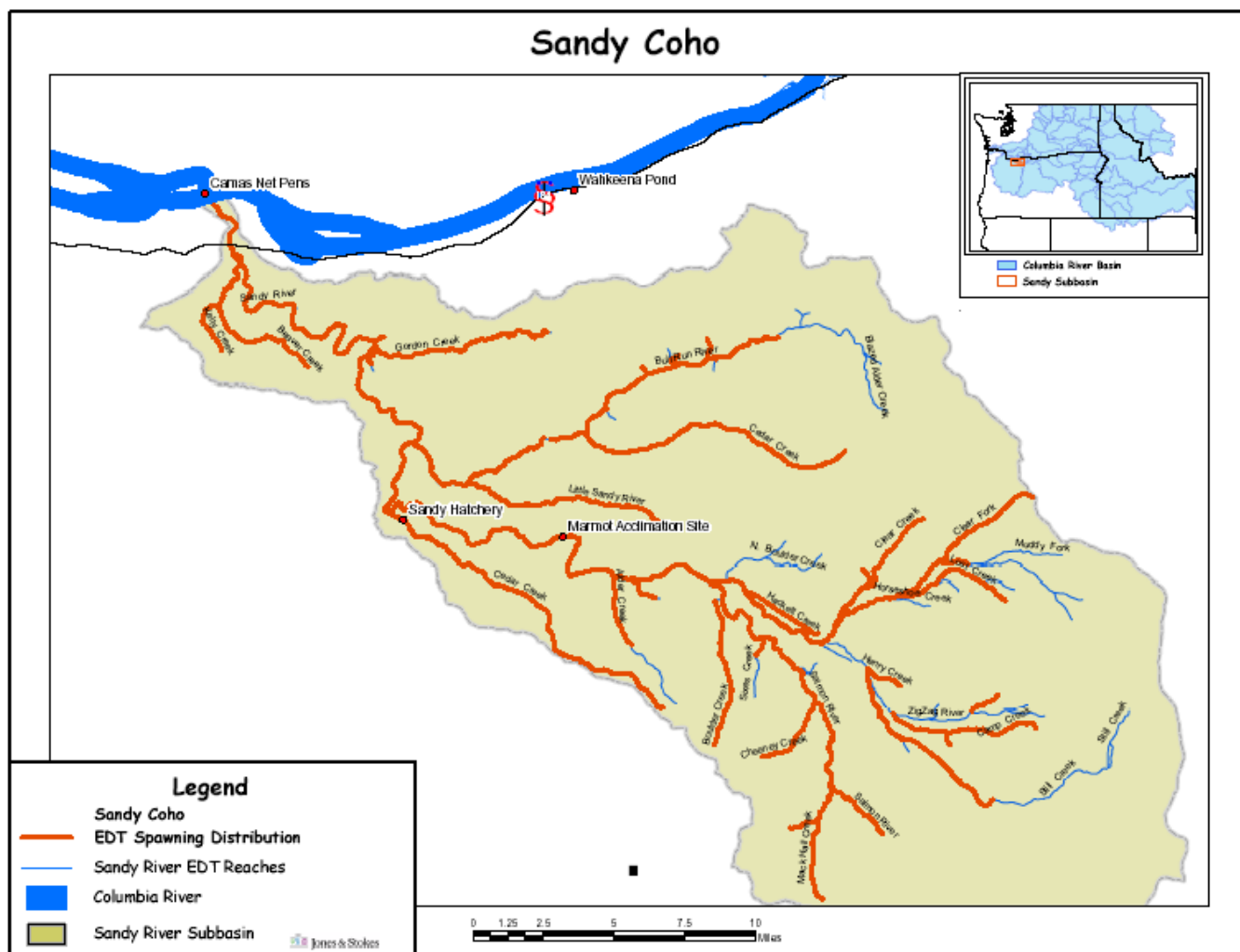


Hatchery Scientific Review Group Review and Recommendations

Sandy River Coho Population and Related Hatchery Programs

January 31, 2009



1 Sandy River Coho

The wild population of coho salmon in the Sandy River is part of the Lower Columbia River coho salmon Evolutionarily Significant Unit (ESU) and is listed as threatened under the federal Endangered Species Act (ESA), effective July 2005. Sandy River coho also are listed as endangered under the Oregon State Endangered Species Act. Habitat conditions below Marmot Dam are slightly to moderately impaired. Above Marmot Dam, habitat conditions are generally better than below. Blockages of Bull Run and the Little Sandy River significantly reduce the distribution of coho. Additionally, poor conditions in the lower river may reduce or restrict utilization by coho salmon (McElhany et. al. 2004).

2 Current Conditions

2.1 Current Population Status and Goals

The naturally spawning coho population in the Sandy is relatively healthy. Information provided by ODFW suggests that this primary population is meeting the highest viability standard.

