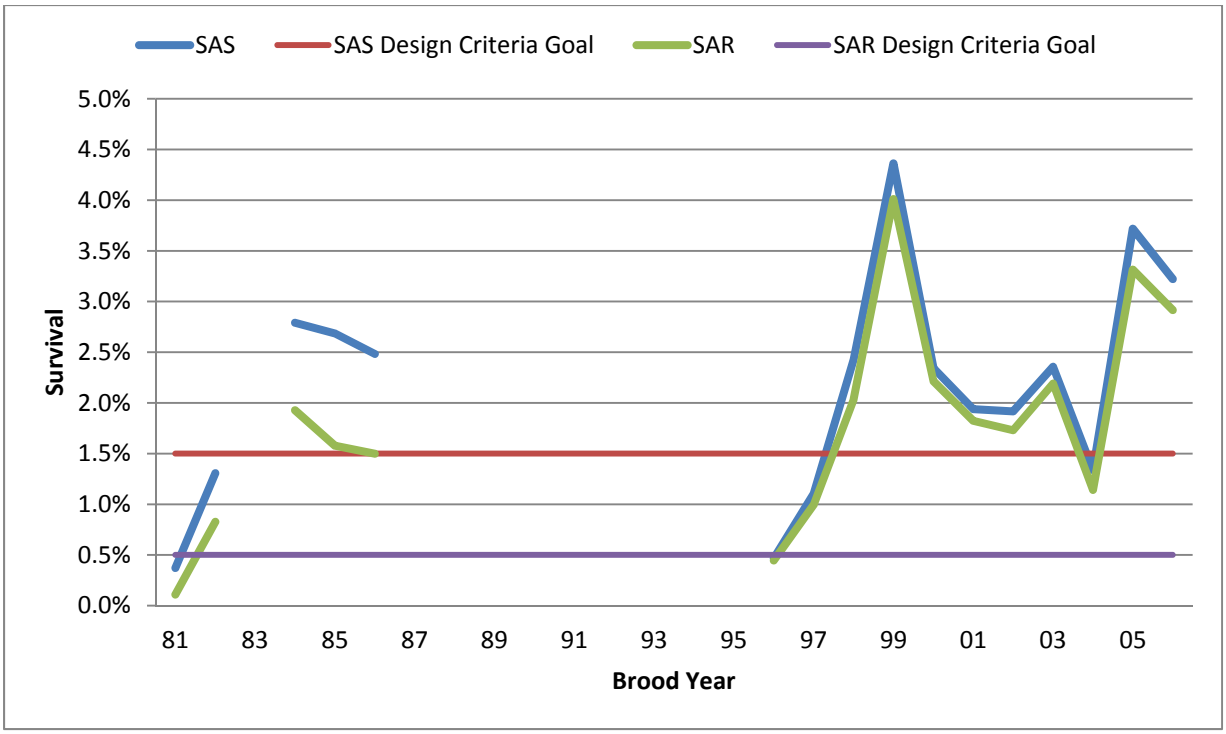

Figure 7. Smolt-to-adult survival (SAS) and smolt-to-adult return (SAR) of WDFW Wallowa stock summer steelhead released into the Grande Ronde Basin.

Currently, Wallowa stock summer steelhead are exploited at very low rates in the ocean and lower Columbia River, but are harvested heavily in steelhead sport fisheries in the main-stem Snake and Grande Ronde rivers (about 58%), with about 33% escaping the fisheries and returning to Cottonwood Creek (Table 2). Mean exploitation rate taken in all fisheries (including those shown as strays because the fish were captured outside of the juvenile migratory route) is 67%. Average stray rate from 2001-2006 brood years as defined by the juvenile migratory route is 6.5%. However, many of the fish defined as strays for this analysis are captured in sport fisheries (Figure 8), with only a very small percentage (10.1% of the total strays by definition) being found in locations (i.e. hatcheries or weirs) at a place and time where they should be considered strays.

