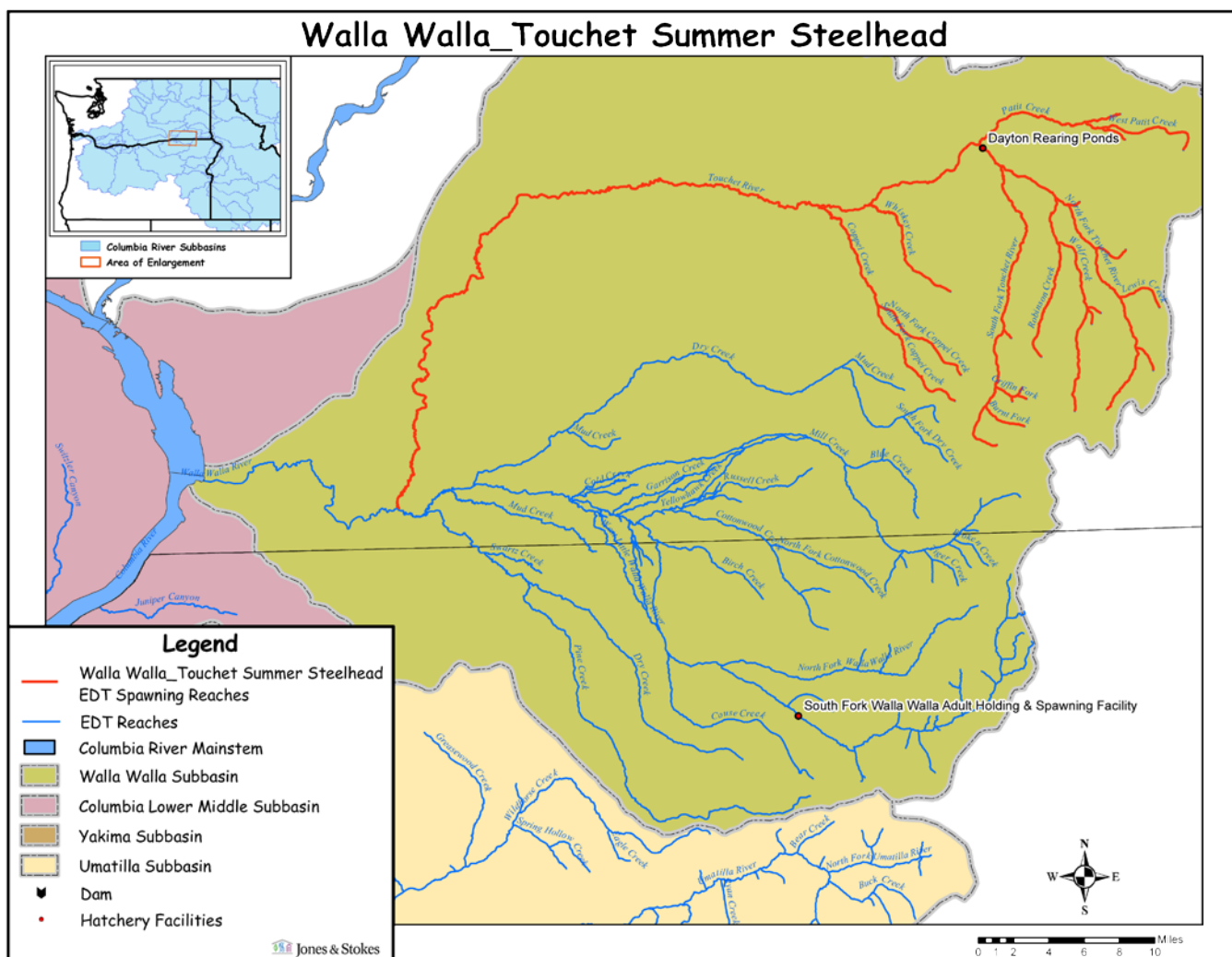


# Hatchery Scientific Review Group Review and Recommendations

## Touchet River Summer Steelhead Population and Related Hatchery Programs

January 31, 2009



Note: Spawning reaches likely vary from those depicted.