- **ESA Status:** This population is listed as threatened and is part of the Lower Columbia River Coho ESU.
- **Population Description:** Sandy River coho are designated a Primary population. The segregated hatchery program in the Sandy was originally derived from the Sandy population; no other stocks have been imported. No other hatchery-origin coho have been observed returning to the Sandy River Hatchery. The contribution of hatchery fish to natural spawning is relatively small (<5%).
- **Current Viability Rating:** High
- **Productivity Improvement Expectation:** Habitat productivity and capacity estimates provided by McElhany et. al. (2007 Draft) are 6.09 and 13,665. Values derived from EDT analysis were significantly lower (4.25 and 3,180, respectively). Based on EDT assumptions, the adjusted productivity (accounting for harvest and hatchery effects) is about 4, with an average natural-origin escapement of about 8,000-9,000 fish.

2.2 Current Hatchery Programs Affecting this Population

The Sandy River coho program is managed as a segregated hatchery program. The current program utilizes only hatchery-produced Sandy River coho returning to the Sandy Hatchery and/or Marmot Dam as broodstock. The limited number of returning hatchery adults that migrate upstream of Cedar Creek were segregated from the naturally spawning wild population through sorting operations at the recently-removed Marmot Dam fish collection facilities.

Adults are collected at Sandy Hatchery where they are held, spawned, incubated and reared. Smolts are released at about 13 to 15 fish per pound directly from the hatchery into Cedar Creek in two release groups, one in April and one in May.

- The program currently releases ~ 700,000 smolts
- Analysis based on the more conservative EDT productivity estimates suggest a pHOS of about 13%.

- Harvest contributions exceed 5,000 (from both natural and hatchery production).
- Hatchery returns exceed broodstock needs.
- Modeling suggests that stray coho from Bonneville Hatchery releases are a problem; however, very few marked coho have been observed at the Marmot Dam trapping facility.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: approximately 584 fish

Population(s) directly affected by the program are:

- Lower Columbia River coho - Lower Columbia River coho salmon are present in numerous Oregon tributaries to the lower Columbia; however, coho observed in some of these subbasins are hatchery stocks and few wild fish are present. An exception to this is the small, self-sustaining populations in the Sandy and Clackamas rivers and small, self-sustaining populations of naturally-produced coho in Scappoose Creek, Clatskanie River, and above Willamette Falls. The population above Willamette Falls is of hatchery-origin.

Population(s) Indirectly Affected by the Program: All ESA-listed species occupying habitat in the lower Sandy River and/or the lower Columbia River migration corridor(s) may be affected by the presence of Sandy River (hatchery) coho salmon. While the potential exists for negative impacts, no direct effect has yet to be quantified regarding which, if any, of these populations are affected, and in what way. It is believed that any incidental impact to listed species will be minimal, based upon risk-aversion measures of the hatchery program identified in this HGMP. Listed species are identified below.

- Lower Columbia River Chinook - The Lower Columbia River Chinook salmon ESU was listed as threatened under the ESA, effective May 24, 1999. This ESU includes all naturally spawned Chinook populations residing below impassable natural barriers (e.g., long-standing, natural waterfalls) from the mouth of the Columbia River to the crest of the Cascade Range just east of the Hood River in Oregon and the White Salmon River in Washington. This ESU excludes populations above Willamette Falls, as well as Clackamas River spring Chinook. Within this ESU, there are historic runs of three different Chinook salmon populations: spring-run, tule, and late-fall “bright” Chinook salmon.
- Columbia River Bull Trout - The USFWS issued a final rule listing the Columbia River population of bull trout as a threatened species on June 10, 1998. The Hood River Recovery Unit forms part of the range of the Columbia River population and encompasses the Sandy River subbasin.
- Lower Columbia River Steelhead - The Lower Columbia River steelhead ESU was listed as threatened under the ESA on March 19, 1998. This ESU contains tributaries to the Columbia River between the Cowlitz and Wind rivers in Washington, inclusive, and the Willamette and Hood rivers in Oregon, inclusive. Excluded are steelhead in the upper Willamette River Basin above Willamette Falls, and steelhead from the Little and Big White Salmon rivers in Washington.
- Lower Columbia River Chum - The Lower Columbia River chum salmon were listed as a threatened species on March 25, 1999. The ESU includes all naturally spawning populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon.

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 3.2 to 5.1. Average abundance of natural-origin spawners (NOS) would increase from approximately 7,300 fish to approximately 10,300 fish. Harvest contribution of the natural and hatchery populations would go from approximately 5,400 fish to approximately 1,900 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).

Observations

Very few marked coho have been observed at the collection facility at Marmot Dam. The West Coast Salmon and Steelhead Status Review (NOAA 2005) estimated a 97 percent homing rate. The current segregated hatchery program (700,000 smolts) is operated consistent with a designation of Sandy coho as a Primary population and meets both conservation and harvest goals.

Recommendations

Continue to monitor the contribution and distribution of hatchery fish on the spawning grounds.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Sandy River Coho. 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	None None	-	95%	0%	6%	0.00	7,294	3.2	1,323	0
	Seg Harv	700.1	95%						4,099	5,792
No Hatchery	None None	-	0%	0%	0%	0.00	10,321	5.1	1,872	-
HSRG Solution	None None	-	95%	0%	2%	0.00	9,536	4.6	1,748	0
	Seg Harv	700.1	97%						5,381	4,684
HSRG Solution w/ Improved Habitat	None None	-	95%	0%	2%	0.00	10,892	5.1	1,997	0
	Seg Harv	700.1	97%						5,381	4,684