The Wallowa stock steelhead had been identified through previous analysis by ODFW, as having large number of fish straying into the Deschutes River, Oregon. Unfortunately, for many years, WDFW did not have coded-wire tags present in our Wallowa stock releases, and there was not terminal trapping location until 1992, so they were not part of the original ODFW analysis. Since that time, WDFW has consistently coded-wire tagged steelhead released from Cottonwood AP. Based on our results (Figures 8 and 9), the WDFW Wallowa stock releases stray into the Deschutes River at a much lower rate than ODFW Wallowa stock steelhead (refer to ODFW presentation). Differences in survival and stray rates following this review have prompted WDFW and ODFW to propose a study which will begin with the 2013 brood to examine effect of rearing facility (Lyons Ferry and Irrigon hatcheries) and release location (acclimated releases from Cottonwood AP, Wallowa AP, and Big Canyon AP) on survival and straying within the Wallowa stock.

Table 2. Catch and escapement of WDFW Wallowa stock summer steelhead, 2001-2006 brood years.

Location	Sub-Area	Brood Year						Mean
		2001	2002	2003	2004	2005	2006	
Ocean		0.3	0.0	0.0	0.0	0.0	0.0	**0.05%**
Columbia River	Sport	2.6	7.2	2.9	4.0	6.1	5.5	4.7
	Tribal	2.8	2.4	3.5	9.6	4.7	3.5	4.4
	Stray Harvest	0.1	0.0	0.1	0.4	0.0	0.2	0.1
	Stray Rack	0.1	0.0	0.5	0.6	0.1	0.3	0.3
	TOTALS							***9%***
Snake River	Sport (Below LGD)	2.8	1.3	3.3	1.0	4.7	0.7	2.3
	Sport (Above LGD)	20.8	18.8	8.5	19.4	24.9	26.0	19.7
	Tribal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Stray Harvest (Below LGD)	0.6	0.5	0.9	0.5	0.3	0.5	0.6
	Stray Harvest (Above LGD)	0.0	4.0	1.9	3.1	8.5	2.8	3.4
	Stray Rack (Below LGD)	0.3	0.3	0.5	0.2	0.1	0.0	0.2
	Stray Rack (Above LGD)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTALS							***26%***
Grande Ronde	**S**port Harvest	43.3	25.0	36.8	29.1	19.8	25.3	29.9
	Stray Harvest	2.3	1.8	1.7	3.3	0.9	0.7	1.8
	Stray Rack	0.0	0.2	0.1	0.0	0.0	0.0	0.1
	TOTALS							***32%***
Escapement to Weir	Cottonwood Creek	24.4	38.5	39.3	28.6	29.9	34.6	***33%***