# 1 Touchet River Summer Steelhead

The Snake River Salmon Recovery Plan (SRSRP 2007) states that Touchet summer steelhead are an independent population because spawning in the Touchet drainage is distant from spawning areas in the upper Walla Walla (110 km), and because Touchet and Walla Walla fish are genetically distinct (Currens 1997). All spawning occurs in the middle and upper reaches of the Touchet River (above the Coppei Creek confluence), because of high temperatures, high embeddedness/sedimentation and low flows in the lower river. Touchet summer steelhead are part of the mid-Columbia DPS, and part of the Umatilla/WallaWalla MPG. The Touchet population comprises two Major Population Spawning Areas (MaSAs) -- the middle mainstem MaSA (Touchet mainstem and tributaries from Coppei Creek to Patit Creek exclusive of Patit Creek), and the Upper Touchet MaSA (Touchet mainstem and tributaries above Patit Creek). The population also includes one Minor Spawning Area, Patit Creek and tributaries (Oregon Mid-Columbia Recovery Plan 2007).

Spawning occurs in the mainstem Touchet and such tributaries as the North Fork Touchet River, South Fork Touchet River, Wolf Fork Touchet River, Coppei Creek and Patit Creek. A few spawners begin entering the Walla Walla River in June but high temperatures and low flows cause most to enter in the late winter and early spring. Spawning begins in February, peaks in early to mid April and ends in May. Spawners are 60-65% 1-salt and 40-35% 2-salt. The incidence of repeat spawners in the Touchet River is approximately 5%, but about 7% of Walla Walla fish are repeat spawners. Fry emerge May-June, rear in the Touchet drainage above Coppei Creek (near Waitsburg, WA) and smolt primarily as two-year-olds. Some of the highest densities of juvenile *O. mykiss* observed in the Walla Walla Subbasin occur in the forks of the Touchet River, and upper Patit Creek. Outmigration begins in February, peaks in April and ends in June (SRSRP 2007). Rainbow trout are sympatric with Touchet steelhead, and interbreeding does occur (G. Mendel, WDFW, personal communication). Accordingly, rainbow trout are included in the DPS and are considered a “mitigating risk factor” (BRT 2003).

The abundance of the historical Touchet River steelhead population has been estimated at about 1,800 fish and current abundance is estimated at 442 (SRSRP 2007). From 1997 – 2001, natural-origin recruits (NORs) comprised 84% of the return at the Dayton, WA, adult trap, but the proportion of NORs was 91% earlier (1987 – 1996). The hatchery fish observed at the trap are primarily Lyon’s Ferry stock (originally Wells stock) and are not part of the DPS. The hatchery fish intercepted at the Dayton trap are recycled to the lower Touchet for harvest, but some still contribute to the natural spawning escapement because the trap is not fish-tight at high flows.

An incidental terminal harvest rate of 10% has been estimated for Touchet River NORs while the terminal harvest rate on hatchery-origin recruits (HORs) has been estimated at 30% (CBFWA Program Amendment Process 2007).

## 2 Current Conditions

### 2.1 Current Population Status and Goals

This section describes the current population, status, and goals for the *natural* population.

- ESA Status: This population is part of the Mid-Columbia Steelhead Distinct Population Segment and is listed as Threatened under the ESA.

- Population Designation: Using a rating system similar to that used by the recovery planners for the Lower Columbia and Willamette, this population would be designated as Primary.
- Current Viability Rating: Intermediate
- Recovery Goal for Abundance: 1,000
- Productivity Improvement Expectation: Productivity: 3.12; Capacity: 1,610 (Draft Mid-Columbia Steelhead Recovery Analysis, NOAA 2008)
- Habitat Productivity and Capacity (from EDT): Productivity: 1.7; Capacity: 691

## 2.2 Current Hatchery Programs Affecting this Population

Two hatchery programs occur within the Touchet River drainage, a segregated harvest program utilizing out-of-DPS stock, and an integrated program using NORs captured at the adult trap at Dayton. The segregated program began in 1983, and between 1983 and 1990 used a variety of stocks -- Wells, Wallowa, Ringold, and Lyons Ferry. Since 1991 only the Lyons Ferry Hatchery stock has been used.

