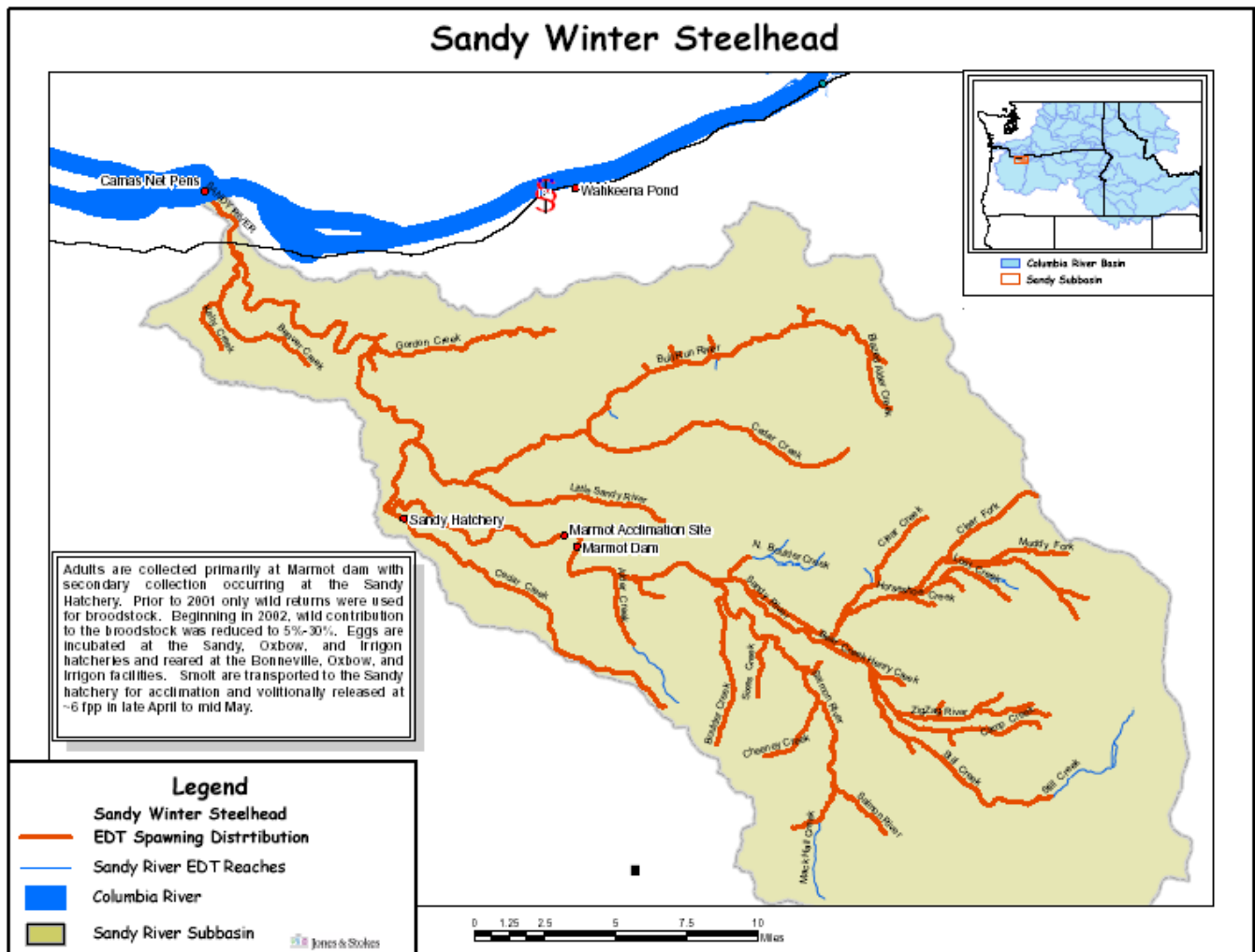


Hatchery Scientific Review Group Review and Recommendations

Sandy River Winter Steelhead Population and Related Hatchery Programs

January 31, 2009



1 Sandy River Winter Steelhead

Winter steelhead in the Sandy River return from December to May and spawn from February to June. Spawning occurs mainly in the Sandy River and all major tributaries. Annual abundance data are available from Marmot Dam counts. The population long-term geometric mean is about 850 natural-origin spawners, which is in the viable minimum abundance threshold category. However, productivity appears to be very low and appears to be associated with a high proportion of hatchery-origin spawners. Hatchery fish are no longer released in or passed into natural production areas upstream from Marmot Dam. It is too soon to determine whether these changes will improve the status of Sandy steelhead, but that is the intent. Significant portions of the historical winter steelhead habitat in the Sandy have been blocked by dams in the Bull Run and Little Sandy watersheds. Large areas of productive high quality habitat remain accessible to steelhead in the remainder of the basin, particularly in the forested upper basin. The long-term effects of the steelhead hatchery program, along with habitat degradation and harvest, have likely reduced diversity of the population.