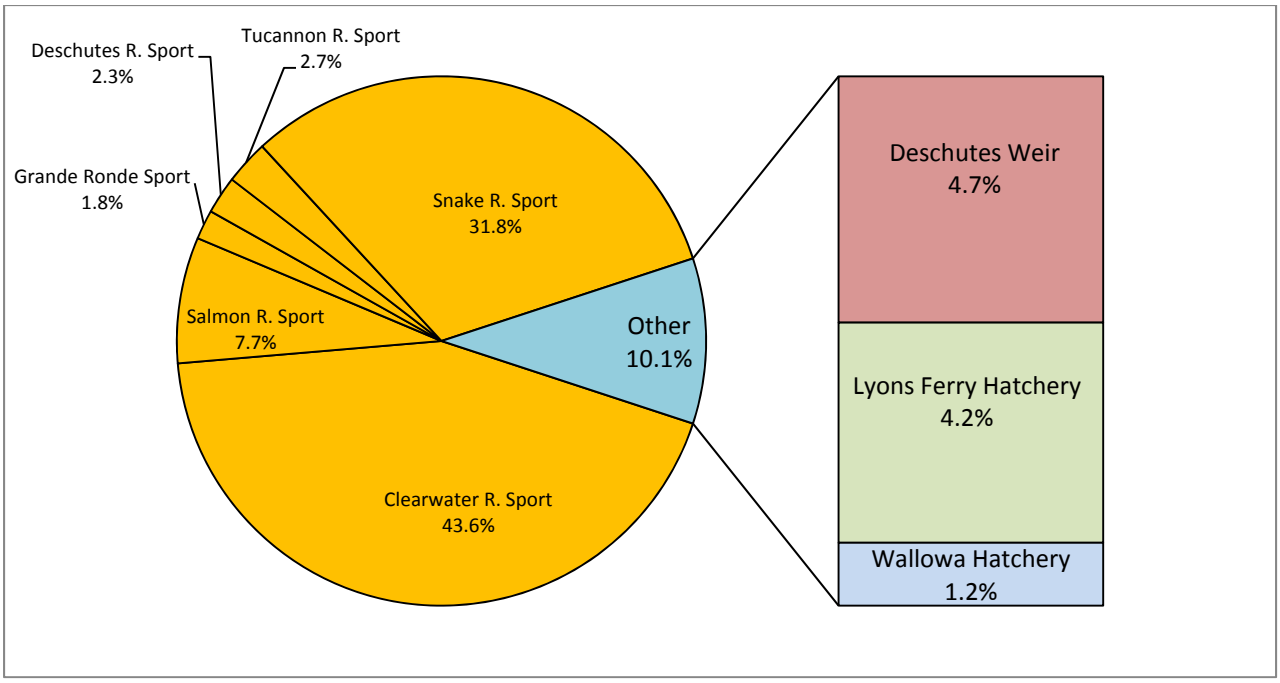

Figure 8. Point of recovery of Wallowa stock summer steelhead (2001-2006 Broods) defined as "strays" in Table 2.