The segregated program releases age-1 smolts at ~4.5 fpp from an acclimation pond in Dayton, WA (RM 54 Touchet River near Patit Creek confluence). Historically, the mean number of fish released per year has been 116,000 (CBFWA Program Amendment Process 2007). In recent years, the mean number released has been 85,000 per year. Releases are volitional between early March until late April, and forced thereafter. All smolts are adipose-clipped and a minimum of 20,000 are ventral clipped as well. In recent years a proportion have also been PIT-tagged. WDFW estimates that about 20% of the returning hatchery adults from the Lyons Ferry program are recovered either at Lyons Ferry Hatchery or in traps in the Walla Walla River. The remaining fish are either harvested or spawn naturally. Biologists attending CBFWA program amendment workshops in 2007 estimated that the about 1,200 Lyons Ferry fish return to the Touchet River each year, of which ~10% spawn naturally. However, most of the hatchery origin spawners in the natural escapement in the upper Touchet (above the trap RM 54) are fish released from the endemic, integrated program. Lyons Ferry adults captured at the Dayton trap have been recycled ~10 miles downstream (to Waitsburg, WA) to augment harvest and limit introgression with the endemic stock, however, they are currently being removed. Differentially marked returns from the endemic program are passed upstream at the Dayton trap.

The endemic program collects ~36 unmarked NORs for broodstock. Between 2000, when the program began, and 2004, an average of 52,982 yearling smolts (range 31,440 – 58,733) have been released *above* the Dayton trap (RM 57.2) without acclimation. Release dates have varied from early April to early May based on stream flow conditions and expected size of fish at release. Although the programmed size at release is 4.5 fpp, the actual size at release has been less, ranging from ~4.9 to ~6.7 fpp. None of the endemic stock smolts are ad-clipped, to reduce harvest losses and facilitate monitoring and evaluating this stock. However, all fish are coded-wire tagged in the snout and a VI tag is placed in the adipose eye tissue for external identification. If the endemic program proves successful, Lyons Ferry releases may be halted and the endemic program expanded.

Estimated number of hatchery strays affecting this program:

- Hatchery strays from in-basin integrated hatchery program: 197 fish
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 204 fish

### 3 HSRG Review

The HSRG has developed guidelines for minimal conditions that must be met for each type of program as a function of the biological significance of the natural populations they affect. For populations of the highest biological significance, referred to as Primary, the proportion of effective hatchery-origin spawners (pHOS) should be less than 5% of the naturally spawning population, unless the hatchery population is integrated with the natural population. For integrated populations, the proportion of natural-origin adults in the broodstock should exceed pHOS by at least a factor of two, corresponding to a proportionate natural influence (PNI) value of 0.67 or greater. For Contributing populations, the corresponding guidelines are: pHOS less than 10% or PNI greater than 0.5. It is important to note that these represent minimal conditions, not targets. For example, the potential for fitness loss when effective pHOS is 5% is significantly greater than it would be at 3%. For Stabilizing populations, we assume the current pHOS or PNI would be maintained.

The HSRG analyzed the current condition and a range of hatchery management options for this population, including the effect of removing all hatchery influence, and arrived at one or more proposed solutions intended to address the manager's goals consistent with the HSRG guidelines for Primary, Contributing, and Stabilizing populations. The solution included in the cumulative analysis is the last option described in the Observations and Recommendation box below.

In order to highlight the importance of the environmental context, two habitat scenarios were considered: current conditions and a hypothetical 10% habitat quality improvement. See HSRG Observations and Recommendations in the box below for more information.