2 Current Conditions

2.1 Current Population Status and Goals

The Sandy River Winter Steelhead population is a viable indigenous population that is listed as a component of the threatened Lower Columbia River Steelhead DPS. The hatchery program is an integrated harvest augmentation and mitigation program to provide benefits in selective fisheries in the Lower Columbia and Sandy River.

- **ESA Status:** This population is listed as threatened and is part of the Lower Columbia Steelhead DPS.
- **Population Description:** Information is not available, but the population is likely a primary and genetic legacy.
- **Current Viability Rating:** There was no specific viability goal for this population; however, with an abundance of ~1500 fish, this population meets the minimum abundance threshold for a population with a High viability goal.
- **Recovery Goal for Abundance:** None identified
- **Productivity Improvement Expectation:** Unknown
- **Habitat Productivity and Capacity (modified from EDT):** Productivity: 3.0; Capacity: 2,500

2.2 Current Hatchery Programs Affecting this Population

There are currently two steelhead programs in the Sandy River, an integrated winter harvest program of 160,000 smolts and a segregated summer program of 75,000 smolts.

The winter steelhead hatchery program began in 1955, and a mix of out-of-basin hatchery fish was used as broodstock. Most recently, Big Creek adults were used for broodstock. Brood year 2000 was the first year that all broodstock were from the Sandy River naturally produced population. Broodstock are collected at Marmot Dam (primary site) and at the Sandy Hatchery (secondary site) as unmarked wild Sandy River Winter Steelhead. The broodstock goal is 114

wild adults. There is a long-term goal of reducing the wild portion of the broodstock to 30%. Spawning occurs at the Sandy Hatchery with a goal of producing 160,000 smolts. Eggs are incubated at Sandy, Oxbow, and Irrigon hatcheries. Fry are reared at Oxbow, Irrigon and Bonneville hatcheries. Smolts are acclimated for 2-3 weeks at Sandy Hatchery and volitionally released at 6 fpp in April/ May.

The Sandy River Summer Steelhead Program uses South Santiam stock (stock 024) summer steelhead (*Oncorhynchus mykiss*). The South Santiam stock summer steelhead originated from Skamania stock summer steelhead. The wild population of steelhead in the Sandy River Basin is part of the Lower Columbia River Steelhead DPS, and is listed as threatened. The hatchery-produced summer steelhead population is not considered part of the Lower Columbia River Steelhead ESU and is not listed.

Summer-run steelhead are not considered indigenous to the Sandy River Basin, but evidence suggests they do exist, although not in self-sustaining numbers. Because there are few naturally produced summer steelhead adults, adult steelhead (South Santiam hatchery stock) returning to the South Santiam River are collected at the Foster Dam trap and used as broodstock for this program. Broodstock are held and spawned at the South Santiam Hatchery. Eggs are incubated through the eyed-stage at the South Santiam Hatchery, after which a portion is sent to both Bonneville Hatchery and Oak Springs Hatchery. Further egg incubation and juvenile rearing takes place at these two locations. Smolts are then sent to the Sandy Hatchery for final acclimation and release.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated hatchery program: 63 fish
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 20 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 PNI (proportionate natural influence) 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 remain at 2.8. Average abundance of natural-origin spawners (NOS) would increase slightly from approximately 1483 to approximately 1664. Harvest contribution of the natural and hatchery populations would go from approximately 1,316 fish to approximately 114 fish.

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).

Observation

There is an integrated winter steelhead hatchery program that releases 160,000 smolts. This program is consistent with management as a Primary population.

There is also a segregated summer steelhead program that releases 75,000 smolts. There is no indigenous summer steelhead population. It is assumed that there is spatial and temporal separation; therefore, there appears to be little genetic or ecological effect of this program on the winter steelhead.

Broodstock is collected and juveniles are reared out-of-basin. Smolts are acclimated and released locally. The practice of out-of-basin rearing introduces additional disease risk and may reduce homing fidelity.

The upper Sandy River is managed as a wild fish management zone.

Recommendations

We have no specific recommendations to improve these programs; however, it is important to continue to evaluate methods of broodstock collection, to monitor straying and to remove surplus hatchery fish.

Monitor the assumed spatial and temporal separation of the populations.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Sandy River Winter 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 Harv	159.9	92%	0%	3%	0.97	1,483	2.8	972	726
	Summer Stlhd Seg Harv	75.0	95%						344	299
No Hatchery	Int Harv	-	0%	0%	0%	1.00	1,664	2.8	114	-
HSRG Solution	Int Harv	159.9	92%	0%	3%	0.97	1,482	2.8	972	726
	Summer Stlhd Seg Harv	75.0	95%						344	299
HSRG Solution w/ Improved Habitat	Int Harv	159.9	92%	0%	3%	0.97	1,756	3.1	991	726
	Summer Stlhd Seg Harv	75.0	95%						344	299