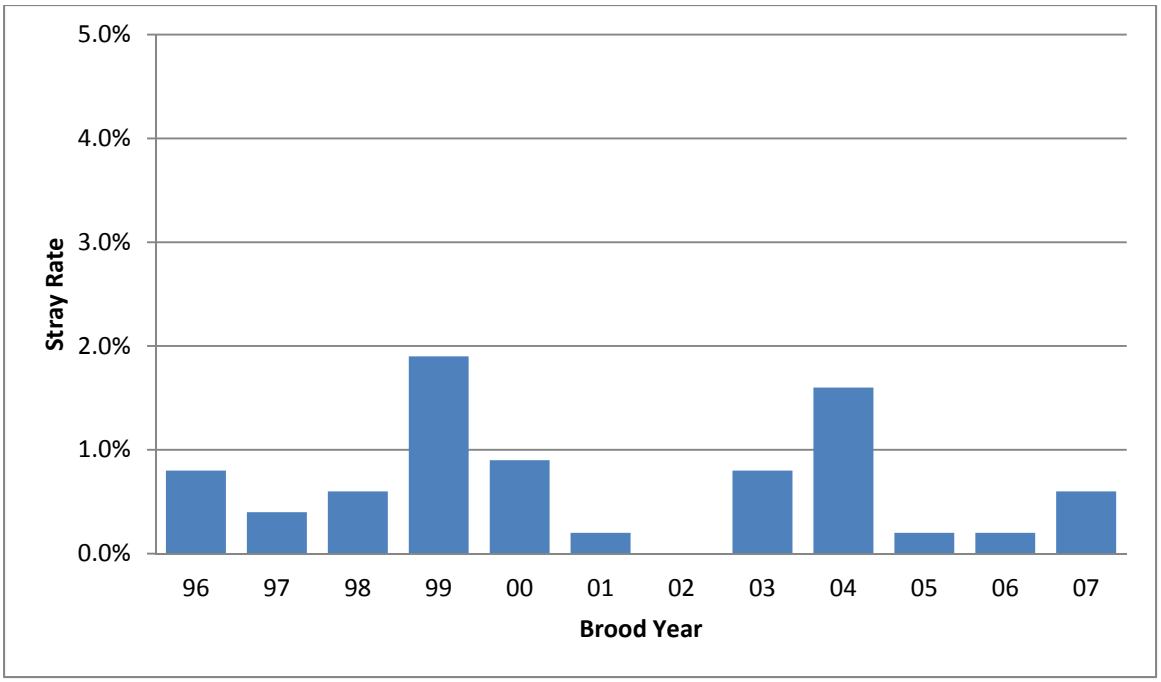

Figure 9. Percent stray rates of WDFW Wallowa Stock summer steelhead into the Deschutes River, Oregon. Percentages based on recoveries within the Deschutes River, and all recoveries upstream in the Columbia and Snake River basins.

The resurgence of sport fisheries in Washington's portion of the Snake and tributary rivers, such as the Grande Ronde River, has been in direct relation to returning large numbers of hatchery fish from the LSRCP program. The steelhead sport fishery in the Grande Ronde River (both Washington and Oregon) is well established and recognized as one of the best in the United States. Within the State of Washington there are 38 river miles open to fishing and steelhead can be retained 319 days of the year. Recent survey information on angler origins indicates that 96% of anglers come from Washington, Oregon, and Idaho, with trip lengths of 1-5 days. Based on a USFWS survey in 2002, we determined a direct cost of ~$1,000 per harvested steelhead, thereby valuing the fishery in the Grande Ronde River (Washington only) between $3-8 million/year (estimates based on harvested steelhead from 2000-2008 Run Years).

The majority of the steelhead harvested within the Washington portion of the Grande Ronde River occurs in the fall and spring (Figure 10A), as winter months can often be too cold, with ice flows in the river limiting fishing opportunities. Based on code-wire tag recoveries from 2008-2009 run years, the ODFW Wallowa stock program contribute the majority of the fish harvested within Washington from September to January (Figure 10B). From February-April, the fishery is dominated by WDFW's Wallowa stock program fish that are returning to the Cottonwood area. Overall, we estimate about 25% of the steelhead harvested within the Grande Ronde River in Washington originated from the WDFW program. From the contribution of both WDFW's and ODFW's Wallowa stock program, the steelhead sport fishery in the Grande Ronde River has greatly increased (Figure 11).