#### 3.1 Effect on Population of Removing Hatchery

The No Hatchery scenario is intended to look at the potential of the natural population absent all hatchery effects with projected improved fish passage survival in the Snake and Columbia mainstem (FCRPS Biological Opinion May 5, 2008).

Our analysis estimated Adjusted Productivity (with harvest and fitness factor effects from AHA) would increase from 1.3 to 1.6. Average abundance of natural-origin spawners (NOS) would decrease from 345 to 243 fish. Harvest contribution of the natural and hatchery populations would go from 1,396 to 25.

#### 3.2 HSRG Observations/Recommendations

In the Observation and Recommendation box below we describe elements of the current situation (Observations) that were important to evaluate the natural population and where applicable, the hatchery program(s) affecting that population. We also describe a solution (Recommendations) that appeared to be consistent with manager's goals; however, this is not the only solution. In some cases more than one solution is described.

Summary results of this analysis are presented in Table 1. The adjusted productivity values reported for each alternative incorporates all factors affecting productivity (i.e., habitat quality, hatchery fitness effects, and harvest rates).

### **Observations**

The WDFW operates both an integrated conservation and segregated harvest program within the Touchet subbasin. Releases for the segregated program are imported annually from Lyons Ferry Hatchery (85,000 smolts acclimated at the Dayton Pond). Smolt releases from the segregated program occur below primary rearing and spawning reaches of the Touchet River.

The existing integrated program (50,000 smolts with a 100% pNOB are hauled and planted directly from Lyons Ferry Hatchery) is operated consistent with the criteria for a Primary population; however, strays from the segregated harvest program constitute more than 10% of the effective natural spawners (basin-wide) and likely pose an ecological and genetic risk to the population. This is not consistent with the standards for a Primary population. An adult trap is located within the City of Dayton; however, it has limited potential for controlling hatchery fish since adult steelhead can pass without entering the trap. A new facility has been constructed and its capabilities are unknown. Comments on smolt quality (size, size variation, degree of Smoltification) by managers indicate it may be affecting SAR of the integrated conservation program. Adults from both Lyons Ferry hatchery and the endemic stock also appear above Lower Granite Dam.

Low natural productivity in the Touchet limits abundance and management options for the population.

### **Recommendations**

The HSRG solution transitions the broodstock collection of Lyons Ferry Hatchery stock to sites within the Walla Walla and Touchet in place of current broodstock collection at Lyons Ferry Hatchery to aid in local adaptation. The solution maintains the current release numbers in the Walla Walla but reduces them in the Touchet River. In addition to the integrated program (49,000 smolts), a segregated program of approximately 20,000 smolts could be operated consistent with the designation of a Primary population if 90% of the returning unharvested adults were removed. Smolts from the integrated program should be acclimated in areas of their intended return.

A single integrated program of approximately 70,000 smolts could be managed consistent with a Primary population designation. Expanding the program beyond this level would require habitat enhancements to improve productivity and the development of facilities to trap and control adults on the spawning ground.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Touchet River Summer Steelhead. The light green row indicates the natural population and yellow indicates the segregated hatchery population, if applicable. A 10% habitat improvement is applied to the HSRG Solution to evaluate the additional effect of improved habitat towards conservation objectives.

Alternative	Type and Purpose	Prog Size (/1000)	HOR Recapture	Additional Weir Efficiency	Effective pHOS	PNI	NOS Esc	Adj Prod	Harvest	Hatchery Surplus
Current	Int Cons	49.2	0%	0%	43%	0.70	345	1.3	60	0
	Seg Harv	84.4	26%						1,336	126
No Hatchery	None None	-	0%	0%	0%	1.00	243	1.6	25	-
HSRG Solution	Int Cons	49.2	35%	0%	49%	0.67	343	1.3	104	221
	Seg Harv	21.1	90%						334	109
HSRG Solution w/ Improved Habitat	Int Cons	49.2	35%	0%	46%	0.69	398	1.4	110	221
	Seg Harv	21.1	90%						334	109