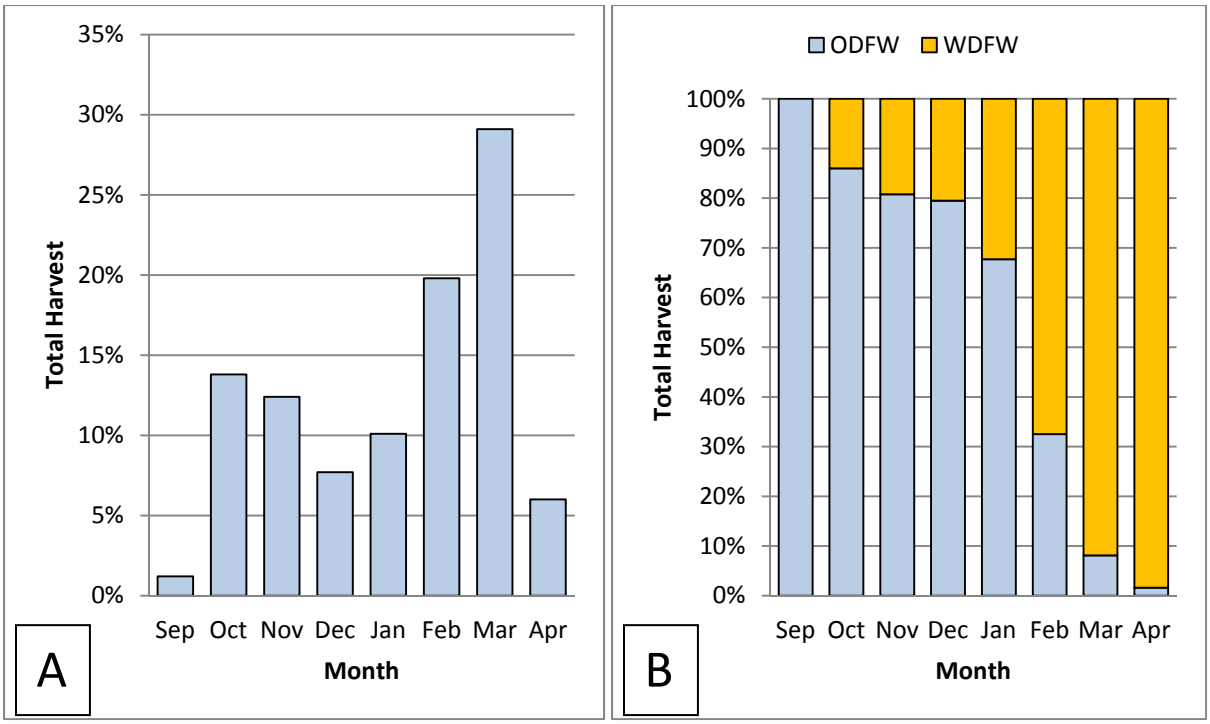

Figure 10. Percent annual steelhead harvest by month in the Washington portion of the Grande Ronde River, 1998-2009 Run Years (A), and contribution of harvested Wallowa stock steelhead by hatchery program, 1998-2009 Run Years (B).

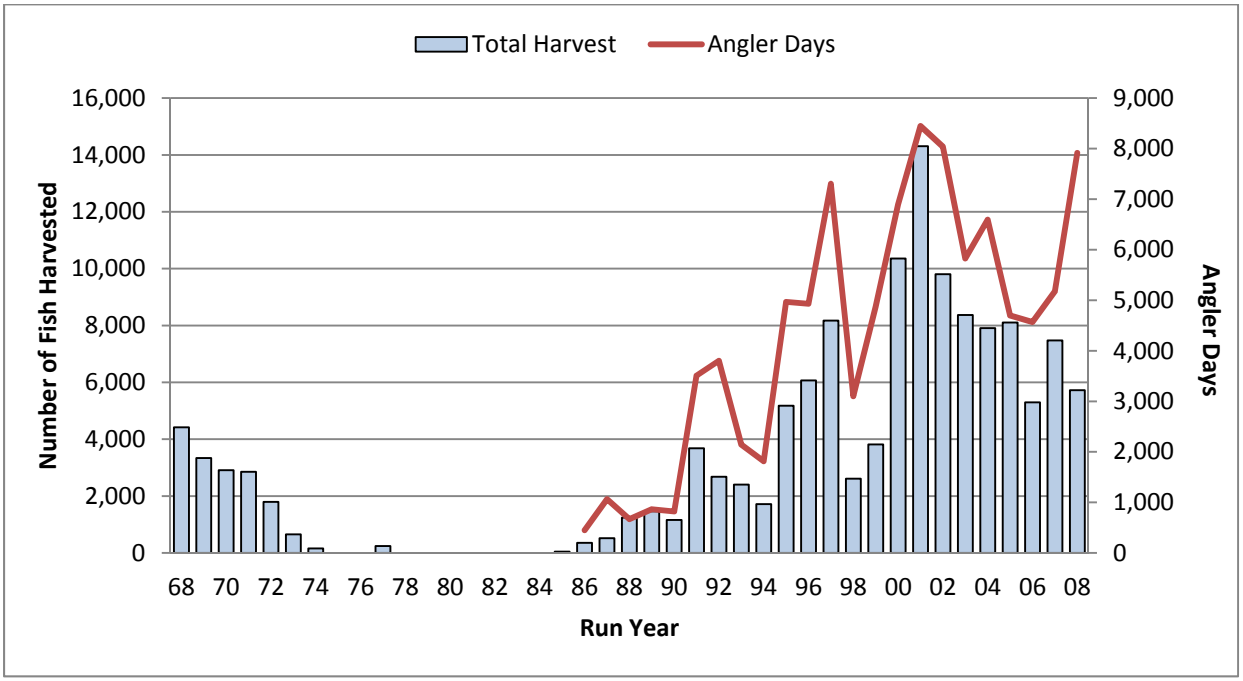

Figure 11. Harvest of steelhead within the Washington portion of the Grande Ronde River (1968-2008), and estimated angler days from 1986-2008.

Increased harvest and an increase in number of angler days (fulfilling program goals), also translate into possible negative effects on wild steelhead populations. As required by NOAA Fisheries to operate our steelhead fisheries within SE Washington, WDFW has compiled a Fishery Management and Enhancement Plan (FMEP) to estimate impacts of fisheries to listed populations of steelhead. During steelhead creel surveys on the Grande Ronde River, samplers collect data on the number of wild fish captured and released. Based on the proportions with hatchery fish retained, and applying a hooking mortality rate of 5%, we estimate that on average about 60 (2.3%) wild Grande Ronde River steelhead are inadvertently killed from the fishery on an annual basis in the Grande Ronde River in Washington (Table 3). Based on the relative low estimated impacts to wild fish, WDFW believes that the creel surveys are adequate in their current design.

Table 3. Estimates of impacts to ESA listed summer steelhead in the sport fishery on the Washington portion of the Grande Ronde River, 1988-2007 run years.

Run Year	Wild (W) SH released	Hatchery (H) SH Kept	Proportion of W to H Kept	Catch Record Card Harvest Estimate	Estimated Wild SH caught	Hooking mortality (5%)[1]	Annual wild steelhead run size estimate[2]	Hooking mortality % of Total
1988	393	647	0.61	465	282	14	3,163	0.4
1989	267	1,014	0.26	844	222	11	3,745	0.3
1990	269	754	0.36	484	173	9	1,393	0.6
1991	412	1,413	0.29	2,284	666	33	2,597	1.3
1992	264	678	0.39	1,423	554	28	2,902	1.0
1993	456	1,282	0.36	1,416	504	25	1,103	2.3
1994	224	726	0.31	1,011	312	16	1,128	1.4
1995	267	1,150	0.23	2,673	621	31	1,199	2.6
1996	283	1,155	0.25	3,387	830	41	1,143	3.6
1997	422	1,417	0.30	4,603	1,371	69	1,311	5.2
1998	355	897	0.40	1,578	625	31	1,408	2.2
1999	508	1,095	0.46	2,191	1,016	51	1,656	3.1
2000	921	2,639	0.35	5,390	1,881	94	3,039	3.1
2001	1,508	3,127	0.48	7,792	3,758	188	6,154	3.1
2002	1,023	2,222	0.46	5,842	2,690	134	6,770	2.0
2003	851	2,189	0.39	4,910	1,909	95	4,374	2.2
2004	1,193	2,068	0.58	4,661	2,689	134	3,458	3.9
2005	1,083	2,871	0.38	4,522	1,706	85	2,716	3.1
2006	755	2165	0.35	3,062	1,068	53	1,421	3.8
2007	394	2217	0.18	4,040	718	36	2,088	1.7
All Years Totals/Average	**11,848**	**31,726**	**0.37**	**62,578**	**23,593**	**1,180**	**52,767**	**2.3**

1 Estimated number of wild steelhead hooking mortalities. Hooking mortality is related to water temperature; as water temperature increases hooking mortality increases (Mongillo 1984; Rawding 2000). A hooking mortality rate of 5% is used because most of the steelhead harvest occurs between October and March when average water temperature in the Snake River was 8.65 ^{0}C, (WDOE – River and Stream Water Quality Monitoring Program – Station#35A150).

2 The estimated annual Snake River wild steelhead run size as counted at Lower Granite Dam (IDFG sampling at Lower Granite Dam). The Grande Ronde River run size was estimated at 15% of that at Lower Granite Dam, as determined in the Lower Snake River Compensation Program (USACE 1975).

WDFW has adapted the Wallowa stock program as needed and has provided a highly successful program; however, a significant objective of the original program remains unmet. Within the Grande Ronde Basin, the status of many natural steelhead populations remains unknown. While some systems, such as Joseph Creek, have been monitored extensively by ODFW (refer to ODFW presentation

for specifics) or more recently the Nez Perce Tribe. Their monitoring efforts would suggest that very few hatchery fish are straying into Joseph Creek. Other major river basins that contain steelhead populations, such as the Wenaha River Basin, have not been monitored at all; mainly due to limited accessibility. In addition, numerous small tributaries that enter the mainstem Grande Ronde River contain steelhead, but are largely unchecked. Limited monitoring of two small tributaries within close proximity to Cottonwood AP (Menatchee Creek, Rattlesnake Creek) would suggest that as high as 80% of the steelhead in those two tributaries are of hatchery origin.

Recognizing that we lack stock status information within the Grande Ronde Basin, and other locations with SE Washington, WDFW has enacted various policies/fishery regulations for protection of wild steelhead. These include: 1) adoption of Wild Steelhead Refuge Areas (Asotin Creek, Joseph Creek, Wenaha River Basin, 2) Restriction of fishing in most headwater areas of streams with wild steelhead present, 3) limitation of directed wild steelhead harvest since 1983, 4) Barbless hooks are required in all Snake River Basin sport fisheries, 5) The daily bag limit of hatchery origin fish was increased from 2 fish/day to three fish/day in 2001, 6) implemented selective gear and closed area regulations for trout/juvenile steelhead and refocused trout fisheries within SE Washington to area lakes stocked with LSRCP fish, 7) Decreased the number of steelhead smolts released and changed their release locations in some rivers to downstream locations to limit their interaction (both as juveniles and returning adults) with wild stocks, and 8) where we operate traps/weirs on tributaries, all mitigation purpose hatchery steelhead are removed upon capture (i.e. Cottonwood Trap, Asotin Creek, Tucannon River, etc…).

SUMMARY AND CONCLUSIONS

Broodstock Development and Management

Originally, ODFW developed the Wallowa stock through trapping of adults at Snake River dams, sharing that stock with WDFW for harvest mitigation within the Grande Ronde. Since 1992, WDFW has generally be able meet its own program needs by trapping adults from Cottonwood Creek. The Wallowa stock (both agencies) remains unchanged.

In-Hatchery Performance

Pre-spawning mortality and egg-to-smolt survival rates have been variable, but within acceptable limits and have not affected overall program performance. Disease incidence within the Wallowa stock has been limited, and has not affected overall program performance. Smolt releases (both target number and size at release) have generally been met, and have not appeared to affect overall program performance.

Survival and Adult Return Performance

Adult return goals (1,500 adults) to the project area have been met in 24 (96%) of the last 25 run years (1984-2009). Total adult returns (4,500 adults) have been met 14 (56%) of the last 25 run years (1984-2009). Smolt-to-adult survival (SAS) and smolt-to-adult return (SAR) has averaged 2.08% (Goal = 2.25%) and 1.72% (Goal=0.75%), respectively. Wallowa stock steelhead returns are exploited in

fisheries at high rates (67%), with most of the current harvest occurring in the Snake and Grande Ronde rivers. About 33% of the steelhead returns annually escape back to Cottonwood Creek. Strays to others hatcheries/traps are very low (0.5% of total returns). Recreational fishing opportunity for summer steelhead has been restored in the Grande Ronde Basin.

Wild Steelhead Stock Status and Data Gaps

The status of wild steelhead populations within the Washington portion of the Grande Ronde is largely unknown. In particular, large and small tributaries within close proximity to Cottonwood Creek and the Wenaha Basin are believed to have hatchery steelhead present, but we currently lack the ability (logistically and financially) to monitor/manage these populations to reduce the effects of the hatchery program on wild steelhead. WDFW has enacted policies/regulations to protect wild steelhead populations within SE Washington.

Hatchery Reform Actions

From the beginning, the WDFW Wallowa stock hatchery program has remained flexible to changing needs/directions that have been provided through ongoing monitoring and evaluation studies, WDFW policy changes, Federal Biological Opinions, Hatchery Scientific Review Group and Hatchery Review Team program reviews, and consultation feedback from NOAA Fisheries on submitted Hatchery Genetic Management Plans (HGMP's) . Program changes that have occurred are:

- The numbers of smolts and release locations have been decreased, and smolt size has been increased. WDFW believes these actions have reduced straying, increased emigration success and survival, and reduced competition and predation effects from residuals.
- Implemented removal of excess hatchery adults at traps/weirs. WDFW believes this action has decreased hatchery fish spawning in target locations and other areas, and has reduced the risk of possible disease transmission (i.e. Cottonwood Adult Broodstock or into the acclimation pond juveniles). In addition, excess adults have been provided to local foodbanks.
- Annually coded-wire tag and PIT tag smolts prior to release. For many years, coded wire tags were not designated for each WDFW steelhead release group, greatly limiting our ability to accurately determine adult returns and survival and assess straying. Beginning in 2001 and 2008 release years, all WDFW LSRCP steelhead releases were tagged with representative groups of coded-wire and PIT Tags, respectively.
- Increasing genetic diversity and fitness of the WDFW Wallowa stock by implementing (when possible) ½ spawning of females. The overall size of the Cottonwood program had been reduced, and concerns were raised about the annual number of spawners used to meet program needs.
- Destroy all eggs from IHNV positive females. If the prevalence of IHNV in broodstock females is high, eggs will be provided by the ODFW Wallowa stock program to meet program needs.
- Installation of handrails at the Cottonwood Adult trap for staff safety.

FUTURE PROGRAM CHALLENGES AND NEEDS

Wild steelhead populations in the Snake River Basin remain depressed. The apparent success of the LSRCP program in Washington (see also the Lyons Ferry program review) to return adult steelhead has had little beneficial effect on wild escapement, but it was never directly intended to rebuild those populations. Program goals and actions may need to be revisited in light of ESA and WDFW policies to preserve/protect/rebuild wild steelhead populations. WDFW is currently tasked with development of Steelhead Management Plans for each steelhead population within the State. Hatchery goals and program actions will be a critical part of those plans, as well as coordinating with Snake River Recovery Plans and HGMP's. Management priorities may differ from those originally established under the mitigation program, and could move management agencies to question whether harvest mitigation programs and wild stock recovery can be conducted/achieved concurrently.

Factors critical to the future success of our program include: 1) Establishment of consistent goals among all managers, 2) wild populations characterization (VSP parameters), 3) Identifying the causes of decline or factors that continue to suppress population productivity, 4) correcting the limiting factors where possible, and 5) retaining flexible hatchery programs. We may need to redefine success for the LSRCP program and for anadromous salmonids in the Snake River basin. We believe that success must include both recovery of depressed wild stocks, and opportunity for Washington's residents to partake of that resource which was lost to them as a result of the construction and operation of the four lower Snake Power Dams. The steelhead fishery currently provided by LSRCP has a significant social and economic impact in the area, and forsaking opportunity solely for recovery will likely cause serious erosion of public support for recovery. Hatchery production has not been the answer to the problem; wild fish populations remain depressed. Correction of survival problems within the basin must occur.